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Central Bank Digital Currency: Disrupting the Disruptors

The "genesis" block of bitcoin—the first cryptocurrency—was mined in early 2009, to the collective indifference of traditional market participants; a search of *The Wall Street Journal* archives reveals that bitcoin's first, brief mention in the paper of record for business and finance occurred in June 2011, more than two years after its introduction.[1] Today, of course, the explosive growth of cryptocurrencies has made them front-page fodder, and the technology that was once the domain primarily of techno-futurists and dark-web degenerates now is the subject of cocktail-party banter and memes forwarded from grandma.

Key Takeaways

- The explosive growth of cryptocurrency markets has prompted central banks to consider the positives and negatives of issuing digital fiat, an effort that took on new urgency with Facebook's ultimately curtailed entry into the stablecoin space and China's advancements with its CBDC.
- Cash usage—already in decline over the past decade as commerce has increasingly migrated online—took a significant hit from the dislocations of Covid-19.
- Policymakers face a host of design choices that likely will influence the domestic adoption of CBDCs as well as its impact on the global monetary and financial systems.
- Though privately issued crypto does not appear poised to challenge the supremacy of national fiat, the technology upon which these platforms are built may support a range of applications for central banks and other policymakers. Implementation is not without risk, however.

While the increasing participation of mainstream financial players in the crypto space has helped fuel its expanded acceptance, national authorities generally have been less responsive to the potential implications of the expanding crypto market. This tide appears to be changing, however. In addition to considering a range of regulatory and oversight frameworks for cryptocurrencies, many central banks—determined not to be undermined by decentralized peer-to-peer networks that operate free from their authority—are studying the feasibility of issuing some form of digital currency of their own. Such central bank digital currencies (CBDCs) are generally intended to leverage the lower costs and higher efficiencies associated with the technology that drives many privately issued cryptocurrencies, while allowing central banks to maintain control of the supply of national fiat and their ability to effectively conduct monetary policy.

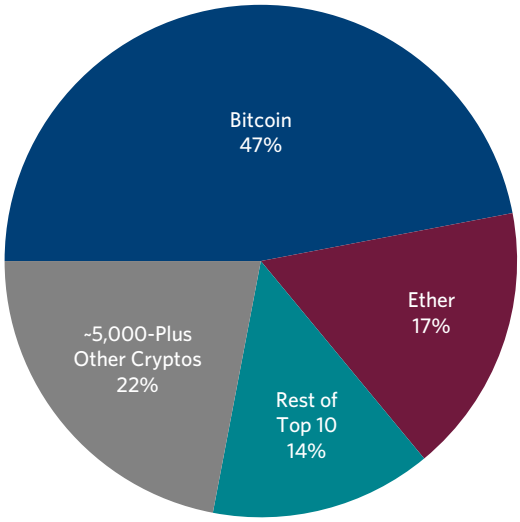
1. Source: *The Wall Street Journal*; as of June 9, 2011.

An Emerging Technology Broadens in Scope

As of mid-July 2021, the cumulative crypto market cap stood at around $1.2 trillion, four times higher than year-ago levels and more than 90 times higher than five years ago.[2] Though CoinMarketCap currently tracks 5,700-plus cryptos and new entrants are being added daily, the market remains dominated by the largest ones, as shown in Exhibit 1; it's worth noting, however, that bitcoin's current 47% market dominance is down sharply from the 71% control of the market it commanded at the start of 2021.

Exhibit 1. Cryptocurrency Market Is Large but Concentrated

Share of Total Cryptocurrency Market



Source: CoinMarketCap; data as of July 20, 2021.

The recent acceleration of growth in the crypto market can be attributed largely to its ongoing insinuation into the mainstream financial system, particularly since the emergence of Covid-19.

The recent acceleration of growth in the crypto market can be attributed largely to its ongoing insinuation into the mainstream financial system, particularly since the early-2020 emergence of the Covid-19 pandemic. While companies like Tesla have garnered the lion's share of headlines on this front, old-school Wall Street participants ranging from Bank of New York Mellon and Morgan Stanley to BlackRock and Goldman Sachs have dialed up their ability to provide crypto-related services and investments to their clientele, while payments systems operators like Visa and PayPal have evolved their technologies to facilitate crypto-based transactions.

Policy responses to the potential implications of the expanding crypto market have been varied across jurisdictions. Advanced economies generally have sought to work constructively with the crypto industry and ease it into the regulatory framework that governs mainstream assets. In May 2021 testimony before a House of Representatives subcommittee, US Securities and Exchange Commission head Gary Gensler said there are "many challenges and gaps for investor protection in these markets," noting that the lack of SEC registration by crypto exchanges presents "greater opportunities for fraud and manipulation" and that he would like to work with Congress on legislation that would provide investors with protections similar to those that are required of traditional securities exchanges.[3] A non-adversarial approach by lawmakers may leave

2. Source: CoinMarketCap; data as of June 24, 2021.
3. Gary Gensler, "Testimony Before the Subcommittee on Financial Services and General Government, U.S. House Appropriations Committee" (May 26, 2021).

Even as the concept of cryptocurrencies has captured the attention of a broad range of financial market participants, including individuals, its nuances can be difficult to grasp. For a primer on the mechanics and drivers of this nascent asset class, please see our May 2021 paper "Considering Crypto."

the door open for public-private partnerships with crypto industry players to further the development of use cases for blockchain technology, including fighting financial crime, securing election integrity, managing personal medical data, supporting the pursuit of sustainability goals and many others.

China's attitude toward crypto assets has grown increasingly antagonistic. The People's Bank of China (PBOC) over the years has issued a variety of mandates to control the spread of crypto among the populace—including prohibiting initial coin offerings, banning citizens from exchanging cryptocurrency for yuan and shutting down domestic cryptocurrency exchanges—citing concerns about financial stability. Despite being the largest domicile for crypto mining by far, China has taken steps to discourage the practice broadly and has banned it outright in some provinces, most recently Sichuan.[4] India, meanwhile, has been even less accommodating than China; policymakers reportedly are preparing to bring a law before parliament that would criminalize a wide range of crypto-related activities—including fines for possession and trading—while establishing the framework for a Reserve Bank of India-backed digital currency.[5]

While regulatory developments are likely to impact the value proposition of crypto ownership going forward, potential competition from central banks—which view privately issued crypto as a potential threat to financial stability and their ability to conduct monetary policy effectively—may represent the biggest challenge to the continued broad demand for these assets, especially those cryptos best suited for transaction. A recent survey by the Bank for International Settlements found that 60 central banks—86% of those surveyed—are researching the potential benefits and risks of issuing digital fiat of their own.[6] Generally speaking, such central bank digital currencies will seek to leverage the lower costs and higher efficiencies associated with the technology underlying cryptocurrencies while also allowing the central bank to maintain firm control of the money supply and the ability to effectively conduct monetary policy.

CBDCs seek to leverage the lower costs and higher efficiencies associated with the technology underlying cryptocurrencies while also allowing the central bank to effectively conduct monetary policy.

In addition to maintaining economic and financial market stability, most central banks also are charged with promoting a smoothly functioning payment and settlement system; this includes ensuring that the public has access to a range of payment options and that financial institutions can effectively provide payment services. While these options have evolved over history, national fiat in the modern era typically has taken one of two forms: physical cash in circulation and bank reserves held at the central bank. A central bank digital currency would represent a third form of central bank-issued money, an electronic record or digital token whose value is denominated in the national unit of account and represents a liability of the issuing central bank.

Exhibit 2. A Range of Payment Options Are Available to Consumers and Businesses

	CBDC	Cash	Commercial Bank Money	Electronic Money	Cryptocurrency	Gold
Format	Digital	Physical	Digital	Digital	Digital	Physical
Value	National currency	National currency	Fixed 1:1 with national currency	Fixed 1:1 with national currency	Independent currency	Market determined
Backstop	Full faith and credit of issuer	Full faith and credit of issuer	Gov't guarantee, supervision and regulation	Varies based on private issuer	None/underlying technology	None/historical precedent

Source: First Eagle Investment Management; data as of June 21, 2021.

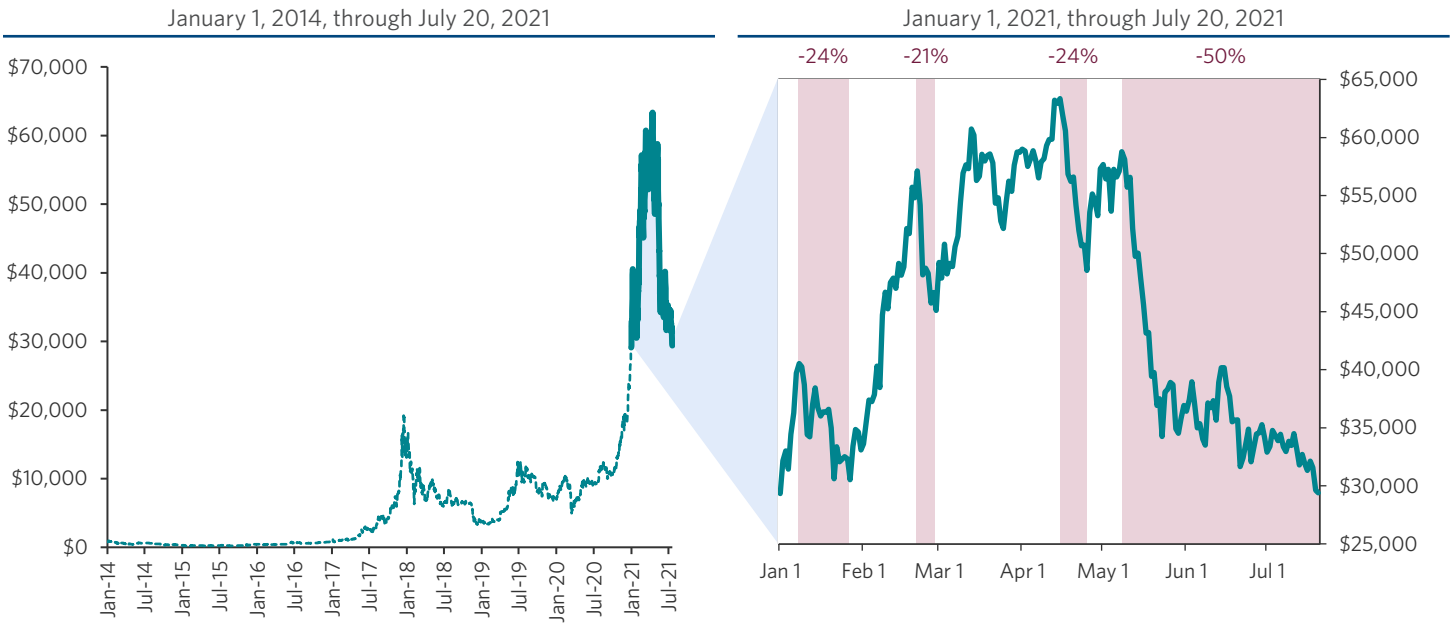
4. Source: Reuters; as of June 19, 2021.
5. Source: *The Indian Express;* as of April 23, 2021.
6. Codruta Boar and Andreas Wehrli, "Ready, Steady, Go? Results of the Third BIS Survey on Central Bank Digital Currency," Bank for International Settlements Papers No. 114 (January 2021).

Central Banks Take Notice of Crypto but Are Proceeding with Caution

Money in the traditional sense—issued by central banks for use by financial institutions, businesses and the public—serves three primary functions within a jurisdiction, acting as 1) a medium of exchange, 2) a common unit of account and 3) a store of value. Not all crypto assets are intended to serve as a substitute for fiat currency—a range of use cases exist for the coins and tokens operating across blockchains, including capital raising, ownership claims and network participation rights—but those that are have faced significant barriers in meeting these functions.

Crypto acceptance continues to ramp up, but only a limited number of businesses and individuals have transacted with it directly, undermining claims on being a common medium of exchange. Further, the notoriously slow transaction processing speed of blockchain-based systems is a significant drawback compared to the near-instantaneous response of legacy payments systems. Finally, the valuation of prominent free-float cryptocurrencies relative to established fiat has been too volatile to imagine them serving as a mainstream unit of account or store of value, in the near term at least. For example, 2021 alone saw bitcoin establish a number of new all-time highs and experience four massive selloffs, one of which remains ongoing, as shown in Exhibit 3.

Exhibit 3. Massive Price Volatility Makes Bitcoin a Questionable Substitute for National Fiat Currency



Source: CryptoCompare, Nasdaq; data as July 20, 2021.

Past performance does not guarantee future results. For illustrative purposes only.

With the crypto industry still in its early stages, it's possible that its above-mentioned shortcomings may ease over time as acceptance broadens. Perhaps more likely—and more threatening to the monetary status quo and the dominance of national currencies—is the emergence of new crypto contenders purpose-built to serve one or more of the functions of fiat currency and to sidestep some of the limitations that have inhibited the progress of current offerings.

One particular area of concern for central banks has been the emergence of stablecoins, crypto tokens that are pegged to the value of a more stable asset like fiat currency to reduce volatility. The wide adoption of such an instrument could present significant risks to the global financial and monetary system and distort the transmission of monetary policy to some degree. To date, no existing stablecoins have come

close to reaching the critical mass necessary to represent an active substitution risk for fiat currency.

Tether, the largest stablecoin, had a market cap of around $60 billion in mid-June, a fraction of the $2 trillion-plus US dollars in circulation.[7] Tether also exemplifies one of the major shortcomings of many existing stablecoins: Though sponsors of the largest stablecoins purport issuance to be fully collateralized by the fiat currency to which the coin is pegged, the accounting of this claim is murky at best. Notably, the New York State attorney general found tether's contention that its issuance was at all times backed one-to-one by dollar reserves to be "a lie" and in February 2021 announced a settlement in which tether and crypto exchange Bitfinex were fined $18.5 million and forbidden from trading activity with New Yorkers.[8] Lacking the backstops that promote the stability of traditional fractional-reserve banks, such as deposit insurance and regulatory oversight, stablecoins without full collateralization could be susceptible to runs, which could have adverse spillovers to the rest of the financial system.

The Libra Association's plan to launch a crypto-based payments system leveraging Facebook's massive global user base caught the attention of national authorities.

Of greater concern to authorities at the national level was a June 2019 announcement by the Facebook-led Libra Association—a consortium that included more than two dozen founding corporate backers including some of the biggest names in payments and digital commerce—that it was preparing to launch a crypto-based payments system in 2020.[9] The libra stablecoin was envisioned as a global blockchain-based payment system collateralized by a basket of fiat currencies, including the US dollar, euro and Japanese yen. By leveraging Facebook's massive global user base, libra had the potential to quickly achieve the scale that had proved elusive to other crypto assets. The project drew immediate backlash from policymakers worldwide, and within months a number of high-profile Libra Association members had rescinded their support for the project, citing regulatory risk. By mid-2020 Libra Association had shifted its focus to single-currency stablecoins, and in December 2020 the organization was rebranded the Diem Association to distance itself from its previous business model. In May 2021 it announced plans to issue a dollar-based diem stablecoin in partnership with crypto-focused Silvergate Bank.[10]

China appears to be the most advanced large economy on the CBDC front.

While the US and its allies were busy clipping Facebook's wings with regulatory and legislative threats, China redoubled efforts to develop an alternative of its own and now appears to be the most advanced large economy on the CBDC front. China piloted its digital currency—the e-CNY or digital currency electronic payment (DC/EP)—with retailers in certain cities during fourth quarter 2020 and plans to make it more widely available in conjunction with the Beijing Winter Olympics in 2022.[11] Strictly a domestic instrument at this point, the e-CNY will be distributed through a two-tier system: The PBOC issues the digital version of its currency to commercial banks and other intermediaries, who are then responsible for facilitating its transactional availability to consumers and businesses primarily via app-based digital wallets. Though the ramp-up may take time, the e-CNY ultimately may weaken the online retail payment duopoly currently held by WeChat Pay (owned by Tencent) and Alipay (owned by Ant Group), which now control about 94% of China's substantial market—and the rich trove of consumer data that represents. While these legacy platforms are likely to play a large role in facilitating e-CNY transactions among the public, Beijing appears interested in promoting greater competition in the payments space to make room for state-owned banks and fintech newbies.[12]

7. Source: CoinMarketCap, Federal Reserve; data as of June 10, 2021.
8. Source: New York State Office of the Attorney General; as of February 23, 2021.
9. Source: *The Wall Street Journal*; as of June 18, 2019.
10. Source: *The Wall Street Journal*; as of October 16, 2019.
11. Source: CNBC; as of April 18, 2021.
12. "The Past and Future of Money: Bitcoin, DeFi and CBDCs in Historical Perspective," Greenmantle (May 20, 2021).

A popular theory is that China's e-CNY rollout may represent an effort to develop a parallel system for cross-border currency movements free from the SWIFT network and the foreign oversight that comes with it. Such a platform could undermine the impact of targeted sanctions by the US and its allies and allow users—governments, businesses, criminal/terrorist organizations and individuals—to dodge capital controls imposed upon them. The PBOC recently joined the Multiple CBDC Bridge in partnership with the BIS Innovation Hub and the central banks of Hong Kong, Thailand and the United Arab Emirates; the project seeks to develop a prototype for real-time cross-border foreign exchange using distributed-ledger technology (DLT).[13] While such a platform could ultimately circumvent SWIFT, the difficulty of establishing coordinated currency systems is significant given the surrender of sovereignty inherent in these agreements, and the track record of similar efforts to date has been poor. Moreover, non-DLT alternatives to SWIFT already exist; both China and Russia have built interbank payment systems of their own, but both their utility and uptake remain limited.[14]

The US has been a relative laggard in researching CBDCs, but attitudes among government officials appear to be shifting.

The US has been a relative laggard in researching CBDCs, but its conservative approach seems appropriate given the profound impact the introduction of a digital US dollar could have. That said, attitudes among government officials appear to be shifting in response to the inroads made by private issuers of digital currencies and the geopolitical implications of China's efforts. Treasury Secretary Janet Yellen, for one, has publicly sounded the alarm on bitcoin—citing its inefficiency as a transaction mechanism, energy consumption and price volatility, among other concerns—while also offering support for a Fed-maintained digital dollar.[15] The Federal Reserve Bank of Boston has been working with the Massachusetts Institute of Technology on a project that could evolve into a digital dollar sometime in the future; it plans to reveal its initial research to the public in July 2021.[16] Fed Chair Jerome Powell acknowledged that a digital dollar would come to fruition only with the support of Congress, which may need to pass a law or an amendment to the Federal Reserve Act for a US central bank digital currency to be legal.[17] The central banks of other countries likely face similar legislative restrictions on their ability to issue digital versions of national fiat.[18]

Elsewhere, the European Central Bank is set to release an analysis of the public response to its October 2020 report on a potential digital euro. Once that makes it way through the appropriate bureaucratic channels over the next few months, the ECB will decide whether or not to begin practical experimentation with an e-euro, with a go/no-go decision on rollout to come some point after that. ECB President Christine Lagarde believes a 2025 launch may be feasible.[19] The Bank of Japan in April 2021 began to study the feasibility of its own digital currency, though the central bank says that it currently has no specific plans to issue a digital version of the yen.[20]

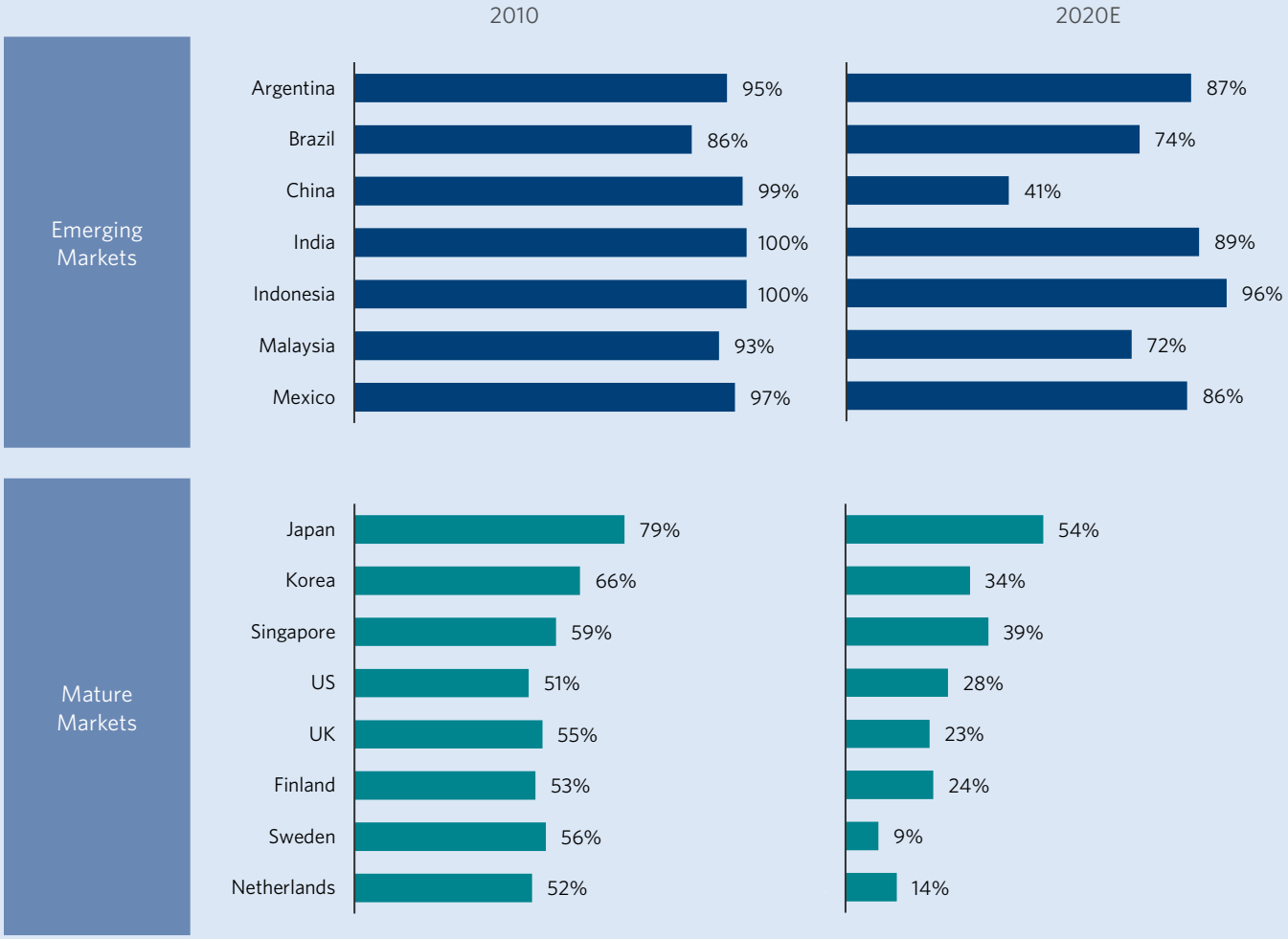
13. Source: Bank for International Settlements; as of February 23, 2021. Note that this project was first initiated bilaterally by the central banks of Hong Kong and Thailand under the name Inthanon-LionRock.
14. Source: Belfer Center for Science and International Affairs at Harvard Kennedy School of Government; as of June 2, 2021.
15, 16. Source: *The New York Times;* as of February 23, 2021.
17. Source: *The New York Times;* as of March 22, 2021.
18. Wouter Bossu, Masaru Itatani, Catalina Margulis, Arthur Rossi, Hans Weenink and Akihiro Yoshinaga, "Legal Aspects of Central Bank Digital Currency: Central Bank and Monetary Law Considerations," IMF Working Paper (November 2020).
19. Source: Bloomberg; as of March 31, 2021.
20. Source: Reuters; as of April 5, 2021.

Is Cash Still King?

Trends in modern commerce have some questioning the ongoing need for cash. While cash remains a key element of the consumer payment mix, especially for small-value transactions, its use has declined in recent years in conjunction with the growth of online commerce and ongoing adoption of electronic payment methods like credit and debit cards. As shown in the exhibit below, the cash share of transaction volume has fallen markedly across markets over the past decade, particularly in mature markets. Of course, this trend received a significant boost from the displacements of Covid-19, as the pandemic compressed "a half-decade's worth of change into less than one year—and in areas that are typically slow to evolve: customer behavior, economic models and payments operating models."[1] In the US, for example, cash transactions as a percentage of the total number of transactions fell from 26% to 19% year-over-year in 2020, as credit cards outpaced cash for the first time while debit cards remained the primary payment instrument.[2]

Cash Transactions Were in Decline Even Pre-Covid

Percentage of Cash Used in Total Transactions by Volume



Source: McKinsey Global Payments Map; as of October 2020.

1. "The 2020 McKinsey Global Payments Report," McKinsey & Company (October 2020).
2. "2021 Findings from the Diary of Consumer Payment Choice," Federal Reserve Bank of San Francisco (May 2021).

The Devil's in the Details

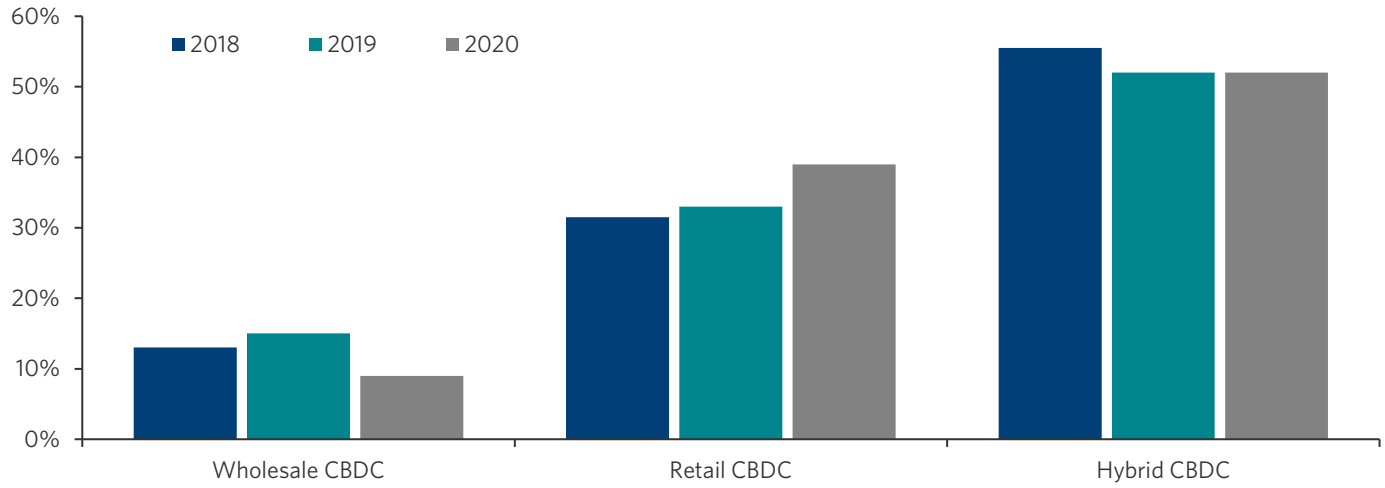
Central banks appear to be leaning toward a retail-only or wholesale/retail hybrid CBDC model.

The potential success of a CBDC is highly dependent on its architecture. Policymakers face a host of design choices that likely will influence the domestic adoption of CBDCs as well as its impact on the global financial and monetary system.

Distribution. Perhaps most elemental is the distribution framework for the currency; a CBDC could be introduced into the wholesale payment system, the retail payment system or both. Restricted to financial institutions, a "wholesale" CBDC would be akin to the already-electronic central bank reserve and settlement accounts used today. Alternatively, a "retail" or general purpose CBDC would represent a new way for all participants in an economy—including individuals and businesses—to hold the liability of a central bank. A survey by the Bank for International Settlements suggests that central banks increasingly are narrowing the focus of their CBDC research toward a retail-only model or a wholesale/retail hybrid.[21]

Exhibit 4. Central Bank Research Biased Toward a Retail-Only or Hybrid CBDC Model

Share of Respondents to Bank for International Settlements' Survey



Source: Bank for International Settlements, First Eagle Investment Management; data as of January 2021.

Tokens vs. accounts. Money typically takes the form of one of two basic technologies: tokens of stored value or accounts. The key distinction between the two is the type of verification required to prove ownership when transacting. Tokens—which include cash—require verification of the token's validity *(Is this store of value real or counterfeit?)*. Account-based systems—such as reserve balances and commercial bank money—require verification of the payer's identity *(Are you the rightful owner of this account?)*. A digital currency may be token-based, account-based or both.[22]

Regardless, a central bank must choose to offer individuals and businesses CBDC wallets directly through the central bank or indirectly through commercial banks and other financial third parties (as China is doing with its e-CNY pilot). A direct approach would require account administration by the central bank and entail considerable costs; it's estimated that banks in the US employ around 20,000 people to monitor anti-money laundering/know-your-customer compliance alone.[23] An indirect system would outsource administrative tasks to an intermediary that would act as an agent of the central bank; with intermediaries lacking the ability to leverage these

21. Codruta Boar and Andreas Wehrli, "Ready, Steady, Go? Results of the Third BIS Survey on Central Bank Digital Currency," Bank for International Settlements Papers No. 114 (January 2021).
22. "Central Bank Digital Currencies," Bank for International Settlements (March 2018).
23. Gregory Baer, "Central Bank Digital Currencies: Costs, Benefits and Major Implications for the U.S. Economic System," Bank Policy Institute Staff Working Paper (April 7, 2021).

CBDC deposits by making loans and limited in the fees they can charge on payments, however, the incentive to provide this service is uncertain. In either account framework, settlement could be executed either through a conventional centralized database or via distributed-ledger technology.

An interest-bearing CBDC would compete with commercial banks for deposits and may represent the preferred currency option during times of crisis.

Interest rates. Remuneration on CBDCs is a significant consideration. Physical cash pays no interest to its holders; while reserves held at the central bank are not an option for the public, the interest rate paid on these reserves influences the rate commercial banks pay on deposits and cash-like instruments. A central bank could choose to mimic either of these remuneration schemes or introduce another framework entirely. An interest-bearing CBDC would compete with commercial banks for deposits and effectively set a floor for what banks could pay. While it would provide commercial banks willing to pay a higher interest rate with a lever for siphoning cash deposits from CBDCs, their ability to do so may be compromised during periods of crisis when safety takes precedence over compensation.

Cross-border payments. The question of whether or not to allow nonresident access to a national CBDC could have significant legal and operational implications. A cross-border CBDC could result in substitution away from the domestic currency in some economies, destabilizing monetary aggregates and exacerbating the advantages certain international currencies already possess. By enabling faster deleveraging in markets, CBDCs could promote capital flight during periods of risk aversion, with likely impacts on exchange rates, asset prices and funding conditions.[24]

There is hope that CBDC technology could be leveraged thoughtfully and in a coordinated manner to usher in a more efficient era of cross-border payment, though the complications are many.

Given costly and slow cross-border payments at both the wholesale and retail levels, however, there is hope that CBDC technology could be leveraged thoughtfully and in a coordinated manner to usher in a more efficient era. While there are multiple ways to establish connections across the CBDCs of multiple jurisdictions—including compatible systems, interlinked systems and integrated systems—all are complicated by the unique interests of each central bank and the negotiations required to overcome them. Starting with a clean slate, however, forward-thinking central bankers may be able to effect the necessary coordination across technical, legal and regulatory frameworks at the onset of development.

CBDCs Offer a Range of Potential Benefits...

Though privately issued cryptocurrencies do not appear poised to dislodge national fiat at this stage of their development, the technology upon which these platforms are built could support a range of applications for central banks and other policymakers.

More efficient payments. While electronic payments—credit and debit cards, payment apps, etc.—have long been a large part of consumer spending behavior, the multiday settlement period for these transactions can delay access to funds, in some cases forcing businesses to maintain large cash balances in order to effectively manage day-to-day operations. A CBDC could offer immediate settlement and the more efficient use of capital. If designed with global interoperability in mind, it could also help facilitate reduced friction in cross-border payment systems.

Lower transaction costs. Processing costs—on both the front and back ends of a transaction—vary across payment types. Credit card transactions, in particular, involve multiple fees to banks, payment processors and facilitators and card networks that can vary significantly by card and are not always transparent to end users, with smaller merchants and those in underbanked domiciles typically paying higher fees. The aggregate impact on a country's economic activity is non-negligible; global payments revenue—including both retail and wholesale transactions—amounted to

24. "Central Bank Digital Currencies," Bank for International Settlements (March 2018).

about $2 trillion in 2019.[25] The use of CBDCs could reduce the fees associated with traditional electronic payments by promoting increased payments diversity and serving as a common transmission mechanism for fragmented private systems.

CBDCs could also reduce friction in global money transfers. In a first, El Salvador in June announced that it had adopted bitcoin as legal tender alongside the US dollar, specifically citing bitcoin's utility as a vehicle for remittances from abroad. Such remittances comprised one-fifth of El Salvador's GDP in 2019, among the highest percentages globally.[26]

An app-based CBDC could help the under-served participate in electronic payment systems and perhaps pave the way for access to other financial products.

Greater inclusion. Though access to digital payment vehicles has been on the rise, 1.7 billion adults and hundreds of millions of businesses globally lack bank accounts and rely on cash as their only means for transacting.[27] Given the ubiquity of mobile devices, an app-based CBDC could help the under-served participate in electronic payment systems and perhaps pave the way for access to other financial products and services as well. In fact, the Bahamas in October 2020 launched the world's first nationwide CBDC—the sand dollar, which is pegged one-to-one with the Bahamian dollar—in part to provide more inclusive access to the 700-island chain's financial system.[28] Such opportunities are not limited to developing economies; nearly half of the Black and Hispanic population in the United States is un- or under-banked, while 10% of low-income households in the euro zone are unbanked.[29]

Curbs on financial crime. Though bitcoin gets some flak for its often-unsavory early applications, cash has been financing the conduct of criminal activity for centuries and continues to outpace its crypto rivals in this regard today. The introduction of CBDCs could potentially inhibit cash transfers among criminal organizations like drug cartels and terrorist cells. A CBDC could also bring "shadow economy" activities like under-the-table sales into the light and subject to taxation; a report by the Internal Revenue Service estimates that tax evasion shaved about 14% from total federal tax revenues annually in 2011–13, with the use of cash being a major factor.[30] Further, government-sponsored CBDCs could offer regulators greater control over know-your-customer, anti-money laundering and financial-terrorism compliance requirements than most jurisdictions currently enforce over private crypto.

Greater policy flexibility. Direct monetary interaction between the government and individuals is negligible in today's economy; instead, central banks influence the behavior of the public indirectly through the management of the rates at which banks borrow and lend among themselves, which are then reflected in money market, lending and deposit rates experienced by consumers and businesses. An interest-bearing retail CBDC account could establish a direct channel through which monetary policy can be transmitted to the public, allowing stimulative or contractionary changes in policy to be felt more readily and broadly, especially if deeper financial inclusion were achieved.[31]

An interest-bearing retail CBDC could establish a direct channel through which monetary policy can be transmitted to the public, allowing changes in policy to be felt more readily.

As interest rates appear to have shifted to structurally lower levels in the years following the global financial crisis, the zero lower bound represents a constraint on the execution of central bank policy. An interest-bearing CBDC in conjunction with a significant reduction or elimination of physical cash could enable a central bank to overcome the zero lower bound on policy rates by eliminating the possibility of substituting negative-yielding bank deposits with zero-interest cash. From a fiscal perspective, a CBDC could also enable policymakers to quickly and easily provide individuals and businesses with cash during periods of crisis—aka "household QE"—without

25. "The 2020 McKinsey Global Payments Report," McKinsey & Company (October 2020).
26. Source: Reuters; as of June 9, 2021.
27. "Annual Report 2019/20: Central Banks and Payments in the Digital Era," Bank for International Settlements (June 2020).
28. Source: International Monetary Fund; as of March 2021.
29. "Annual Report 2019/20: Central Banks and Payments in the Digital Era," Bank for International Settlements (June 2020).
30. "Tax Gap Estimates for Tax Years 2011–2013," US Internal Revenue Service (September 2019).
31. Markus K Brunnermeier, Harold James and Jean-Pierre Landau, "The Digitization of Money," Bank for International Settlements Working Paper (May 2021).

the attendant financial market distortions that have accompanied traditional forms of quantitative easing. It could also be designed to support the efficient administration of any number of day-to-day government functions, ranging from unemployment payments to tax collection.

...And a Number of Significant Risks

Of course, some of the above benefits could be achieved without the introduction of CBDCs. Innovation has been a hallmark of payment systems throughout the digital age; real-time gross settlement systems—payment processing for financial institutions, some of which operate 24/7/365—have been around in some form for decades, while the number of countries offering fast-payment systems that provide instant settlements at the retail level is growing quickly.[32] At the same time, policymakers have taken action to curb card fees and encourage greater inclusion in the financial system.

Further, there are a number of potential risks that accompany the introduction of a CBDC, no matter how carefully designed.

Disintermediation of financial institutions. While the launch of a CBDC may help fend off the competitive threat posed by private cryptocurrencies, central banks who do so risk entering into some degree of competition with their domestic banking sector. Depending on its design, a CBDC could render obsolete certain bank services and revenue streams and spur competition across the financial services landscape, not insignificant given that payments revenue represented nearly 40% of total banking revenue in 2019.[33] On the other hand, a CBDC would lower the costs of bank operations (branches, ATMs, cash management), while expanding banks' addressable market and the services they provide to support electronic payments. It's worth noting that commercial banks generally have proved resilient to the many large-scale changes to the financial system over the years, adopting strategies that have preserved their viability.

The overall impact of CBDC introduction on domestic banking industries and payment networks is unclear.

The potential impact of CBDCs on existing payment networks is also unclear. While central banks have a vested interest in protecting their banking systems, there are fewer incentives to coddle the legacy payments ecosystem. A CBDC would obviate the need for third-party settlement and would compete against the likes of Visa and Mastercard. Merchants likely would have a strong preference for CBDCs relative to legacy systems given lower transaction expenses and socialized fraud costs, but they might find it difficult to steer consumers away from the card networks and the benefits they provide, such as rewards and dispute resolution. As the link between banks, buyers and sellers, merchant acquirers—which provide a range of services, including the interface to collect payment information on the front end and settlement services on the back end—likely would remain important part of the payments framework if CBDCs are introduced.

Loss of privacy. Though cryptocurrencies are widely believed to offer greater anonymity than traditional forms of payment, they are not immune to detection; for example, it took the US Justice Department only about a month to recover 64 of the 75 bitcoin ransom paid to hackers in May by East Coast pipeline operator Colonial Pipeline.[34] While a central bank could design its digital currency to offer anonymous transactions and user identities, there likely will be thorny legal issues around privacy versus national security and law enforcement. More authoritarian countries may leverage a CBDC to monitor and control their citizenry; in China, for example, the e-CNY could serve as another cog in its already-vast state-surveillance mechanism.

32. Augustin Carstens, "Digital Currencies and the Future of the Monetary System," remarks before the Hoover Institution Policy Seminar (January 27, 2021).
33. "The 2020 McKinsey Global Payments Report," McKinsey & Company (October 2020).
34. Source: *The New York Times*; as of June 8, 2021.

CBDCs could be expected to represent a particularly high-value target for cybercriminals.

Security concerns. Cybercrimes have been on the rise across industries, and a CBDC could be expected to represent a particularly high-value target for hackers, some of whom are suspected of ties with nation-states like North Korea and Russia. Central banks would need to establish state-of-the-art protocols and processes to protect the confidentiality of users and the integrity of the currency and to ensure uninterrupted availability of CBDC services in the face of potential distributed denial-of-service and botnet attacks.[35] Even minor security breaches could erode public confidence in a CBDC.

Conclusion

Though caution remains the modus operandi of most central banks, their extensive research and development work on CBDCs suggests an ongoing commitment to evolving best practices in their payment systems. And while Facebook's effort to break into the cryptocurrency space may have been neutered, China's continued progress suggests that the US and its allies may need to view competing CBDCs just as warily as the crypto coded by private-sector upstarts.

As part of the monetary base—M0 in the US—a CBDC would be no more resistant to ongoing debasement than traditional forms of money, which could leave room for privately issued crypto assets like bitcoin to evolve over time into long-term stores of value. "Over time" is the key phrase here; as we've said, we believe bitcoin at this stage of development is best described not as "digital gold" as some have dubbed it but rather as an option on becoming digital gold. As we wait for clarity and maturity in the environment for digital currencies—both private and central-bank issued—we are comfortable that a strategic allocation to gold represents the most compelling long-term store of value and potential hedge against the risks facing investment portfolios.

35. Cyrus Minwalla, "Security of a CBDC," Bank of Canada Staff Analytical Note (June 2020).

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