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# Central Bank Digital Currencies – Some Considerations

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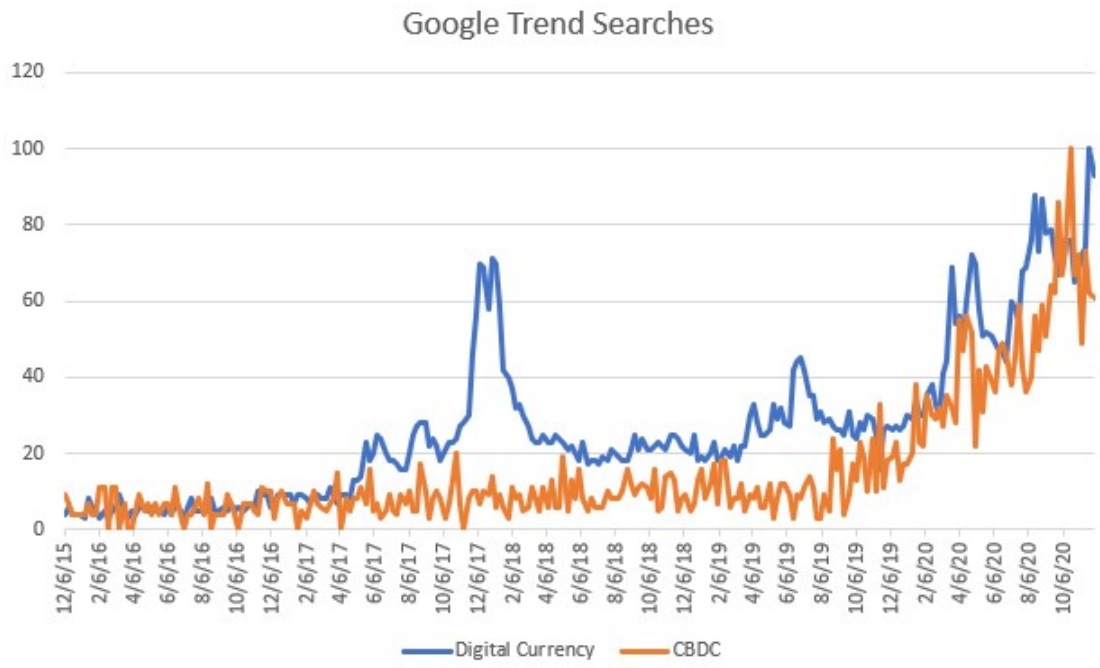
**In this far-ranging analysis of Central Bank Digital Currencies (CBDC), there is plenty to think about and digest. Would everyone have their own CBDC account? How would a CBDC impact commercial banking? What will the technology look like? These are a few of the questions raised in this article co-authored by Andrew Fately, Executive Director, Foreign Exchange, at Sumitomo Mitsui Bank, and Susan Joseph, Founder and Principal at SusanJosephLLC, a consulting firm.**

Digital currencies, overall, have been a hot topic for the past three years, as evidenced by Figure 1 below. While this timeline includes the infamous Thanksgiving of 2017, when Bitcoin first hit the collective consciousness, the demand for information regarding this product has consistently increased over time. With the announcement of Facebook's Libra Coin initiative (recently renamed "The Diem") in May 2019, interest clearly accelerated to the point where it is now a mainstream topic of discussion in the financial world. Almost daily, there are stories of another large institution (PayPal, Square, etc.) that is dipping its toes into the digital currency realm. What had been considered taboo just a few years ago has evolved into interesting and seems headed toward required.

Figure 1




With this as prelude, it should be no surprise that we are hearing more and more about a subset of digital currencies, central bank digital currencies (CBDCs). While the European Central Bank is merely the latest to discuss the issue openly (see "The Future of Money – Innovating While Retaining Trust"[1]), this conversation has been ongoing since 2014, when China initiated its Digital Currency/Electronic Payments project in an effort to reduce its reliance on the U.S. dollar for international commerce.[2] But are CBDCs really coming to a bank near you soon? There are multiple rationales for nations to embark on this path, although the barriers to a successful implementation remain high.

Let us consider the current state of some of the key issues and concerns that may help drive the decision. While not an exhaustive list, our review does touch on several important considerations:

- Technology – Distributed ledger (crypto) or centralized ledger (today's technology)
- Target market – Institutional (Reserve) or retail (Personal)
- Societal goals – A new product or a replacement for cash

# Technology

We regularly hear about what central banks are doing with respect to monetary policy activities. In fact, it often leads the financial news headlines. In addition, given the huge rally in Bitcoin and other cryptocurrencies, we continue to hear more and more about that market as well. The convergence of these two finance/market themes, neither of which is either widely or well understood, but both of which have garnered significant headlines, has led many to believe that they are related. As of now, they are not directly related, but given the increase in the number of central bank studies and reports

on the topic, it seems a fair bet that they will be so going forward. In fact, it seems likely that central banks, if they do move forward with CBDCs, are counting on the current "sexiness" of Bitcoin and its place in the digital transaction markets, to help them both make their case and gain acceptance and adoption as a distant cousin of a cryptocurrency.

In his groundbreaking paper in 2009[3], Satoshi Nakamoto, the inventor of Bitcoin, described a technology—distributed ledger—which allows for the verification of transactions without a trusted intermediary, like a bank or central bank. This concept of trustless verification has been crucial in the explosion of new fintech businesses, as well as serving as the underpinning of why a large segment of the cryptocurrency universe believes so strongly in the value of its currencies. The idea that by simply holding a cryptographic key, one has access to an asset that is universally agreed to be the keyholders, without requiring anything other than the blockchain (computer protocol) on which the asset information resides, offers great appeal and (providing one doesn't lose the key) safety of the assets.

Satoshi's essential vision was a cryptocurrency that is accessible to all running on open-source technologies. It is a fit-for-purpose transaction network that may also operate as a sort of "digital gold" today as it becomes more widely adopted. The computer network is referred to as the Bitcoin network, and the cryptocurrency native to it is referred to as bitcoin. If you have a computer, you can access the network 24/7 and use or trade your cryptocurrency. Parties you do not know approve the transactions, and all transactions are pseudonymous, such that you can trace their history, but not necessarily the participants per se. No one entity "controls" the bitcoin network or the bitcoin cryptocurrency. There is no central point of failure or supervision. The bitcoin network is designed with certain game incentives and cryptography, and there are a finite number of bitcoins in the world.

Important in the vision is that there are no qualifiers to access or hold this type of financial instrument. Such restrictions occur if/when you begin to marry bitcoin into the legacy financial world and accept legacy financial world constraints (such as conversion to fiat currency, trading on certain exchanges, using custodians to hold your crypto, etc.). The bitcoin network has organically grown so large that it would be nearly impossible to hack it, due to the computing power required to do so, and therein lies what some consider to be security in using the network. The characteristics described above all fall within the definition of a blockchain, which is important to note and distinguish when thinking about the manner in which CBDCs may develop and the types of technologies that will power them.

Of course, to the Twitterverse, where bitcoin and cryptocurrency "information" is widespread, many people are not concerned with the technology. Rather, they are simply looking to cash in on what seems to be the hottest new investment opportunity, albeit volatile and speculative, especially now that FAANG has stopped rocketing higher.

With this in mind, it seems many, if not most, people assume that any CBDC will be a cryptocurrency as well. After all, cryptocurrencies are often called digital currencies, so why wouldn't a CBDC be cryptographic in nature. However, is the blockchain and cryptocurrency, as described above, the vision on which central banks and others expect a CBDC will rely? Rather, it seems reasonable that central bankers would like to rely on the cryptocurrency "mystique" to have any CBDC gain acceptance with the public, as well as the institutional community. However, in order for a CBDC to be a cryptocurrency within the full meaning and characteristics as described above, it would mean that central banks would need to utilize distributed ledger (aka blockchain) technology, a huge departure from their current centralized ledger framework. And given central bankers' tendency to want to completely control the workings of their own currencies, that means they would have to essentially create their own segregated or private blockchain to generate digital currencies, using entirely different technologies than that described above, upon which CBDC transactions and payments would occur.

This need for a private type of network and associated digital currency is reason enough to deter major countries' central banks from pursuing a crypto variety, although China's Digital Currency Electronic Payment (DCEP) is ostensibly being created in just such a format. But there are other reasons as well that point to a crypto CBDC being very unlikely. Consider, trillions of dollars' worth of transactions and payments are currently made on a daily basis, with an extremely high rate of precision and confidence, using central ledger technology. And given the dramatic decline in the cost of computing power and storage, there are really no impediments to growing those ledgers much larger. In other words, central banks, which are among the most conservative of all institutions, would need to take a great leap of faith that embarking on a new technology would result in a significantly better outcome than something that has been working effectively for many years.

If we rule out the idea that any CBDC is going to be a cryptocurrency, it begs the question, what is the primary goal of creating such a digital instrument?

# Target Market

The Bank for International Settlements (BIS) is often described as the central banks' central bank, and from its headquarters in Basel, Switzerland, there is no question that it is one of the most widely respected financial institutions on the planet. Not only does it help promulgate global banking rules to help countries maintain financial safety, but it also does a significant amount of first-rate research on both economics and finance. In 2018, the BIS published an extremely interesting paper on the

subject, simply entitled "*Central bank digital currencies*"[4]. One of the features highlighted in this paper is a critical consideration for central banks in this discussion, namely, who is the target market for these proposed currencies.

Today, central banks serve the role of monetary policy stewards and lenders of last resort. Once they develop digital currencies, the essence of the question identified by BIS is what is the role of CBDCs? Will CBDCs exist solely in the central bank/commercial bank nexus, essentially as another form of bank reserves continuing the current banking framework, or will CBDCs be opened up to the population at large, with each citizen in a nation opening (or receiving) an account at the central bank in their own name, which will have direct access to these CBDCs? Make no mistake, this is a huge decision with significant potential ramifications that can change the financial and political landscape around the world. Consider, the ability of a central bank to directly place funds into the economy by means of crediting CBDC accounts directly would be the biggest change of monetary policy in history. Going forward, we will describe the former idea as Reserve CBDCs and the latter as Personal CBDCs.

# Reserve CBDCs

In truth, other than as a proving ground for the concept of how CBDCs will work, the idea of a Reserve CBDC makes little sense. Note that banks already trade reserves among each other as needed, in order to manage their balance sheets, as well as trading them with the central bank of their home country. All of this activity takes place via electronic debits and credits, all of it works smoothly without funding or settlement issues, and the central bank already has complete information regarding which bank is doing what. Given the current state, exactly what would a Reserve CBDC bring to the table? Certainly, there would be little, if any, improvement in efficiency of transactions, nor in the information available to the central bank regarding individual bank positions.

Consider the way monetary policy is currently promulgated in a fractional reserve banking system (the current global banking framework):

1. The central bank decides it wants to increase the amount of money in the system (increase QE).
2. The central bank goes to the market and purchases government bonds from the commercial banks in its network, paying with newly created bank reserves and receiving the bonds in exchange.

- The central bank relies on commercial banks to lend money to clients, which is then spent and redeposited and spent again… until those new reserves have been converted into usable funds (as a multiple of the reserves) in the system.

1. However, if the commercial banks do not see sufficient demand for loans that meet their return targets, they may simply redeposit those reserves at the central bank for a modest interest payment, but, importantly, no additional risk.
2. In this scenario, new money never enters the economy and the transmission mechanism upon which the central bank relies fails.

Now, ask yourself if a change to Reserve CBDCs will alter this equation? The answer is clearly no. Changing the form of bank reserves will not change their use or availability.

However, as a proving ground, their use could well be the first step in a process from the current state of affairs to the eventual elimination of cash, which has huge societal implications. At the same time, if a central bank were inclined to use blockchain technology, rather than the current centralized ledgers, a CBDC would be well-placed to act as a first tool in any transformation to basing systems on new technology, such as blockchain. Given the ultraconservative tendencies of central banks (at least when it comes to technological changes), the relatively closed universe of a nation's banking reserve system could be a perfect proving ground, especially when run in parallel with the current system, to allow central banks to become more comfortable with a new technology while debugging it and determining the most effective ways to use it to further their policy goals. But it beggars belief that the central bank community would invest the time and money necessary to prove a new technology to simply replace a technology that has been proven to work without problem for years. Which brings us to:

# Personal CBDCs

Personal CBDCs, on the other hand, would offer dramatic new policy options for central banks which could change the way monetary policy is implemented in the future, as well as the nature of what commercial banking means.

In this scenario, if a central bank created a Personal CBDC and created an account at the central bank for each citizen directly, when that central bank wants to increase the amount of money, the new procedure would be as follows:

1. The central bank decides it wants to increase the amount of money in the system (no QE necessary).
2. The central bank directly credits each Personal CBDC account with funds.

- These funds are immediately available to be spent, rather than having to come from a lending relationship with a commercial bank.

1. As these funds are spent, the central bank can be confident that the monetary amount of economic activity will increase. The risk, of course, is that actual economic activity may not

increase, and price inflation will result. This, however, is a different issue, and one where, given the recent 40-year history of disinflation, most central banks are working feverishly to move in the direction of higher prices. As such they are unlikely, at least initially, to hesitate.

As is manifestly clear by looking at the two examples, the creation of a Personal CBDC will give central banks a substantial increase in control over the monetary levers in the economy, with the ability to directly influence spending decisions. This is a revolutionary transformation in monetary policy, and one that is unlikely to be made without significant study and consideration. However, it seems inevitable that this is the future. Which brings us to the final question, what are the goals to be achieved with this major change?

# Societal Goals

Monetary policy does not exist within a vacuum, and central banks, regardless of what they would have you believe, are not truly independent. In the U.S., and in truth in all Western economies, central banks owe their existence to the legislative branch of government. The idea behind central bank independence was created as a defense mechanism so governments would not be able to order more cash printed to pay for their wish lists. We have seen the results of this process, with Venezuela merely the latest, in a long line of nations that have succumbed to the temptation and destroyed their economy.

With that in mind, introduction of a Personal CBDC will have many potential knock-on effects, not least of which is the possible loss of the one true anonymous transaction vehicle that is still widely accepted. Prior to the introduction of a tool of this potential power, there will need to be an extensive discussion of the desired goals. Is the Personal CBDC simply a more effective tool for implementing monetary policy, as described above? Or will it be used to rein in the power of the commercial banking sector? Will it be seen as the gateway to a cashless society, something that has been on many governments' wish lists for quite some time? What happens to societies as we know them? Will it offer the ability to track every remit for every citizen? Will it disenfranchise those citizens who do not want to participate or cannot participate in the banking world today? And if it disenfranchises citizens, are the ones most hurt those who are most at risk already in today's societies? Will this lead to civil unrest and ultimately a riskier world on all counts? What other consequences, whether intentional or unintended, might arise? Despite the gravity of this list of questions, however, they are outside the scope of this analysis.

# What Happens to Commercial Banks?

The first issue to address is what will happen to the commercial banking sector in the event that Personal CBDCs become a reality. This question is too general, however, to answer in this form. The commercial banking sector is really bifurcated into two main groups: the global megabanks (e.g., JPMorgan Chase, Citibank, Bank of America, Barclays, HSBC, Deutsche Bank, etc.) and the second-tier and smaller banks. Consider, in the U.S. alone, as of December 31, 2019, there were 5,177 commercial and savings banks[6], but only six of them rank in the 50 largest in the world (JPM, Citi, Wells, BoA, Goldman Sachs and Morgan Stanley). The same situation obtains in most nations, with a handful of national champions that stride the global stage, and a large number of smaller regional and local banks that have little to do with the transmission of monetary policy and are also the target of consolidation by central banks all over the world. After all, the more banks in existence, the harder it is for central banks to regulate them effectively and bring oversight to bear on each one.

Additionally, the megabanks perform many other tasks, including lending large amounts of money to corporate clients via loan syndicates, providing supply-chain and project finance, as well as pricing and trading risk management products for both the corporate and investment sectors of the economy. Meanwhile, the smaller banks focus on a smaller clientele, with local businesses seeking small loans and some more mundane bank services, like lockboxes or simply cash management.

While it is possible that a central bank would open an account in each citizen's name, it seems far more likely that the current banking sector will be managing that process on an agency basis for the central banks. In other words, your current checking account may be converted to digital dollars, but it will still reside at your current bank. This will allow the central bank to maintain the policy initiatives it seeks, without the hassle of the entire account-opening/Know Your Customer (KYC) processes that currently absorb so much time and resources of the banking community. Naturally, commercial banks will not be doing this for free, but if and when digital dollars (or euros or yen) are the coin of the realm, individuals will have no choice but to pay for the service.

The next thing to consider is the cost of the new process. Remember, if the central bank's goal is to encourage economic activity, (i.e., spending), then the most likely policy will be negative interest rates on all balances above some threshold, potentially $500-$1,000, necessary for day-to-day spending activities by individuals. Holding more than that in your account will be deemed inappropriate to the central bank's stated goals, and will attract a negative interest rate, in perpetuity. Additionally, subtract from that rate the agency bank's fees and the result is that holding cash in an account will be a losing proposition. As such, the choice will be to spend or invest, both of which are key features of monetary policy transmission.

# Replacement for Cash

The natural consequence of this process is the eventual elimination of cash, with Personal CBDCs becoming the only acceptable transaction medium. While digital dollars will maintain their value vis-à-vis the cash type, at some point they will be the only choice. As was first highlighted by economist Kenneth Rogoff in his 2016 book, *The Curse of Cash,* there has been a growing movement by those in the policymaking sphere to eliminate cash under the belief that it will both reduce crime and increase tax revenues. While the former seems unlikely (criminals will always find some other way to pay or be paid for their activities, with gold or cryptocurrencies coming to mind), the latter may have some validity. After all, if Personal CBDCs are the only way to pay for goods or services, then every transaction will be recorded in a way that offers the possibility of tracking, and where taxes are due, the government will be aware and able to levy said tax. There is already a growing understanding that our interactions and transactions are tracked to a large degree through social media, apps, devices, and communications. Adding fully tracked remittances to the equation further ups that ante and creates surveillance every time you move your currency. Privacy-rights advocates will certainly weigh in on this type of system.

Of course, in today's environment of massive financial inequality, as well as the ostensible concerns of the disenfranchisement of the portion of the population that does not use banking services at all (estimated at 6% in the U.S.[7] and 31.5% worldwide[8]), CBDCs may create more problems than they solve for a large portion of the population.

Another issue that has been raised is that central banks would be unwilling to lose the seignorage that accrues when they print cash. As per the Oxford English Dictionary, seignorage is the profit made by a government (read central bank) by issuing currency, especially the difference between the face value of the coins and their production costs. Of course, today, given that the bulk of cash created is paper, and in the U.S. (and worldwide) the bulk of that is $100 bills, the difference between the cost of printing and the value accrued is huge. According to the Federal Reserve, as of November 11, 2020, there was $2.01 trillion of Federal Reserve Notes (cash) in circulation.[9] That means that the government has gotten $2.01 trillion, less printing costs, from the users of that cash. Central banks will not willingly cede that much value. However, in the CBDC world, we believe that central banks will be better off than the current situation. After all, the marginal cost of creating a CBDC dollar is essentially zero. As such, we do not believe this will be a concern in the process.

# Other Issues and Concerns

One of the most common responses to the idea of the elimination of cash and its replacement by CBDCs is that people will simply convert to true cryptocurrencies, with Bitcoin retaining its current preeminence in the space. However, the natural response of government in this case will be to simply outlaw the conversion of CBDCs into cryptocurrencies. So, while they may not be able to

eliminate Bitcoin, they can certainly devalue it significantly. In its current construct, Bitcoin is not a very effective transaction medium, and instead it has gained favor as a speculative investment vehicle. However, if there is no ability to convert the potential gains on speculation into the coin of the realm, interest in Bitcoin, and every cryptocurrency, will almost certainly wane significantly. While true believers may continue to promote cryptocurrencies in this environment, it seems unlikely that this will be a majority view.

The other key question is what will happen to the individuals who are not currently part of the banking system? Arguably, they will be forced to open a bank account of some type, and to the extent that a central bank is willing to seed those accounts with “free” money, it is a powerful incentive for them to do so. One consequence of this, given the absolute KYC requirement of those people to show at least one form of identification in order to open said account, is that the political ramifications could be large. After all, neither party can claim that voter ID laws discriminate as essentially everyone will be required to have some type of ID simply to live their lives and spend money. Secondly, there could be an emergence of a shadow banking market for those individuals who do not want to or are not able to participate, with its own set of risks and rewards which may include a certain increased amount of civil unrest and instability.

Finally, while Federal Reserve Chairman Jerome Powell has been unequivocal, thus far, in his claim that a negative interest rate policy (NIRP) will not be part of U.S. monetary policy, as explained above, it seems highly likely that NIRP will be coming to the U.S. if and when CBDCs become a reality. And while the timing is unclear, all things point to just that outcome.

# Conclusions

Cryptocurrencies have pluses and minuses, not the least of which are a change in the current power structure of monetary policy. Personal CBDCs, though not cryptocurrencies, will allow a greater degree of control by central banks over not only the broad monetary aggregates, but the spending by individuals, as well as help government tax policy become far more effective. If we know nothing else about governments, it is that the ability to increase their control over their citizens is, everywhere, a tacit goal, and one that Personal CBDCs are likely to significantly enhance. The trade-off may be, however, a more surveilled world where every transaction can be traced, and the development of a shadow banking economy which may offer a different set of risks/rewards and the potential for civil unrest.

Welcome to the future!

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