

Special Commentary — February 22, 2022

Digital Revolution: Will Cryptocurrencies Take Over the World?

Compendium

Summary

There are no features of the current monetary system that necessarily make it the final stop in the evolution of money. In that regard, cryptocurrencies, which exist in electronic form only, have come into use as a medium of exchange in recent years.

Moreover, the explosive growth in digital currencies, which did not even exist prior to 2009, is a testament to some of their qualities that make them a better medium of exchange than paper money. But one of the most notable drawbacks to some cryptocurrencies is their extreme price volatility. For example, the price of Bitcoin has dropped roughly 35% on balance since its peak in November, and daily changes of 10% are not uncommon. This volatility derives from the limited supply of many cryptocurrencies. Prices can fluctuate widely as demand shifts back and forth along an inelastic supply curve. Due to this high degree of price volatility, many cryptocurrencies are not good "stores of value," at least not over short periods of time. Furthermore, the limited supply of these digital currencies could potentially lead to price deflation of goods and services.

So, what does the future hold? For starters, digital currencies have established a firm foothold in the global financial system, and they are simply not going away, in our view. But we believe that cryptocurrencies with inelastic supplies and significant price volatility (e.g., Bitcoin and Ether) will play a limited role as a form of money. Money has three functions: it is a medium of exchange, a unit of account and a store of value. Digital currencies such as Bitcoin and Ether are currently being used as a medium of exchange, but only to a limited extent. Rather, the vast majority of transactions today continue to be made in national currencies (e.g., U.S. dollars, euros, etc.) Their use as a unit of account is also quite limited at present. That is, prices of most goods and services continue to be denominated in national currencies, not in terms of specific cryptocurrencies.

We recently finished an 4-part series of reports on digital currencies, both public and private, and the future potential of Central Bank Digital Currencies (CBDCs). We gather all of the individual reports together in this compendium piece.

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Part I: Are Cryptocurrencies Really "Money"?

Part I: Summary

The form that money takes has evolved over the centuries. Most recently, fiat money and bank deposits replaced gold and other precious metals as the predominant form of money. Will cryptocurrencies (a.k.a. digital currencies) supplant paper money and bank deposits?

- According to most economics textbooks, money has three main functions: it is a medium of exchange, a unit of account and a store of value.
- Digital currencies are already being used as a medium of exchange, but their use as a unit of account is more limited at present. That is, prices of most goods and services continue to be expressed in national currencies, not in terms of digital currencies per se.
- Cryptocurrencies can offer a store of value, at least in a long-run sense. However, the extreme price volatility of many digital currencies implies that individuals and businesses can experience meaningful short-term losses. Furthermore, there has been no issuance to date of crypto-denominated securities (i.e., stocks and bonds), to the best of our knowledge.
- There are a number of benefits of digital currencies. Payments can be made essentially instantaneously *via* cryptocurrencies, and these transactions can be made secretly. They can also be a good inflation hedge.
- But digital currencies also possess a number of notable drawbacks. Secrecy can enable illicit activities, and their limited supply could potentially lead to a deflationary situation.
- Stablecoins, which are digital currencies whose prices are essentially tied to another asset such as the U.S. dollar, may offer some of the benefits of cryptocurrencies without some of their notable drawbacks. We will discuss so-called "stablecoins" in Part II before turning our focus to central bank digital currencies in Part III. We will offer conclusions in the fourth and final report in this series.

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Will National Currencies Go the Way of the Horse & Buggy?

Humans have been engaging in voluntary and welfare-enhancing exchange of goods and services for millennia. Initially, these exchanges were transacted via barter. For example, an individual in ancient Mesopotamia may have been willing to trade three lambs to another individual for two bushels of wheat. If the other individual agreed to those terms, the trade was made. But barter is an inefficient form of exchange, because the terms of each and every transaction need to be negotiated. Eventually, people invented "money," to serve as a medium of exchange. Instead of exchanging lambs for wheat directly, individuals could sell their lambs for money and then use money to subsequently buy wheat either at that time or sometime in the future. Gold and other precious metals were used as some early forms of money.

Gold and other precious metals have intrinsic value. That is, these metals can be used to make goods, such as jewelry, that individuals value. But a disadvantage of precious metals is their weight which limits their transportability. A gold bar could conceivably be used to buy goods and services, but a standard gold bar weighs 27 lbs. Gold coins weigh significantly less than an entire bar, but it is not always practical to carry around numerous coins. So fiat currencies (i.e., paper money that is issued by governments and central banks of sovereign nations) gradually came into use. During the Gold Standard era, paper money was "backed" by gold. Individuals and businesses could exchange the paper bills they possessed for an equivalent value of gold. But the U.S. government stopped gold convertibility in 1971. Today, paper money is not "backed" by anything that has intrinsic value.

Indeed, there is little intrinsic value to paper money; the paper itself is essentially worthless. But what gives paper money its value is the trust that people have that other individuals will accept it as a means of payment. And these recipients of paper money are willing to accept it as payment for goods and services because they trust that other people will do so as well. In short, paper money is backed by trust: trust that other people will accept it in exchange for goods and services. But if this trust breaks down, then paper money becomes worthless.

Modern monetary systems have evolved further and include more than just paper money. There currently is more than \$2 trillion of paper notes and coins that are denominated in U.S. dollars in circulation today. These physical forms of money can be considered as "public" money because they are liabilities of the U.S. government (coins) or the Federal Reserves (paper notes). But there is nearly \$5 trillion in demand deposits (i.e., plain vanilla checking accounts) in U.S. financial institutions, and the value of other liquid deposits, which can easily be converted into cash or demand deposits, exceeds \$13 trillion. These deposits can be considered as "private" money because they are liabilities of privately-owned financial institutions. However, the value of these deposits are guaranteed by the federal government, up to a limit, and they can be used to purchase goods and services.¹

This brings us to 21st century and the advent of cryptocurrencies (a.k.a, digital currencies.). Bitcoin, which was introduced in 2009, was the first cryptocurrency. But the number of digital currencies has mushroomed in recent years. According to coinmarketcap.com there currently are more than 16,000 digital currencies, although many of these cryptocurrencies are little used at present. Just two cryptocurrencies (Bitcoin and Ether) together account for about 60% of the \$2 trillion worth of digital currencies that are in circulation today. Although coins and paper bills, which have physical forms, comprise a part of most nations' money supplies, cryptocurrencies exist only in electronic form that has even less intrinsic value than paper.

As discussed above, the form that money takes has evolved over the centuries, and there are no properties inherent in paper money and bank deposits that necessarily make them the final step in the evolutionary chain of monetary systems. The explosive growth in the amount of outstanding digital currencies, from nonexistent a few short years ago to roughly \$2 trillion today, raises an interesting question: will cryptocurrencies such as Bitcoin and Ether eventually replace national currencies such as the U.S. dollar and the euro? We will attempt to provide an answer to that question in a series of four reports.

This series is organized as follows: we focus on the benefits and drawbacks of digital currencies in this first report. In the second report, which we plan to publish shortly, we will focus on privately-issued "stablecoins." As their name implies, one of the benefits of stablecoins is the relative stability in their value. Are there any notable drawbacks to stablecoins? Although issuance of cryptocurrencies is largely confined to the private sector at present, the public sector is starting to get in on the act. We will focus

Barter is an inefficient form of exchange.

Paper money is backed by trust.

There is nothing inherently permanent about paper money and bank deposits as the predominant form of money.

on the future of central bank digital currencies in Part III, and we will offer conclusions in the fourth and final report.

What Functions Does Money Serve?

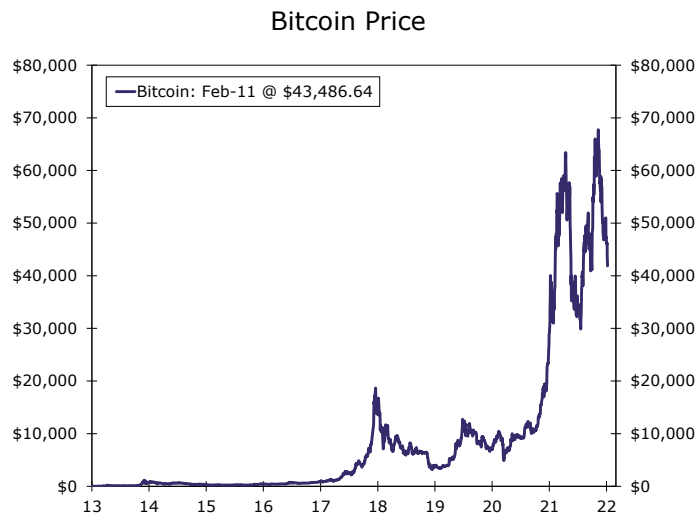
Let's start by asking if cryptocurrencies are in fact "money." According to most economics textbooks, money has three main functions: it is a unit of account, a medium of exchange, and a store of value.² In terms of the first function, cryptocurrencies are not used much as a unit of account at present. Prices of most goods and services are largely expressed in terms of national currencies such as U.S. dollars and euros and not in terms of cryptocurrencies per se. In other words, national currencies continue to serve as the numéraire—the common benchmark in which the values of goods and services are measured—in their respective economies. Unless one of the thousands of digital currencies that currently exists becomes completely dominant, cryptocurrencies likely will not become units of account anytime soon.

Despite their limitations as units of account, digital currencies fulfill the function of mediums of exchange. That is, individuals can use cryptocurrencies to buy goods and services, provided the sellers agree to accept them as payment at the prevailing exchange rate between a specific digital currency and a specific national currency (e.g., the prevailing U.S. dollar/Bitcoin exchange rate). Bitcoin is presently used in roughly 250,000 or so transactions daily on a global basis, although this amount is just a fraction of the U.S. dollar-based transactions that occur every day.³ The reluctance to date of governments, except for El Salvador, to designate cryptocurrencies as legal tender clearly restrains their wider adoption as mediums of exchange.⁴ Furthermore, China's central bank announced in September 2021 that any transactions conducted in the country in privately-issued cryptocurrencies would henceforth be illegal. This move by the world's second largest economy also splashes some cold water on the wider adoption of digital currencies as mediums of exchange. That said, the number of crypto-based transactions could clearly increase further in coming years given that there are more than 16,000 cryptocurrencies that already exist.

Are cryptocurrencies "stores of value"? Yes, at least in a long-run sense. The price of one bitcoin on December 30, 2011 was \$4.25, and it ended 2021 at roughly \$46,000. If an individual had remained in possession of that token over that ten-year period, then he or she would have realized an average return of more than 150% per annum ([Figure 1](#)). But this incredible rate of return over the past ten years has been associated with stomach-churning volatility. For example, the price of Bitcoin slumped more than 80% between December 2017 and December 2018. More recently, Bitcoin has dropped roughly 40% from its November 2021 peak of nearly \$70,000. The average daily price fluctuation of Bitcoin since January 2012 has been 3%, with day-to-day swings in excess of 10% not uncommon ([Figure 2](#)). Clearly, Bitcoin has been an outstanding store of value since its inception, but individuals and businesses that may need to hold it for short periods of time to meet cash flow needs could have incurred significant losses. The same holds true for many other cryptocurrencies.

Cryptocurrencies have generally been good stores of value over long periods of time, but they also have been associated with tremendous price volatility.

Part I - Figure 1



Source: Bloomberg LP and Wells Fargo Economics

Individuals who own U.S. dollars can hold them in the simple form of coins, currency and bank deposits. There is no price volatility associated with these forms of money, although their purchasing power can erode over time due to inflation. But individuals can also invest those dollars in numerous fixed income and equity securities. The S&P 500 index has risen significantly less than Bitcoin—about 14% on an average per annum basis since 2012—but without the same degree of volatility. In that regard, the average daily price fluctuation of the S&P 500 has been only 0.7% since 2012, with just one daily price swing (daily close-to-daily close) in excess of 10%. The price volatility of investment grade debt securities tends to be even lower. These dollar-denominated securities tend to be good stores of value because they generally pay dividends (stocks) or coupons (bonds), and equities generally appreciate over time.

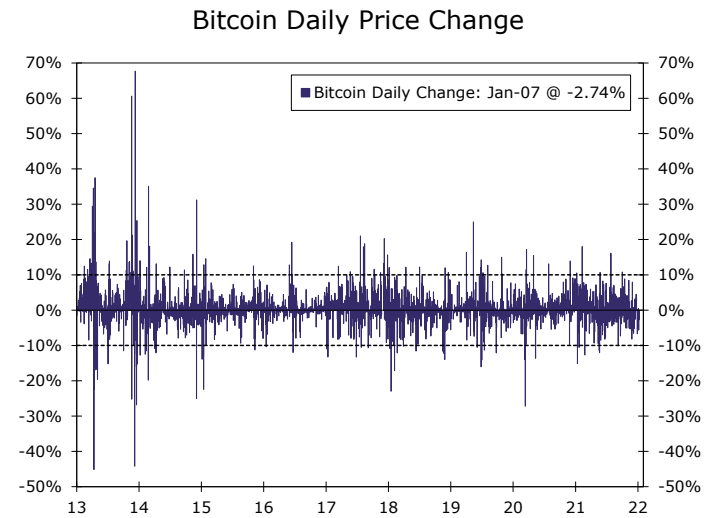
In contrast, the investment options of cryptocurrencies are more limited at present. Crypto saving accounts have been developed recently whereby owners of digital currencies can place their holdings into these accounts and the funds are then lent to borrowers. These saving accounts typically offer attractive rates of interest, but borrowers could potentially default and the value of the accounts are not government guaranteed.

Furthermore, to the best of our knowledge, no government or company has yet issued a crypto-denominated security. Bitcoin exchange-traded funds (ETFs) have recently been created, but the prices of these ETFs simply mirror the price of Bitcoin. Digital asset securities also have been created, whereby an individual can trade shares of stock digitally. The investor may be able to use a cryptocurrency to buy these securities, but the underlying assets (e.g., shares of Apple or Amazon) are denominated in national currencies such as U.S. dollars and not in cryptocurrencies per se. In sum, investors who want cryptocurrencies to be part of their portfolios but without the associated price volatility have few options currently.

Will crypto-denominated securities become part of the investment landscape anytime soon? In our view, corporate treasurers likely will remain hesitant to issue crypto-denominated securities, at least for the foreseeable future. Corporate revenues and assets are currently denominated in national currencies, but any company that issued a crypto-denominated security would have exposure to that digital currency on the liability side of its balance sheet. The company could quickly find itself in financial stress from an asset-liability mismatch if the price of the digital currency were to rocket higher.

This mismatch could be reduced if companies held crypto-denominated assets and/or they could hedge their crypto-denominated debt payments but, as noted previously, there are no crypto-denominated securities that corporate treasurers can buy at present. Some companies hold digital currencies as part of their cash balances, but the extreme price swings associated with cryptocurrencies likely make treasurers reluctant to make digital currencies a significant component of those cash balances at this time. Whereas a deep and liquid market exists where corporate treasurers

Part I - Figure 2



Source: Bloomberg LP and Wells Fargo Economics

To the best of our knowledge, no government or company has yet issued a crypto-denominated security.

can swap their U.S. dollar-denominated floating rate liabilities into fixed rate liabilities and *vice versa* (i.e., the swaps market), the ability to hedge crypto-denominated liabilities is currently quite limited. Bitcoin futures contracts have recently come into existence, but contracts that mature more than a month or two in the future are not actively traded at present.

In theory, issuance of crypto-denominated securities could potentially ramp up in coming years, which would enhance their ability to serve as a store of value. But until goods and services are more widely priced in terms of cryptocurrencies (i.e., cryptocurrencies become more widely used as units of account) and/or the extreme price volatility of many digital currencies subsides, we believe that many corporate treasurers will remain hesitant to issue crypto-denominated securities. In short, the ability of digital currencies to serve as stores of value without extreme price volatility likely will remain limited, at least for the foreseeable future.

The Pros and Cons of Cryptocurrencies

There are a number of benefits to cryptocurrencies. First, digital currencies exist only in electronic form, and payments between individuals and businesses can be made essentially instantaneously.

In contrast, an individual or business can wait days to receive payment while a check "clears."

Cryptocurrencies could also be used to make costless payments for "unbanked" individuals.⁵ Because these individuals do not have access to checking accounts, they often must rely on costly alternatives such as money orders to make payments. Unbanked individuals would need just a mobile phone to make payments with digital currencies. Digital currencies are generally secure, in contrast to physical cash which can be misplaced or stolen. That said, there is some probability, albeit small, that digital wallets can be hacked.

Additionally, cryptocurrencies are not issued by governments, and they largely exist outside the regulatory framework today. So transactions with digital currencies can be made largely in anonymity. And the supply of individual digital currencies are generally limited, so they can be a good inflation hedge. As shown in [Figure 3](#), the recent rise in the rate of CPI inflation has been associated with a sharp increase in the price of Bitcoin.

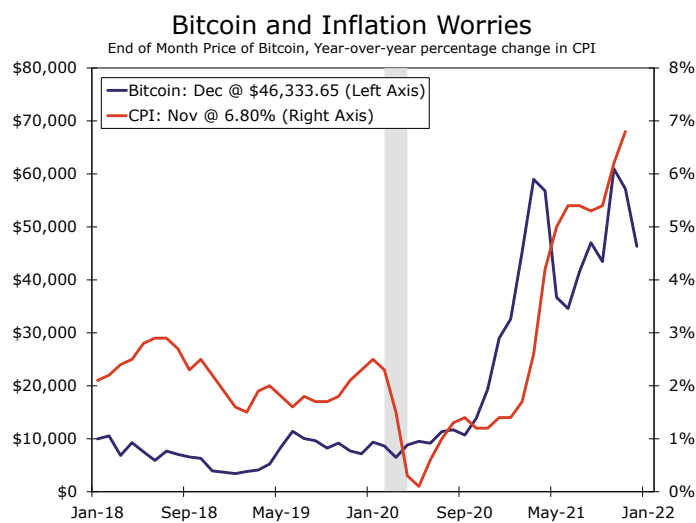
But there are some notable drawbacks to digital currencies as well. First, the anonymity that some individuals treasure in crypto transactions can help facilitate illicit activities, although the absolute amount of illicit payments is generally small at present.⁶ Second, the limited supply of digital currencies, which give them properties as an inflation hedge, has some serious drawbacks. For starters, the generally inelastic supply of cryptocurrencies contributes to their price volatility. As the demand curve for digital currencies shifts back and forth along an inelastic supply curve, prices can fluctuate markedly.

Furthermore, the limited supply of digital currencies that causes their prices to explode when demand increases sharply can pose a potential economic risk. Nearly 19 million bitcoins have been "mined" since its inception in 2009, but Bitcoin has a maximum supply of only 21 million coins. It is only a matter of time before this limit is reached. There is not a maximum supply associated with Ether, the second most prevalent digital currency, but new "issuance" of this digital currency is limited to only 18 million coins per year. If the global supply of goods and services grows faster than the global supply of all cryptocurrencies in the years to come, then prices of goods and services will fall relative to the prices of cryptocurrencies. In other words, deflation will set in if privately-issued cryptocurrencies were to replace national currencies as the predominant units of account.

Payments can be made essentially instantaneously with digital currencies.

The limited supply of digital currencies could lead to a prolonged period of deflation.

Part I - Figure 3



Source: Bloomberg LP and Wells Fargo Economics

This dynamic occurred during the heyday of the Gold Standard in the late 19th century. Economic historians estimate that the general price level in the United States fell by more than 20% between 1873 and the turn of the 20th century.⁷ The deep and long-lasting economic contraction that started in 1873 had a role to play in depressing the price level, but prices continued to slide even after the economy had found its footing again in the 1880s. Because the global supply of gold was limited, prices of goods and services fell as their supply increased. Long periods of deflation can eventually lead to prolonged periods of high unemployment, and it was this period of deflation that led politicians of the period such as William Jennings Bryan to call for the use of silver as another component of the money supply.

As noted previously, there are more than 16,000 cryptocurrencies in existence today, and many more likely will be introduced in years to come. So the overall supply of cryptocurrencies likely will continue to grow, which should limit prospects for a prolonged period of deflation. But individual cryptocurrencies are not perfect substitutes, and the value of one digital currency can fluctuate widely *vis-à-vis* another one. For example, Ether lost 80% of its value against Bitcoin between early 2018 and early 2020, although it subsequently has recouped much of those losses (Figure 4). This volatility may prevent individuals from shifting seamlessly from one cryptocurrency to another one, which would keep the use of individual digital currencies siloed.

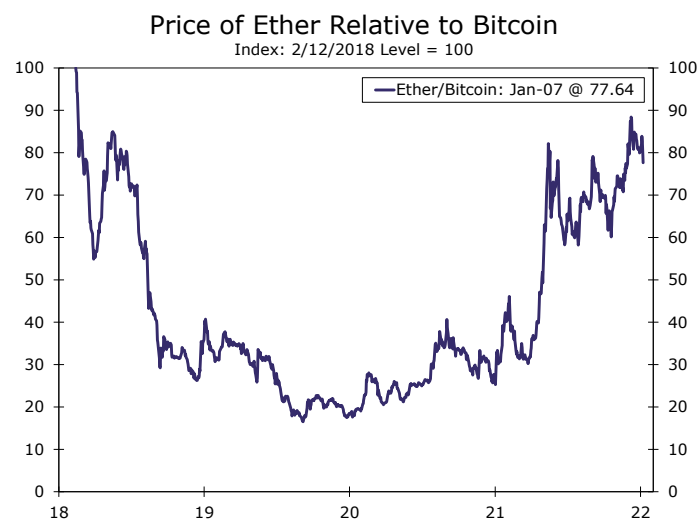
What the world needs is an elastic supply of a digital currency(ies) that have less price volatility. Stablecoins, which are digital currencies whose prices are essentially tied to another asset such as the U.S. dollar, may offer some of the benefits of cryptocurrencies without some of their notable drawbacks. We will discuss stablecoins in more detail in the next report in this series.

Conclusion

The form that money takes has evolved over the centuries, and there is no reason to suspect that its current form—paper bills and bank deposits—necessarily has any permanence. In that regard, the use of cryptocurrencies has mushroomed in recent years, and they threaten to overtake paper bills and bank deposits in coming years as the predominant form of money in the world. The ability to make payments essentially instantaneously is an attractive feature of digital currencies as is their properties as an inflation hedge.

But there are also some serious drawbacks to cryptocurrencies, at least at present. Investors who want digital currencies to be part of their portfolios must be willing to tolerate high degrees of price volatility and the lack of crypto-denominated securities. In addition, the limited supply of digital currencies could potentially exert deflationary pressures on the global economy if they ever superseded national currencies. A prolonged period of deflation is a problem because debt is generally fixed in nominal terms. Therefore, a business' or individual's relative debt burden would grow as prices and wages fall, potentially leading to widespread bankruptcies and unemployment.

Part I - Figure 4



Source: Bloomberg LP and Wells Fargo Economics

The U.S. price level fell during the heyday of the Gold Standard.

But there is a class of digital currencies, which are known as stablecoins, that do not have some of these drawbacks. The values of stablecoins are essentially tied to another asset such as the U.S. dollar, which keeps values more or less "stable." Additionally, supplies of stablecoins are not limited. Could stablecoins be the digital currencies that eventually supersede national currencies? We will discuss the outlook for stablecoins in Part II of this series.

Endnotes

¹The Federal Deposit Insurance Corporation (FDIC) guarantees up to \$250,000 in deposits per account owner. ([Return](#))

²For example, Mishkin, Frederic, *The Economics of Money, Banking, and Financial Markets* 8th edition, Pearson, Boston, 2007. ([Return](#))

³Data on Bitcoin-based transactions can be found on [Statista](#). The [Federal Reserve](#) processed nearly 65 million transactions on an average day in 2020. ([Return](#))

⁴Sellers are mandated by law to accept "legal tender" as payment for goods and services. Bitcoin became legal tender in El Salvador in September 2021. ([Return](#))

⁵According to the FDIC, 5.4% of U.S. households (approximately 7.1 million) were "unbanked" in 2019, [How America Banks: 2019 FDIC Survey](#). ([Return](#))

⁶Chainalysis estimates that digital currencies were used in \$21.4 billion worth of illicit payments in 2019, which accounted for 2.1% of all crypto transaction volume that year. However, that amount fell to \$10 billion in 2020 (only 0.34% of the total transaction volume in 2020). See [The 2021 Crypto Crime Report](#), Chainalysis, February 16, 2021. ([Return](#))

⁷U.S. Census Bureau, "[Price Indexes](#)" 1949. ([Return](#))

Part II: Are Stablecoins Really "Stable"?

Part II: Summary

- Stablecoins, which are a category of digital currency, have many favorable characteristics. Payments can be settled essentially instantaneously, and "unbanked" individuals can easily use them. Their supplies are not limited, so potential problems with deflation do not arise with stablecoins as they potentially could with limited forms of digital currencies.
- Unlike other cryptocurrencies, such as Bitcoin and Ether that exhibit extreme levels of price volatility, the values of stablecoins tend to be stable. Many stablecoin issuers claim that their tokens are fully "backed" by reserves.
- However, assets that can experience their own periods of illiquidity and price dislocation represent a significant proportion of the reserves of some stablecoin issuers. If the confidence of investors in the value of their holdings is shaken, then stablecoin issuers can experience "runs," much like commercial banks before the advent of deposit insurance and the creation of a robust supervisory and regulatory framework.
- If the explosive growth that stablecoins have enjoyed in recent years continues in coming years, then periods of financial market volatility could potentially become extreme.
- Stablecoin issuers have largely operated in a regulatory vacuum until now. But regulators have become acutely aware of the potential risks that stablecoins present, and they are scrambling to catch up. Some federal agencies have recommended that Congress pass legislation that would require stablecoin issuers to become insured depository institutions, which would be subject to supervision and regulation by the appropriate regulatory bodies.
- Furthermore, private stablecoin issuers may soon face competition from central banks that are gearing up to issue their own digital currencies. We will discuss central bank digital currencies (CBDCs) in Part III of this series.

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Stablecoins: Benefits of Digitization Without Price Volatility

In the [first report](#) of our series on cryptocurrencies (a.k.a. digital currencies), we discussed their ability to perform the three basic functions of money as well as some of their benefits and drawbacks. In terms of the functions of money, their use as a unit of account is limited at present. That is, prices of most goods and services continue to be expressed in terms of national currencies (e.g., U.S. dollars, euros, etc.) rather than in cryptocurrencies per se. Digital currencies are being used as mediums of exchange, albeit still well short of the volume of transactions that are being processed via national currencies at present. They can provide good stores of value, at least when held over long periods of time. But the high degree of price volatility that is inherent in digital currencies can limit their ability to serve as a store of value for individuals and businesses in the short term. Furthermore, the investment options of cryptocurrencies are limited at present, because there has been no issuance of crypto-denominated securities, to the best of our knowledge.

But there is a class of cryptocurrencies, which are known as "stablecoins," that possess the benefits of digitization without the extreme price volatility of some other digital currencies, such as Bitcoin and Ether. As the first half of their name implies, prices of stablecoins tend to be stable, because their values are essentially pegged to another asset, such as a national currency. For example, Tether, which is the most widely used stablecoin, is convertible to U.S. dollars at a ratio of 1:1 and the issuers of Tether claim that every token is fully backed by \$1 worth of dollar-denominated assets.¹ Since it started trading in 2015, the day-to-day price fluctuation of Tether has generally been less than one-hundredth of a cent. That said, there have been episodes when the price has moved by significantly more, a topic to which we will subsequently return. Other widely used stablecoins include USD Coin and Binance USD, which also have very low price volatility.

Stablecoins have a number of benefits, some of which are inherent to all digital currencies and some of which are specific to stablecoins. Similar to all cryptocurrencies, payments made in stablecoins can be settled essentially instantaneously. This is especially important for payments that are made across national borders, which historically have been time-consuming and characterized by high transactions costs. In addition, stablecoins could be used to make costless payments for "unbanked" individuals, which we discussed in more detail in [Part I](#). But what sets stablecoins apart from other digital currencies is that the former do not have wild swings in value, thereby enhancing their property as a short-term store of value. Furthermore, the supply of stablecoins is not limited. Consequently, the potential deflation issue associated with a limited money supply that we discussed in our first report does not arise with stablecoins.

But stablecoins do not overcome some notable drawbacks of digital currencies. Similar to other cryptocurrencies, there has been no issuance to date, to the best of our knowledge, of securities that are denominated in stablecoins. Therefore, individuals who own stablecoins earn a rate of return of 0%, unless they place those tokens in a crypto savings account, which we briefly noted in [Part I](#). But because stablecoins do not have wild swings in value, corporate treasurers in coming years could potentially start to issue securities that are denominated in stablecoins, which would enhance their quality as a store of value. In addition, stablecoins could be used increasingly by individuals and businesses to make payments due to their stable values.

Stablecoins Are Potentially Vulnerable to "Runs"

But there is a more significant drawback to stablecoins that was highlighted in a recent [speech](#) by Federal Reserve Governor Christopher Waller. Specifically, stablecoins are issued by the private sector and, in essence, stablecoin issuers resemble 19th century commercial banks. As long as depositors in that bygone era were confident that they could withdraw all of their money from their bank, the system was sound. But as soon as that confidence was shaken, a "run" on the bank could ensue that could lead to the collapse of the bank. In a full-blown panic, such as what occurred in 1893 and again in 1907, the entire banking system was potentially at risk. The Federal Deposit Insurance Corporation (FDIC) estimates that about 9,000 American banks failed between 1930 and 1933, which contributed to the depth and the severity of the Great Depression.

In response, Congress created the FDIC in 1933 to guarantee the value of banking accounts. Today, the FDIC guarantees checking and savings accounts up to \$250,000 per depositor, per insured bank. Furthermore, deposit-taking institutions are regulated and supervised by federal and state agencies. The existence of deposit insurance in conjunction with a robust supervisory and regulatory framework gives individuals confidence in the safety of their deposits. Bank runs, which were commonplace prior

Stablecoins generally do not have the daily price fluctuation that tend to be inherent in other cryptocurrencies.

Stablecoins could be used increasingly by individuals and businesses to make payments due to their stable values.

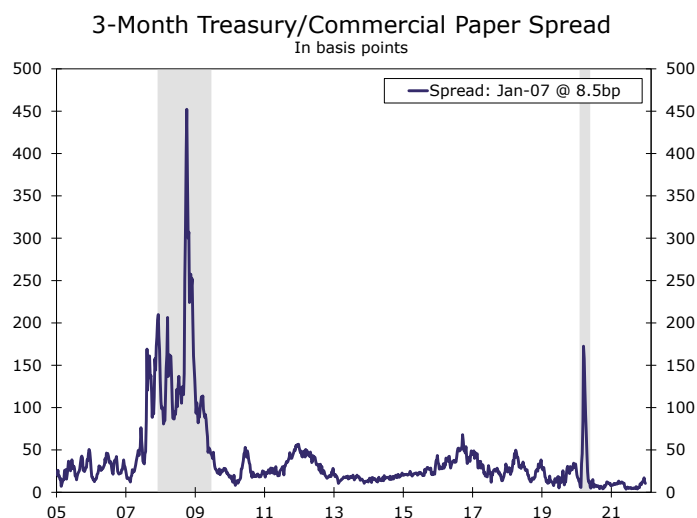
to the establishment of the FDIC and federal regulatory bodies, have been exceedingly rare since 1933.

In contrast, the value of stablecoins are not guaranteed and stablecoin issuers are not currently regulated. Many stablecoin issuers claim that their coins are "backed" by some other asset(s). For example, the issuers of Tether state that "every Tether token is always 100% backed by our reserves," which include traditional currency and cash equivalents and, from time to time, may include other assets and receivables from loans made by Tether to third parties." In that regard, the most recent independent accountant's report, which was published in September 2021, showed that "commercial paper and certificates of deposit" accounted for more than 40% of Tether's assets. Normally, the commercial paper (CP) market is deep and liquid with interest rates on high-quality CP only a few basis points above rates paid on Treasury bills (Figure 1).

Values of stablecoins are not insured and issuers of stablecoins are not regulated.

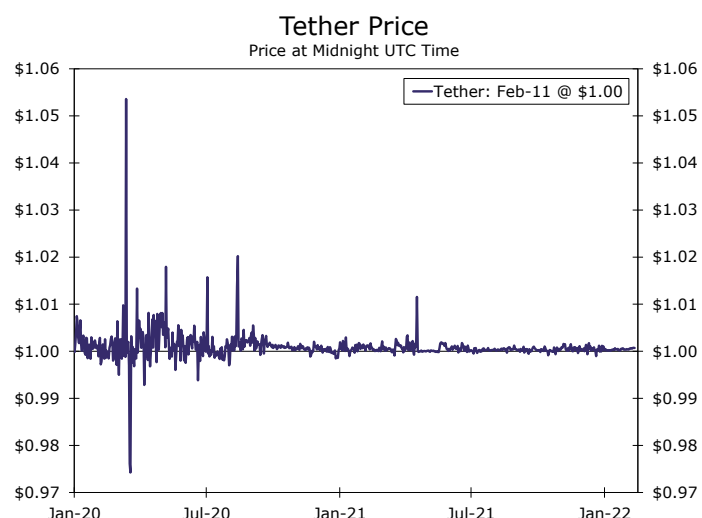
However, the CP market can become illiquid during times of financial stress. As Figure 1 makes clear, CP spreads spiked during the 2008 financial crisis and again in March 2020 when the global economy was going into free fall amid the onset of COVID-19. This sharp rise in CP interest rates relative to T-bill rates implies that prices of CP nosedived. In other words, the value of the assets that, at least in part, "back" stablecoins fell sharply, and owners of stablecoins no longer had assurance that each token they owned was fully convertible into one U.S. dollar. Selling of stablecoins ensued, causing their prices to fall. As shown in Figure 2, the price of Tether dipped to \$0.97 in March 2020. The price of USD Coin also fell during that period.

Part II - Figure 1



Source: Bloomberg Finance L.P. and Wells Fargo Economics

Part II - Figure 2



Source: Yahoo Finance and Wells Fargo Economics

Periods of market dislocations, as occurred in March 2020, can potentially initiate negative feedback loops. That is, marked declines in CP prices can lead to weakness in stablecoin prices. Selling of CP by stablecoin issuers to finance redemptions puts added downward pressure on CP prices, which can then lead to further price declines of stablecoin prices, etc. Furthermore, dislocations in one asset market, such as the CP market, can quickly spill over to other asset markets. The Federal Reserve moved quickly to pump liquidity into financial markets in March 2020, but the price dislocations experienced in the CP and stablecoin markets during that period could have been more extreme and long-lasting had officials not acted so nimbly and adeptly. Stablecoins had not yet been created in 2008, but the sharp price declines experienced in the CP market during the global financial crisis undoubtedly would have put significant downward pressure on prices of stablecoins, had they existed at that time. Because the size of the stablecoin market has grown exponentially—the market capitalization of Tether, which is just one stablecoin among many, has shot up from about \$4 billion at the beginning of 2020 to roughly \$78 billion at present—stablecoins represent a potential risk to the financial system.

Stablecoins represent a potential risk to the financial system.

There is also the issue of market power. There are numerous issuers of stablecoins at present, but as demonstrated by other tech platforms over the past few decades, one company can become dominant due to network effects. For example, there initially were many "word processing" software programs available when the technology was first developed. But Microsoft Word eventually emerged

as the program that essentially all individuals wanted to adopt, because a "critical mass" of other individuals were using it. The same winnowing process could eventually occur with stablecoins, which could lead to an undue amount of market power for that issuer. Is it good public policy to allow the payment system of an economy to be controlled by a small handful of private companies without public sector oversight?

Regulators Are Increasing Their Focus on Stablecoin Issuers

As noted previously, stablecoin issuers are not regulated at present. But regulators are attuned to the risks that stablecoins potentially pose, and they are increasing their focus on them. The Federal Reserve, the FDIC and the Office of the Comptroller of the Currency (OCC) recently conducted a series of "policy sprints" and, as highlighted in a recent [joint statement](#), they plan to begin issuing guidance "on whether certain activities related to crypto-assets conducted by banking organizations are legally permissible." As these agencies note, this guidance will apply only to the activities of banks, not to other platforms. But the use of the word "sprint" reflects the sense of urgency that the explosive growth in digital currencies, and its associated implications for the financial system, has imparted on regulators.

Regarding regulation that is specific to stablecoins, the President's Working Group on Financial Markets (PWG) recently issued a [report](#) in November 2021 that asks Congress to pass legislation requiring stablecoin issuers to become insured depository institutions.² These institutions would have access to the liquidity facilities of the Federal Reserve, and the value of the tokens that are issued by these institutions would be guaranteed, up to a limit, much as bank deposits are guaranteed up to \$250,000 by the FDIC. These institutions would also be subject to supervision and regulation by the appropriate regulatory bodies and to liquidity and capital requirements, much as "traditional" depository institutions (i.e., commercial banks and credit unions) are currently subjected. Furthermore, the PWG report recommends that stablecoin issuers be restricted from affiliating with commercial entities, much as commercial banks are generally prohibited from owning or being owned by a non-bank enterprise.

It is an open question whether Congress will ultimately choose to follow the PWG's recommendations. Congress could enact its own set of guidelines or choose to ignore the issue entirely. But even in the event that Congress does not authorize a broad and comprehensive regulatory framework, there may be some limited steps, which were highlighted in a recent [speech](#) by Treasury Undersecretary Liang, that agencies can take under current authorization to provide some regulatory oversight of stablecoin issuers. In short, the days of laissez-faire in the stablecoin market are probably numbered. Not only are regulators poised to undertake some degree of oversight, but some central banks are gearing up to issue their own digital currencies, which could create competition for privately-issued stablecoins. We will turn to central bank digital currencies (CBDCs) and their implications for the financial system in Part III of this series.

Part II: Conclusion

Similar to all digital currencies, there are some significant benefits associated with stablecoins. They allow payments to be made essentially instantaneously, and "unbanked" individuals could use stablecoins provided they have a mobile phone. Issuance of stablecoins can be unlimited, so the potential deflationary risk that arises with digital currencies with limited issuance does not arise. Their attractiveness as a short-term store of value is enhanced by their generally stable values.

But there is a notable drawback to stablecoins at this time. Specifically, their values are not insured, as commercial bank deposits are, and stablecoin issuers are not regulated at present. Consequently, in periods of heightened financial stress, such as autumn 2008 and March 2020, stablecoin issuers could potentially experience destabilizing "runs." If the explosive growth that stablecoins have enjoyed in recent years continues in coming years, then periods of financial market volatility could potentially become extreme.

Government regulation usually lags developments that occur in the private sector, and stablecoin issuers have largely operated in a regulatory vacuum. But regulators are becoming attuned to the risks that stablecoins potentially present, and they are scrambling to catch up. Although it is not clear what sort of legislation Congress may eventually enact, the days of laissez-faire in the stablecoin market are probably numbered. Furthermore, private stablecoins issuers may soon face competition from digital currencies that are issued by central banks, which is the topic of our next report in this series.

Regulators are attuned to the risks that stablecoins potentially pose, and they are increasing their focus on issuers.

Endnotes

¹ [tether-assurance-sept-30-2021.pdf](#). (Return)

² The PWG was created in 1988, and it is chaired by the secretary of the Treasury. Other members include the chair of the Board of Governors of the Federal Reserve System, the chair of the Securities and Exchange Commission, and the chair of the Commodity Futures Trading Commission. (Return)

Part III: Central Bank Digital Currencies

Part III: Summary

- Paper money is a risk-free asset for an individual or business that holds it and a liability of the central bank that issues it. Paper money works well as a medium of exchange for small value payments that are made "in person," but it does not work as well for payments that are large in value or need to be made remotely.
- Many central banks are contemplating the issuance of their own digital currencies. Similar to paper money, these so-called central bank digital currencies (CBDCs) would be a liability of the central bank and a risk-free asset of the public. Large value payments and remote payment could be made easily with CBDCs, and payments would clear essentially instantaneously.
- But there are complex design issues associated with CBDCs. Bank deposits, which are the liabilities of private sector commercial banks, constitute the vast majority of the money supply of most economies. A CBDC could compete with bank deposits, which could lead to disintermediation from the banking system, especially in times of financial stress. Disintermediation could have devastating consequences for economic growth.
- The People's Bank of China (PBoC) recently issued the Digital Currency Electronic Payment (DCEP) on a limited basis, making it the first major central bank to launch a digital currency. The DCEP is a liability of the PBoC, but the public acquires it from commercial banks, not directly from the central bank. The DCEP does not pay interest, which should limit the potential disintermediation effects of the digital currency in the Chinese banking system.
- Advanced economies are lagging behind in terms of CBDC issuance. Work on a CBDC in Sweden, which increasingly has become a "cashless" economy, has been underway for more than four years. The Swedish central bank completed a test of an e-krona last year, but no decision has been reached yet about whether to actually issue a CBDC in Sweden. The European Central Bank expects to have a prototype of a digital euro ready for testing sometime in 2023.
- The Federal Reserve recently published a report that lists some basic principles regarding the potential issuance of a U.S. CBDC. But the Fed essentially kicked the decision about the creation of a digital currency back to the executive branch and Congress.

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Central Banks Are Getting in on the Digital Act

In [Part I](#) of this series, we discussed some benefits and drawbacks of digital currencies. One of the notable drawbacks of some cryptocurrencies is their extreme price volatility. For example, daily swings in excess of 10% in the price of Bitcoin are not uncommon, which raises questions about its use as a store of value over short periods of time. There is a category of digital currencies, which are known as stablecoins, that tend to have stable values. But as we discussed in more detail in [Part II](#), a drawback to stablecoins is that they are liabilities of private issuers. They function well normally, but they can be susceptible to "runs" when the public turns risk averse and begins to question the financial viability of the issuer(s).

But there clearly are some desirable characteristics of digital currencies. For starters, digitization allows payments to be made essentially instantaneously, whereas it can take days for checks to "clear." Additionally, individuals without bank accounts (the "unbanked") can easily make payments with digital currencies as long as they have a mobile phone. It is for these reasons that central banks, which play a vital role in the traditional payment systems of most economies, have shown a keen interest in potentially developing their own digital currencies. The Bank for International Settlements (BIS) defines central bank digital currencies (CBDCs) as "a form of digital money, denominated in the national unit of account, which is a direct liability of the central bank."¹

Parts of the payment systems of most economies are already digitized. For example, commercial banks in the United States have accounts at the Federal Reserve, and the Fed digitally clears trillions of dollars of payments every day for these banks. Moreover, the process of clearing payments is speeding up. The [Target2](#) system of the European Central Bank, which provides real-time gross settlement on most days of the year for banks and other central banks, has been operational since 2007. The Federal Reserve plans to implement its [FedNow Service](#), which will provide real-time clearing on a 24/7 basis, beginning next year.

Essentially all central banks issue their own form of paper money that can be used as a medium of exchange. Paper money is a risk-free asset for an individual or business that holds it and a liability of the central bank that issues it. However, most economies do not yet have a digitized form of their national currency that individuals and businesses can use to make payments. So many central banks are currently focused on the development of "retail" digital currencies. But there are complex design issues underlying the creation of CBDCs, and ill-design could have negative consequences for the banking system in many economies. We will begin by discussing some benefits and drawbacks of CBDCs before turning to a discussion of the work that is underway at some of the world's major central banks regarding potential issuance of digital currencies.

Potential Benefits of CBDCs

Let's start with the potential benefits. Paper money (e.g., U.S. dollar bills) serves well as a medium of exchange for small value payments that are made "in person." For example, using dollar bills to buy a few items at a convenience store is routine. But paper money does not work as well for large value payments and for payments that need to be made remotely. An individual probably would not want to carry \$70,000 in cash to a car dealership to buy an expensive new car, nor would he or she want to send cash through the mail to pay for an item, regardless of the price of that item.

A CBDC would be a superior way relative to paper money for individuals to make payments. Similar to paper bills, a CBDC would be a liability of a central bank. But digitization would make it much easier to use a CBDC rather than paper bills because the former would be accessible via a mobile phone. An individual could easily make large payments as well as remote payments with a CBDC. Furthermore, these payments would settle essentially instantaneously; no more waiting for "the check to clear." This would be especially important for international transactions, which can often be time-consuming and expensive. The World Bank estimates that the cost of sending a \$200 payment to another country currently averages nearly \$13 in the G-20 economies. CBDCs could potentially be available to "unbanked" individuals as well.²

Additionally, CBDCs could solve some privacy issues that arise with stablecoins, which we briefly discussed in Part II. Private sector issuers of stablecoins have data on the payments that individuals who use their tokens make. Although numerous privately-issued stablecoins exist today, "network effects" could lead to a winnowing process in which only a few stablecoins survive. For example, the BIS notes that 94% of mobile payments in China today are made by just two big tech firms.³ Is it good public policy to have significant amounts of personal data concentrated in the hands of just a

A CBDC would be a superior way relative to paper money for individuals to make payments.

few private companies? Of course, a CBDC could give government authorities access to private data, depending on how it is designed.

CBDCs could also offer some benefits to central banks in terms of monetary policy options. Central banks presently are constrained in their ability to take interest rates into negative territory, which may be warranted when economic conditions weaken significantly. Some major central banks (e.g., the European Central Bank and the Bank of Japan) have implemented negative interest rates, but these policies apply only to the interest that central banks pay on the reserves that commercial banks hold at the central bank. (Under negative interest rates, commercial banks pay interest to the central bank.) But most commercial banks are hesitant to pass these negative rates on to their depositors and creditors. Consequently, negative interest rates at present do not have much stimulative effect on aggregate demand.

But a CBDC could give a central bank the ability to directly reduce the digital assets of a household or a business by the appropriate interest rate. Faced with the prospect of "paying" the central bank, household and businesses may opt to spend some of their CBDC holdings, thereby giving a boost to aggregate demand. Alternatively, a central bank could stimulate aggregate demand with "helicopter money," by which the monetary authorities could credit the digital balances of household and businesses.⁴

Some Notable Drawbacks of CBDCs

But there are also some clear drawbacks to CBDCs. Let's return to the example above in which an individual wants to buy an expensive new car. In the current payment environment, that person could pay for the car by writing a check, which is a liability of a commercial bank. But before transferring ownership of the car, the car dealer probably would want to verify that the funds are "in the bank" or wait until the check "clears." Both options can be inconvenient and time-consuming.

In a world in which CBDCs existed, the individual could authorize payment to the car dealer using his or her mobile phone and the funds would be transferred instantaneously. In that sense, the CBDC would work like a debit card. But with a debit card, the individual's assets are a liability of a commercial bank that the bank uses to finance its loans. The existence of a CBDC could potentially induce individuals and businesses to substitute the liability of a commercial bank for the liability of the central bank. That is, a CBDC could potentially lead to disintermediation from the banking system. Loans account for roughly 80% of the credit that is extended to the non-financial private sector (i.e., households and non-financial businesses) in the United States. This proportion is even higher in other economies that do not have well-developed corporate bond markets like the United States. CBDCs could potentially lead to shrinkage in the balance sheets of many commercial banks, which could have devastating consequences for economic growth.

This disintermediation problem could become particularly acute if central banks paid interest on CBDCs. After all, why would an individual want to keep deposits at a commercial bank if they could hold risk-free assets that earn interest at the central bank? Consequently, most central banks may choose to not pay interest on CBDCs. But this disintermediation problem could still persist during period of financial stress if individuals and businesses choose to move their assets from the commercial banking system to the safety of the central bank. Therefore, a cap on the amount of CBDCs that an individual or business could own may be warranted to minimize the potential risk to the commercial banking system.

Furthermore, central banks do not have the resources to handle all the tasks that the commercial banking system undertakes. For example, according to the FDIC, there are approximately 124 million American households with bank accounts, representing roughly 95% of American households.⁵ The Federal Reserve simply does not have the resources available to onboard and maintain the accounts of millions of American households, a task that currently is being handled by the nation's 4,800 insured commercial banks. Central banks in most other economies are also ill-equipped to handle these tasks.

Progress on CBDC Issuance in Major Economies

Despite these drawbacks, some central banks have already launched their own digital currencies with many other central banks actively exploring the potential to do so themselves. According to [The Atlantic Council](#), there were nine countries as of December 2021 which had already launched a CBDC, and 69 others in which a pilot program existed or active development or research was ongoing.

CBDCs could make negative interest rate policy more effective.

CBDCs could potentially lead to disintermediation from the banking system.

China, which began work on a digital currency in 2014, in recent weeks became the tenth country to have issued a CBDC.⁶ The digital currency of the People's Bank of China (PBoC) is known formerly as Digital Currency Electronic Payment (DCEP). Similar to paper yuan, the DCEP is a liability of PBoC, but the public acquires the digital currency only from commercial banks, not directly from the PBoC.

China recently issued its own CBDC.

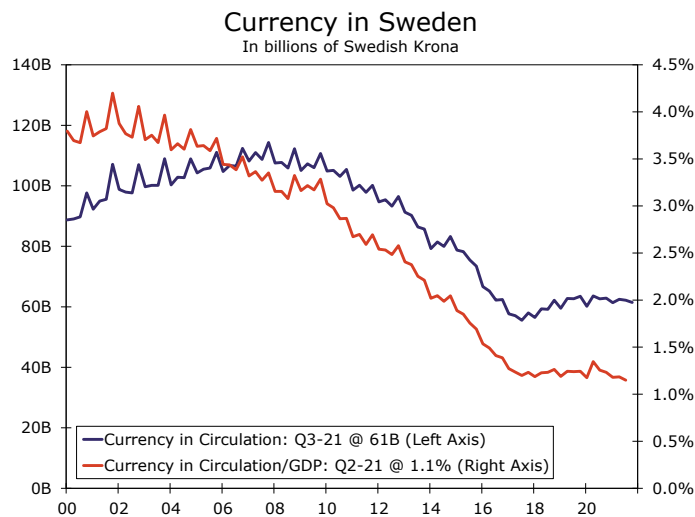
The DCEP was designed with small transactions in mind. That is, it is not based on blockchain technology, as are some cryptocurrencies such as Bitcoin, because that technology would make it cumbersome to handle a high volume of small transactions. In that regard, China's system reportedly can process 300,000 transactions per second. The DCEP does not pay interest, which should limit the incentive of individuals to switch out of bank deposits and into digital yuan. Therefore, any harmful disintermediation effects on the commercial banking system in China should be limited. The PBoC has rolled out the DCEP on a limited basis, at least for now, and it potentially could evolve over time if circumstances warrant.

Sweden, where the amount of currency in circulation peaked in 2007, has become an increasingly "cashless" economy. Although the outstanding value of coins and bills has stabilized over the past few years, the amount of currency in circulation relative to the size of the economy is only 1%, a record low (Figure 1). The Swedish Riksbank (the country's central bank) says on its website that "in response to the increasingly marginalized role of cash, the Riksbank is investigating whether it is possible to issue a digital complement to cash, the e-krona."

Sweden has become an increasingly "cashless" society.

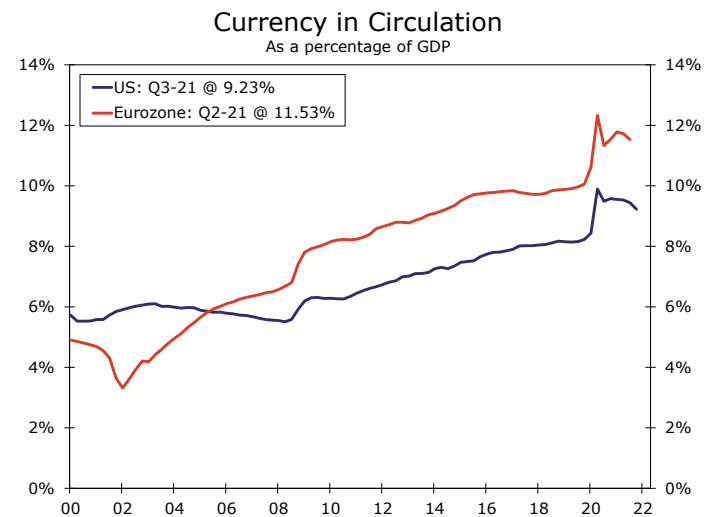
Preliminary work on the design of an "e-krona" began in 2017, which made Sweden one of the first central banks among the advanced economies to conduct research on the feasibility of issuing a CBDC, and the central bank completed a test of the e-krona last year. That said, launch of a CBDC in Sweden does not appear imminent, because the central bank continues to state that "at yet no decision has been taken to issue an e-krona." At the completion of the test, Riksbank Governor Ingves said that Sweden could have CBDC "within five years."

Part III - Figure 1



Source: Statistics Sweden and Wells Fargo Economics

Part III - Figure 2



Source: Federal Reserve Board, European Central Bank and Wells Fargo Economics

Unlike the circulation of the Swedish krona, which has declined markedly over the past decade or so, the amount of euros in circulation continues to rise, not only in absolute terms but relative to the size of the Eurozone economy as well (Figure 2).⁷ Nevertheless, the European Central Bank (ECB) established a task force in January 2020 to consider the implication of a digital euro that "could support the Eurosystem's objectives by providing citizens with access to a safe form of money in the fast-changing digital world." The ECB published a report on the task force's findings in October 2020, and it moved to the "investigation phase" of a digital euro in October 2021. According to the ECB's website, this phase is projected to last 24 months. In testimony to the European Parliament in November, ECB Executive Board Member Panetti said "we expect to narrow down the design-related decisions by the beginning of 2023 and develop a prototype in the following months." Presumably,

The ECB expects to have a prototype of a digital euro ready for testing sometime in 2023.

it will take more time to test any prototype of a digital currency that the ECB may develop. In short, potential issuance of a digital euro by the ECB appears to be a few years away.

Work on a CBDC for the United State is also underway, and the Federal Reserve recently released a [report](#) on its preliminary conclusions. The report does not go into specific design features of a potential digital dollar, but rather highlights some broad principles. Specifically, the report notes that "a potential U.S. CBDC, if one were created, would best serve the needs of the United States by being privacy-protected, intermediated, widely transferable, and identity-verified."

"Intermediated" means that the Federal Reserve would not issue a digital dollar directly to the public. The digital currency would be a liability of the Fed, but "the private sector would offer accounts or digital wallets to facilitate the management of CBDC holdings and payments." These holdings would need to be "readily transferable between customers of different intermediaries." That is, an individual with a CBDC account or wallet at a specific commercial bank should be able to easily send a payment to a person who can then make a deposit in his or her CBDC account or wallet at another commercial bank. Intermediaries would need to verify the identity of their CBDC depositors to protect against money laundering, although "any CBDC would need to strike an appropriate balance between safeguarding the privacy rights of consumers and affording the transparency needed to deter criminal activity."

The Federal Reserve concluded its report by asking for public comments until May 20, 2022 on the benefits, risks and policy considerations related to a U.S. CBDC. However, the Fed also said that it is not taking a position on the ultimate desirability of a U.S. CBDC, and it kicked the decision back to lawmakers by stating that it "does not intend to proceed with issuance of a CBDC without clear support from the executive branch and from Congress, ideally in the form of specific authorizing law." But should lawmakers decide to proceed with a CBDC for the United States, some preliminary research on technical issues has already been done, which the Federal Reserve Bank of Boston and the Massachusetts Institute of Technology explain in a recent [report](#).

The Fed will defer to lawmakers on the question of a CBDC for the United States.

Part III: Conclusion

As we noted in Part I of this series, the dominant form of money that societies have used has evolved over centuries, and there is no inherent reason to believe that its current form (i.e., paper bills and bank deposits) is the last step in the chain of monetary evolution. In that regard, there are some clear benefits to digital currencies that would make their issuance on a "retail" basis attractive to central banks. But the desirability of a CBDC for the public in a specific economy is not entirely clear-cut. There are some complex design issues that require careful considerations, and ill-design of a CBDC could potentially contribute to monetary and financial instability which most central banks strive to avoid.

China recently became the first major country to issue a digital currency for public use, and many other central banks are working to determine whether the potential benefits of a CBDC outweigh the potential costs. Sweden has already tested a prototype CBDC, but the country has not yet determined whether to move forward with actual issuance. The ECB plans to introduce a prototype some time in 2023, but actual issuance of a CBDC in the Eurozone, if it indeed occurs, still looks to be a few years in the future. The Federal Reserve is studying the issue, but it does not intend to proceed with issuance unless specifically authorized to do so by U.S. lawmakers. In short, a world in which CBDCs are circulating widely does not look to be imminent. In the meantime, the digital currency environment will continue to be dominated by private issuers. We will return shortly with some concluding thoughts regarding digital currencies in our fourth and final report in this series.

Endnotes

1 BIS Annual Report 2021, Bank for International Settlements, Basel, SZ, June 2021 ([Return](#))

2 [Remittance Prices Worldwide: Issue 38](#). The World Bank, June 2021. ([Return](#))

3 BIS, *op. cit* ([Return](#))

4 Milton Friedman first wrote about "helicopter money" in 1969 when he wrote about the effects of a hypothetical helicopter dropping \$1000 bills from the sky that were "hastily collected by members of the community." Ben Bernanke [resurrected the term](#) in 2002 when he wrote about potential policies to fight deflation. ([Return](#))

5 "[How America Banks: Household Use of Banking and Financial Service](#)" FDIC, 2019. ([Return](#))

6 For further reading on China's digital currency see Ma, Gene, Conan French and Vanessa Sun, "China Spotlight: The Digital RMB is Still a Form of Cash," Institute of International Finance, December 2020 and Lowery, Clay, "China's Digital Currency: National Security Concerns?", Institute of International Finance, May 2021. ([Return](#))

7 Unlike the Swedish krona, both the euro and the U.S. dollar are used widely outside the Eurozone and the United States, respectively. The Federal Reserve estimates that more than 40% of U.S. dollars are held by foreigners, while the ECB estimates that non-Eurozone residents hold 20% to 25% of outstanding euros. The increase in U.S. dollars and euros in circulation may reflect, at least in part, foreign demand for these major currencies. ([Return](#))

Part IV: Conclusions

Part IV: Summary

- Monetary systems have evolved over centuries, and there is nothing inherently "permanent" about the current system, which is composed of "public" money (i.e., paper bills that are the liabilities of central banks) and "private" money (i.e., bank deposits that are the liabilities of private enterprises).
- In our view, cryptocurrencies with high price volatility and inelastic supplies (e.g., Bitcoin and Ether) likely will continue to represent an important investment class, but they are ill-suited as a form of money.
- Likewise, privately-issued stablecoins, at least as currently constructed, are also ill-suited as a form of money due to their potential susceptibility to "runs."
- Many major central banks are actively weighing the benefits and drawbacks of issuing their own central bank digital currencies (CBDCs). The Federal Reserve has essentially handed the decision about potential issuance of a U.S. CBDC to lawmakers.
- Determining exactly what Congress will eventually authorize, if indeed it actually does, is more or less impossible. But a scenario in which Congress chooses not to authorize a U.S. CBDC does not seem implausible to us. We could envision a scenario in which lawmakers require that private stablecoin issuers become insured and regulated depository institutions. Under such a scenario, the line between stablecoin issuers and commercial banks would become increasingly blurred.
- Due to the benefits of digitization, it is only a matter of time before some form of digital currency takes its place among the primary methods through which payments are made, in our view.

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The Form of Money Continues to Evolve

We began this four-part series on digital currencies by describing in [Part I](#) how exchange has evolved over the centuries. Initially, exchange took place by barter, but humans eventually invented "money," because it is a more efficient form of exchange than barter. Forms of money with intrinsic value, such as cowrie shells and precious metals, eventually gave way to paper money. Today, the monetary system of most economies is composed of risk-free "public" money (i.e., paper bills that are the liabilities of central banks) and "private" money (i.e., bank deposits that are the liabilities of private enterprises).

Individuals and businesses in most economies willingly accept private money as a perfect substitute for risk-free public money, because the value of bank deposits is guaranteed, at least up to some limit. Furthermore, the supervisory and regulatory framework that exists in most economies gives the public some confidence that the banking system is financially sound. In short, money today is "backed" by trust. Individuals accept paper bills and checks as means of payment for goods and services, because they trust that other people will in turn accept those forms of money as payment. If that trust breaks down, then so too does the monetary system.

Pros and Cons of Digital Currencies as a Form of Money

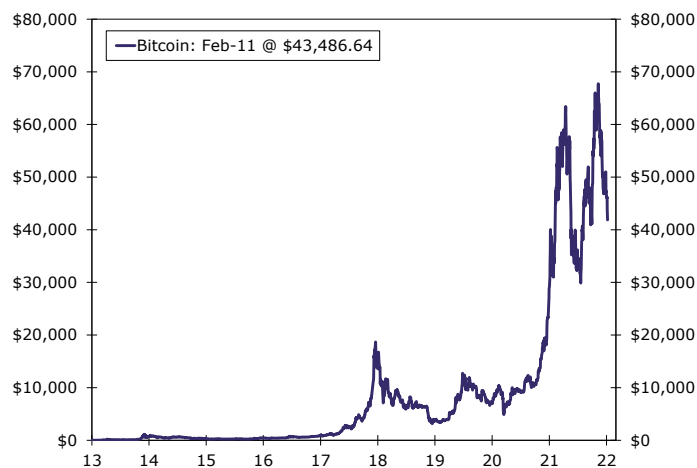
There are no features of the current monetary system that necessarily make it the final stop in the evolution of money. In that regard, cryptocurrencies, which exist in electronic form only, have come into use as a medium of exchange in recent years. Moreover, the explosive growth in digital currencies, which did not even exist prior to 2009, is a testament to some of their qualities that make them a better medium of exchange than paper money.¹ Among other benefits, which we discussed in more detail in [Part I](#), is the speed of payment. Rather than waiting for the "check to clear," settlement in digital currencies occurs essentially instantaneously.

But one of the most notable drawbacks to some cryptocurrencies is their extreme price volatility. For example, the price of Bitcoin has dropped roughly 35% on balance since its peak in November, and daily changes of 10% are not uncommon ([Figure 1](#)). This volatility derives from the limited supply of many cryptocurrencies. Prices can fluctuate widely as demand shifts back and forth along an inelastic supply curve. Due to this high degree of price volatility, many cryptocurrencies are not good "stores of value," at least not over short periods of time. Furthermore, the limited supply of these digital currencies could potentially lead to price deflation of goods and services.

There are no features of the current monetary system that necessarily make it the final stop in the evolution of money.

Part IV - Figure 1

Bitcoin Price



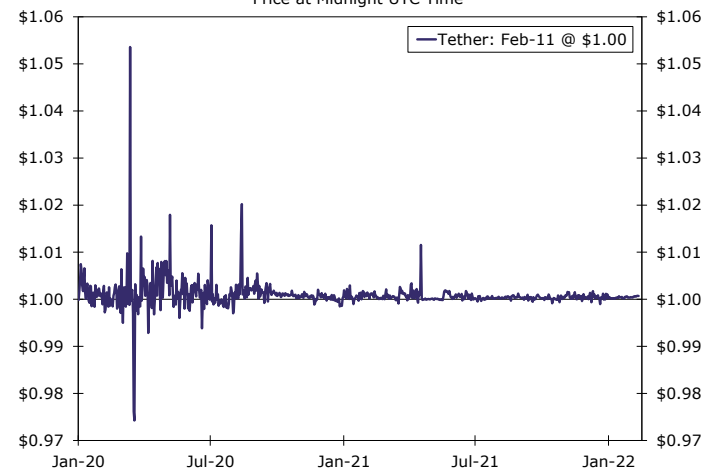
Source: Bloomberg Finance L.P. and Wells Fargo Economics

There is a class of digital currencies, known as "stablecoins," which we discussed in more detail in [Part II](#) that tend to have stable values. Therefore, stablecoins would be a better form of money than cryptocurrencies that have higher degrees of price volatility. In addition, the supply of stablecoins can expand elastically as demand increases. The potential deflationary situation that is associated with inelastically supplied cryptocurrencies does not arise with stablecoins.

Part IV - Figure 2

Tether Price

Price at Midnight UTC Time



Source: Yahoo Finance and Wells Fargo Economics

However, the major drawback to privately-issued stablecoins is their potential susceptibility to "runs." Stablecoin issuers hold assets that they can use to meet redemptions. In addition to bank deposits and risk-free Treasury bills, the assets of stablecoin issuers often include higher-yielding commercial paper. The values of stablecoins are generally stable. But because stablecoins are the liabilities of private enterprises that are not guaranteed, their prices can decline when owners of the tokens start to question the value of the issuer's assets. For example, the price of Tether, one of the most highly traded stablecoins, weakened noticeably in March 2020 when financial market volatility spiked ([Figure 2](#)). In short, privately-issued stablecoins can be subjected to runs, much like commercial banks were prior to the establishment of deposit insurance and credible supervisory and regulatory agencies. If runs on stablecoin issuers were to become systemic, then financial stress could potentially become extreme. In other words, trust, which is the only quality that "backs" money today, could break down.

As noted earlier, currency is a risk-free asset for the public, because it is a liability of the central bank. But there are some drawbacks to currency, which we discussed in more detail in [Part III](#). Specifically, currency is not an efficient way to make large value payments or payments that need to be made remotely. These problems could be solved if central banks could create their own digital currencies. These so-called central bank digital currencies (CBDCs) could also offer some benefits in the form of monetary policy options. But there are many complex design issues involved with CBDCs that require careful consideration. For example, CBDCs would be risk-free assets of individuals and businesses that hold them. If the public perceives CBDCs to be superior to the liabilities of commercial banks, then disintermediation from the banking system could occur, which potentially could have negative consequences for economic growth.

Therefore, many central banks are proceeding cautiously with the introduction of digital currencies. Among major central banks, only the People's Bank of China has issued a CBDC to date. The Swedish Riksbank has tested a prototype and the European Central Bank plans to have its own prototype ready for testing in 2023, although neither central bank has yet to commit to actual issuance. The Federal Reserve is conducting in-depth research about the pros and cons of its own digital currency, but it has essentially handed the decision about potential issuance of a U.S. CBDC to lawmakers.

What Does the Future Hold for Digital Currencies?

So, what does the future hold? For starters, digital currencies have established a firm foothold in the global financial system, and they are simply not going away, in our view. But we believe that cryptocurrencies with inelastic supplies and significant price volatility (e.g., Bitcoin and Ether) will play a limited role as a form of money. Money has three functions: it is a medium of exchange, a unit of account and a store of value. Digital currencies such as Bitcoin and Ether are currently being used as a medium of exchange, but only to a limited extent. Rather, the vast majority of transactions today continue to be made in national currencies (e.g., U.S. dollars, euros, etc.) Their use as a unit of account is also quite limited at present. That is, prices of most goods and services continue to be denominated in national currencies, not in terms of specific cryptocurrencies.

Prices of many cryptocurrencies with inelastic supplies have risen significantly on balance since their introduction, but their price volatility does not make them good stores of value, at least not over short-run horizons. Consequently, most individuals and corporate treasurers likely would not want to make this class of cryptocurrencies a significant part of their liquid cash balances. To the best of our knowledge, there has been no issuance to date of securities (i.e., stocks and bonds) that are denominated in inelastically supplied cryptocurrencies. Securities continue to be denominated in national currencies such as U.S. dollars, euros, Japanese yen, etc. As long as prices of these inelastically supplied cryptocurrencies remain highly volatile, we think that corporate treasurers will largely refrain from issuing securities that are denominated in them. Therefore, individuals who want to invest in this class of cryptocurrencies are largely limited to owning just the digital currency, rather than an interest-earning or dividend-paying security.

In our view, cryptocurrencies with inelastic supplies and highly volatile prices will continue to offer investment opportunities for individuals and institutions, especially those with high tolerances for risk. In that regard, this class of cryptocurrencies likely will represent an important investment class, similar to emerging market securities. Although these cryptocurrencies are not currently regulated, they potentially could fall under the regulatory purview of an agency such as the Securities and Exchange Commission (SEC). We will defer to investment professionals regarding issues of investment options and potential regulation. But we do not see cryptocurrencies with inelastic supplies and high price

Stablecoins could experience "runs" during periods of financial stress.

Digital currencies are simply not going away, in our view.

We do not see cryptocurrencies with high price volatility or privately-issued stablecoins, as currently constructed, replacing national currencies anytime soon.

volatility replacing national currencies as the primary mediums of exchange and units of account anytime soon.

The class of digital currencies that are known as stablecoins have some advantages over their more volatile counterparts in terms of a form of money. In addition to the property of instantaneous payment, a quality that is inherent of all digital currencies, stablecoins generally have stable values and elastic supplies. But as noted previously, the main drawback to stablecoins is that they are liabilities of private enterprises that are not guaranteed, at least not at the present time. Their potential susceptibility to runs could add to volatility during periods of financial stress.

Furthermore, there is the issue of "convertibility" among stablecoins. Assume that Individual A, who has a Tether account, needs to pay Individual B, who has an account that is denominated in USD Coin. One of the individuals could exchange one stablecoin for the other, but there would be transaction costs associated with the exchange. These transaction costs do not arise when individuals are making and receiving payments in the same national currency (e.g., U.S. dollars). Because of their potential susceptibility to runs and this convertibility issue, we do not envision the replacement of national currencies with privately-issued stablecoins, *as currently constructed*, anytime soon.

Central banks could potentially begin to issue their national currency by digital means rather than via paper bills. Large and remote payments, which are problematic for paper currencies, could be made easily with CBDCs. But a notable drawback to CBDCs is that they could lead to disintermediation from the commercial banking system, if ill-designed. Furthermore, most central banks simply do not have the scale or the scope to onboard and maintain the accounts of millions of households and businesses, a task that currently is being handled by commercial banks in each individual economy. Many major central banks are actively considering the pros and cons of digital currencies, but none to date, aside from the Peoples Bank of China, have begun to issue their own CBDC.

Due to the benefits of digitization, it is only a matter of time before some form of digital currency takes its place among the primary methods through which payments are made, in our view. But we also believe that there will be some public element to payment-related digital currencies due to the drawbacks of privately-issued stablecoins that were noted previously. The exact design of these digital currencies will ultimately depend on the legal, regulatory and political milieus of each economy that adopts one. In the United States, the Federal Reserve has highlighted four basic principles to which any U.S. CBDC would need to adhere: privacy protection, intermediated (i.e., offered via the private sector), transferable and identity-verified. However, the Federal Reserve has also said that "it does not intend to proceed with issuance of a CBDC without clear support from the executive branch and from Congress, ideally in the form of specific authorizing law."

Determining exactly what Congress will eventually authorize, if indeed it actually does, is essentially impossible. But a scenario in which Congress chooses not to authorize a U.S. CBDC does not seem implausible to us. There already is some skepticism in Congress regarding CBDCs. For example, Representative Tom Emmer (R-MN) recently introduced a [bill](#) that would amend the Federal Reserve Act to prohibit the Fed from issuing "a central bank digital currency directly to an individual." Of course, Emmer is just one voice in Congress, but the political economy of the country seems to skew toward private sector solutions to many issues, including those that are related to the financial sector.

So, if Congress does not authorize a U.S. CBDC, how could it allow the country to capture the benefits of payment digitization? The [report](#) that was published in November 2021 by the President's Working Group on Financial Markets (PWG) offers a potential way forward. As we noted in Part II, the PWG report concluded that Congress should pass legislation requiring stablecoin issuers to become "insured depository institutions, which are subject to appropriate supervision and regulation." Deposit insurance in conjunction with a robust supervisory and regulatory framework should largely prevent "runs" on stablecoin issuers, much as bank runs have become exceedingly rare since the creation of the Federal Deposit Insurance Corporation (FDIC) in 1933.

If Congress were to follow the PWG recommendation, then stablecoin issuers would start to resemble commercial banks, which currently issue private money in the form of bank deposits. Legislation could be crafted such that these stablecoin enterprises would need to hold some proportion of their privately-owned deposits as reserves at the Federal Reserve, much as commercial banks do today. Commercial banks in turn could also begin to issue their own digital forms of private money, with the blessing of the regulatory authorities. Over time, the lines between stablecoin issuers and commercial banks would become increasingly blurred. The government would continue to delegate the task of issuing most of the nation's money supply to the private sector, with appropriate regulatory and

It is only a matter of time before some form of digital currency takes its place among the primary methods through which payments are made, in our view.

The recommendations that were made in the PWG report offer a potential way forward.

supervisory oversight, including robust capital requirements. The private sector would be able to drive innovation in payment technologies, as it does today.

Under this scenario, the potential for disintermediation of the banking system would largely disappear, because the United States would not have a CBDC. Likewise, the potential of runs on stablecoin issuers would also become largely irrelevant, because they would be insured and regulated enterprises. But what about the issue of "convertibility"? Similar to the current environment, in which numerous stablecoins exist, a specific bank/stablecoin issuer presumably would be issuing its own form of digital currency, while another platform would be issuing a different form of digital currency. Would these two currencies be easily and inexpensively convertible?

The Federal Reserve noted in its report that "transferability" is one of the qualities a CBDC should have. That is, a CBDC "would need to be readily transferable between customers of different intermediaries." Although this quality is meant to apply to any digital currency that the Fed would issue, it could equally apply to digital currencies that are issued via the banking system. Any legislation that requires stablecoin issuers to become insured depository institutions could also include the requirement that their tokens are readily transferable between different depository institutions.

But even if legislation did not specify this requirement, we think competitive pressures would eventually force the stablecoins of different private sector issuers to largely resemble each other. U.S. dollars that are held in one commercial bank today are identical to U.S. dollars held in another commercial bank. Moreover, an individual can send payments of U.S. dollars to another individual without transaction costs. So, we think depository institutions/stablecoin issuers would all eventually issue the same U.S. dollar-based digital currency.

Part IV: Conclusion

Starting with Bitcoin's inception in 2009 to today, the number of digital currencies in circulation has exploded from one to more than 17,500, which have an aggregate value of roughly \$2 trillion at present. Although the exact future of digital currencies is difficult to discern, one thing seems certain to us: they are here to stay. There is nothing inherently "permanent" about the current form of money, and digital currencies have many superior qualities to paper money.

But there are different types of digital currencies, and some are better suited for some purposes than others. There is a class of digital currencies that generally have inelastic supplies with high degrees of price volatility. Notable examples are Bitcoin and Ether. In our view, digital currencies with these characteristics are ill-suited to serve as a form of money, and we do not envision them replacing national currencies as the primary mediums of exchange and units of account anytime soon. But they could represent a class of investment assets that, although unregulated at present, may eventually fall under some regulatory purview. But we will defer to the opinions of investment professional on these matters.

There is another class of digital currencies, which are known as stablecoins, that tend to have stable values and elastic supplies. But they are the liabilities of private enterprises and their values are not insured, which makes them potentially susceptible to runs. Therefore, we do not envision them replacing national currencies, at least not as they are currently constructed. That said, stablecoins have more promise than inelastically supplied digital currencies as potential forms of money, if some changes are implemented.

Much will depend on the decisions that governments make regarding CBDCs. If a government decides to move ahead with a CBDC, then the future of privately-issued stablecoins would likely be more tenuous. Everything else equal, why would the public want to use the liabilities of a private enterprise as a form of money when it could use a risk-free digital currency that is supplied by the central bank? But stablecoins could still have a future depending on the underlying design features of the CBDC. Outside of China, actual issuance of CBDCs, if it occurs at all, still seems to be a few years in the future in most economies.

Will the United States ever have a CBDC? It obviously is difficult to know with certainty, but we are skeptical. The Federal Reserve does not intend to move forward with issuance "without clear support from the executive branch and from Congress." In our view, the political economy of the United States skews toward private sector solutions to many issues, and a CBDC could potentially threaten many private enterprises in the financial system. We can envision a solution whereby Congress passes

legislation that requires stablecoin issuers to become insured depository institutions with appropriate regulatory and supervisory oversight.

Under such a scenario, the line between stablecoin issuers and commercial banks would become increasingly blurred. But the advantage of such a scenario is that the private sector would continue to drive innovation in payment technologies. Moreover, this scenario would be more or less similar in design, and therefore familiar, to the current banking system. That is, the majority of the nation's money supply is "private" money that is supplied by private enterprises. The only difference between the current system and the system of the future would be the form of money. Money at present is paper in form; it would be digital in the future.

Endnote

¹ When we published our [first report](#) on January 10, there were about 16,400 digital currencies at that time. The number of digital currencies today exceeds 17,500. ([Return](#))

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