

CENTRAL BANK DIGITAL CURRENCY: WHAT IS THIS AND WHY IS IT IMPORTANT?

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Abstract

This paper explores the topic of central bank digital currency, which refers to cryptocurrency issued by the central bank. It could provide more efficiency, bigger share in payments market and respond to the tendency of using fewer physical cash. The key impacts and risks are identified as well as preconditions for successful implementation of CBDC. Overall, CBDC attracts interest among many central banks and researchers but also it could be more significant for retail users.

Key words: Central bank digital currency, monetary policy, financial intermediation, payments, negative interest rates.

INTRODUCTION

This paper aims to explore the topic of central bank digital currencies (CBDC) and the impacts they could have on the monetary and financial stability policies and the payment system.

Many central banks including that of China are considering issue of CBDC and they even started testing their Digital Currency Electronic Payment, which is actually a “Digital Renminbi”.

Uruguay, Saudi Arabia, the United Arab Emirates, Russia and Turkey have also initiated projects for testing their national versions of CBDC. Almost every week there are statements or research papers by central banks all over the globe on this topic. It is considered as a tool to improve the payment system and to catch up to the technologically advanced private fintech companies that take away market share from the central bank and the commercial banks.

WHAT IS CBDC?

Central bank digital currency is a digital representation of a sovereign currency issued by and as a liability of a jurisdiction’s central bank or other monetary authority as it is defined by (Kiff et. al., 2020) will be used. As the topic is not well explored the classification of digital money is still evolving and there is no universal CBDC definition. There are four types of digital currency: CBDC, synthetic CBDC (sCBDC), stablecoins, and crypto-assets, based on whether:

- it is issued by a central bank;
- it is a legal tender;
- central bank backed;
- pegged to a fiat currency;
- allows peer-to-peer transfers;
- can be programmed.

For example, sCBDC is backed by but not issued by a central bank, but it can be legal tender. There are other digital forms of money backed by fiat currency but not issued by the central bank and are

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not considered as CBDC. These could include various forms of “b-money” such as credit and debit cards and “e-money” like stored-value cards.

Stablecoins are crypto-assets pegged to fiat currency. They are privately issued tokens that are digital representations of value that are not denominated in fiat currency, that depend primarily on cryptography and distributed ledger technology as part of their perceived or inherent value. Typical example are the asset backed stablecoins.

Legal tender is a money that is legally recognized as satisfactory mediums of exchange to pay for goods and services and repay financial obligations. Also, all digital currencies can be programmed. It is achieved via smart contracts that encode the terms of traditional contracts into computer programs and executed them automatically.

Many central banks are considering issuing retail CBDC. Central banks of Bahamas, Ecuador, Ukraine, and Uruguay have already conducted issuance of CBDC and many others including some of the largest are making such plans.

Some countries are exploring crypto-assets but not CBDC used as a medium of exchange. These are not digital representations of countries’ central bank issued fiat currency but are issued by the finance ministries. Apart from this Venezuela had launched Petro which was a commodity backed asset but this trial failed.

CHARACTERISTICS OF CBDC

One of central banks’ functions is to operate the payment system. Using CBDC is a way to reduce the market dominance of private payment systems or to reduce the concentration risk. Such systems tend to become natural monopolies as a result of network externalities, economies of scope and scale (Bolt and Humphrey, 2005) and (Gowrisankaran and Stavins, 2004).

CBDC’s are a tool for development of financial system in countries with remote or rural areas or with underdeveloped infrastructure of distributing cash.

Digitization of financial services and issuing CBDC could reduce costs associated with issuing and managing cash. Different estimates of private costs using cash range between 0.2 and 0.6 percent of GDP in developed countries and between 1 and 2.5 percent of GDP in developing and emerging market countries. They are distributed among banks, firms and households.

Maintaining CBDC requires substantial fixed costs while marginal operational costs would be low including the customer service. However, in terms of cost efficiency it would be more suitable for larger jurisdictions which are able to bear fixed costs. Managing digital currency could be as complex as managing cash. This is the reason why it should be assumed that digitalization would lead to cost reduction. Some of fixed costs for the central bank and commercial banks associated to cash will remain.

Additional operational costs associated with CBDC are for software development, user experience testing, wallet maintaining, servers, licences, service fees, threat modelling, protection, identification, response management, help desk, training, communication etc.

CBDC is expected to improve monetary policy effectiveness. CBDC are interest bearing including negative interest rates but it requires either prohibition of cash² or increasing the costs of holding cash³, or if cash could be depreciated against CBDC, which could become the sole legal tender⁴. Deeply negative interest rates are not likely to be accepted by the public which could substantially undermine the confidence in the central bank. Such negative interest rates would be equivalent to levying tax on users of CBDC without legal foundation. This means that the central bank not the Parliament could impose additional taxation which is intolerable and undemocratic.

² See Rogoff, 2014.

³ See Bordo and Levin, 2018.

⁴ See Agarwal and Kimball, 2015.

On the other hand, CBDC could be used for making differentiated transfers based on user account balances⁵ or other type monetary stimuli. They could supplement fiscal policy measures and make them more effective as well.

CBDC could also be used as a tool to accelerate the velocity of money by influencing the consumer behaviour. CBDC holdings could incur a fee to incentivize public to spend it quickly. The central bank would also credit households' CBDC accounts but distributional issues arise by this policy. It raises questions about the differentiation between monetary and fiscal policies and whether the central bank overtakes fiscal policy out of the government. Innovative monetary policy could discourage innovation in existing payment systems (BoE, 2020), lead to disproportionate concentration of power in the central bank (Mersch, 2020).

Improved effectiveness of monetary policy could be a result of better direction and timing. It is aided by the ability to observe the economy's response to shocks more accurately. Microlevel data of payment flows could help policymakers to implement monetary policy more accurately accounting for seasonality or natural disasters. Another advantage is that forecasting the demand for CBDC would be applicable by regions and sectors. Thus, the central bank would be able to make better macroeconomic projections, anticipate changes in demand for liquidity and reserves, or the velocity of money. Apart from this the central bank should be vigilant about data protection otherwise risking reputational issues far exceeding benefits of CBDC.

CBDC would help central banks' maintain market share in payments. Cryptocurrencies' based payment systems like bitcoin and possible newer projects could gain a substantial share of payments markets and especially in developing economies and emerging markets. It is possible to have a currency substitution. Migration to cryptocurrencies could reduce commercial bank deposits shrinking their sources of stable funding and limiting their ability to provide loans to the economy. Thus, financial intermediation would also tend to decrease. Globally spread digital currencies are difficult for supervision and regulation by a single national institution and especially in developing or emerging market economies. A well-designed CBDC might maintain the role of the public money as a unit of account.

CBDC could be used as a tool for using local currency as means of payment in countries/areas with high share of currency substitution. It could be part of policy mix along with sound monetary, fiscal, and financial policies for macroeconomic stabilization.

CBDC could facilitate government interventions through direct payments to households. For example, according to the draft stimulus package the "digital dollar" would be created to make possible stimulus payments to US citizens without bank accounts. Thus, the US Treasury would be able to make payments by direct deposits to recipient bank accounts for which otherwise checks would be used. Digital dollars would be remunerated at an interest rate that is the greater of the interest rate on required reserves and that on excess reserves. This idea was not approved in the final version but eventually it could be legalized in near-future bill. Ultimately, CBDC enables governments to transfer funds directly to households in many ways⁶.

Problems often referred as to the private issuers could be also applicable to central banks. There could be cases of not internalizing social costs of operational failure like cyberattacks. Monopolistic issuers can abuse that power and supply partial, inadequate and expensive services. Collected user data could be used as a source of additional revenues.

CBDC could not address the issues related to the currency substitution particularly where residents have lost their confidence in local monetary and fiscal authorities due to high rate of inflation, currency devaluation or other financial distresses.

⁵ See Davoodalhosseini et al., 2020.

⁶ See Rutkowski et al., 2020.

RISKS ASSOCIATED TO CBDC

CBDC could affect the monetary policy. It could change the demand for and the composition of base money in unpredictable way. It can also change the sensitivity of quantity demanded for money to changes in interest rates⁷. Other studies state that there could be such impact but it is not likely to be significant (Mancini-Griffoli et. al. 2018). If CBDC increases financial inclusion it could expose more persons and businesses to interest sensitive assets thus making monetary policy more effective. The exchange rate transmission channel could facilitate more active currency management which could affect its rate more for a given exchange rate change.⁸ The bank lending channel could also be strengthened because the interest rate would be more directly transmitted to the banking system.

CBDC could compete with bank deposits depending on its design and on interest rates paid on CBDC. If CBDC is interest bearing, then central bank in fact would interfere on the current accounts market, while non-interest bearing CBDC would be virtually cash. Banks with retail deposits will be competitors to the central bank and eventually should increase deposit rates. Higher funding costs would create pressure to increase lending rates as well. Thus, the quantity demanded for loans would decrease affecting market share and profits. Bank funding would also become more volatile as retail deposits in general are more stable source of funding.

Deposit insurance allows banks to have cheaper funding compared to other sources. CBDC could reduce market discipline as banks would take higher risk to offset deposit funding. Banks could rely on wholesale funding which could have implications on funding costs, stability, and market discipline. Because of the liquidity requirements they may have to reduce lending or corporate bond holdings. Such option would not be appropriate for economies with less developed capital markets. Hence, banks would need to hold more liquid assets to meet regulatory requirements or reduce lending at the expense of profits, less financial inclusion, and lower investment rates.

CBDC could have impact on central bank's balance sheet. If disintermediation happens the central bank could try to lend to banks to offset for diverted deposits. This is not entirely consistent to the central bank mandates and could harm the independence principle by opening door for political interference.

Risks could be effectively managed if it would replace the existing physical cash. The change would be only on the right side of the central bank T-account from cash to CBDC. The impact could be different if CBDC is issued against bank reserves when users convert from commercial bank deposits. When CBDC are paid for with reserves the central bank liabilities would be unchanged while those of commercial banks would shrink.

Different suggestions have been made to alleviate this consequence for commercial banks. Some of them are imposing holding limits for CBDC, limiting the commercial banks ability to provide on-demand convertibility of deposits into CBDC and some suggest that no policy actions are necessary. Ultimately, it depends on CBDC's design of whether it would trigger bank runs by providing safe and liquid alternative to deposits. Still, the increase of this risk will depend on whether bank deposits are insured and of the credibility such scheme. Cases of individual bank insolvency running from one bank would likely be to another without converting to CBDC. However, CBDC could increase the risk of generalized runs out of the commercial banks. In case of such run central bank using CBDC is enabled to offer liquidity faster to commercial banks to avoid the panic. CBDC is not likely to increase run risk in a currency or sovereign crisis because depositors would typically run from all local assets.

For countries with fixed exchange rate it is also important whether there is CBDC of the reserve currency. In such cases it is possible such CBDC to increase the extent of currency substitution. It is

⁷ See Carstens, 2019.

⁸ See Armelius et. al., 2018.

also likely financial integration between these countries to be facilitated by more direct transmission of the reserve currency monetary policy to the other country.

INTEREST AND FEES

There could be interest payments on CBDC, which would be a way to apply also a negative nominal interest rates that is not possible with physical cash. This option depends on constraints on cash because otherwise the users would choose the option with higher return. Interest payments could have a negative impact on anonymity due to tax compliance and emerging issues about the calculation of interest. It could be an issue for offline stored value devices which require specific solutions such as occasional connections to the network.

Such system would also require transaction fees to be applied in order to be effective. They could be fixed amounts, percentage or volume based and could vary depending on types of transactions or tiered by transaction volumes (Kiff et. al., 2020). Lower fees on transactions would create incentives for retailers and consumers to adopt and use CBDC. However, this would raise the question whether it is appropriate to use tax revenues to finance central bank competition with private banks. On the other hand, transaction fees could be a tool for mitigation the operational risks for the CBDC payment system.

There are no immediate needs for interest accrual or transaction fees on CBDC. Such options would make it more flexible but would create greater differences to physical cash. Thus, a new item in central bank liabilities would be created with negative implications on commercial bank balance sheets and their profits.

CBDC impact would be assessed relative to central bank policies. If CBDC substituted for physical cash the expenses for printing and minting currency, maintaining it, building vaults and storage depots, and for distribution would be significantly reduced. There would be also costs related to CBDC services that should be covered through fees. Such expenses are generated by the interbank funds transfer systems that should not be subsidized in order not to create incentives for market distortions and misallocation of resources.

ALTERNATIVES TO CBDC

Some of the main purposes of issuing CBDC are to help implementing monetary policy by avoiding zero lower bound on cash. The other one is related to operation of payment system. Some central banks are working on improving existing payment systems to match the speed and convenience of digital currencies. The Federal Reserve System of the United States is developing so-called fast payments which is focused on low-cost and nearly instantaneous settlement of inter-bank retail payments. As the FED still do not apply negative policy rates CBDC is not a top priority for the bank.

In other countries, increased competition by fintech companies and other reforms led to improved payment services for retail users without issuing CBDC. If the objective is to react to reduced cash usage other options would be mobile and electronic money or incentives for private institutions to offer suitable products.

PRECONDITIONS

CBDC would require infrastructure upgrade costs for electricity grids, mobile networks and internet coverage, cyber security that could be significant. This process might accelerate country's infrastructure investment in fibre optic cables, landlines and satellite connections and the digitalization of the financial system. Robust data privacy protection legislation and regulations and central bank resilience are necessary. CBDC might require changes in governing, accounting, and financial reporting standards.

Human resources are equally important as physical infrastructure for CBDC implementation. Personnel should be trained in developing, operating and managing such arrangements and also education for users and service providers.

Issuing of new currency could lead to major changes in monetary policy transmission channels, financial stability, financial intermediation, and payment system. The central bank should consider the existing operating environment, the degree of public acceptance, use and consumer preferences. The impact on the central bank operations should be examined as well.

Similar to the issuance of physical cash the central bank and the government will have to show strong commitment to create credibility of the CBDC, so it is perceived at least as useful and valuable as the physical currency. Public confidence in economic and financial stability, in the parity between digital and physical cash and in the central bank is crucial. Trust-building policy should precede CBDC considerations.

If the central bank does not have the capacity to directly issue CBDC, sCBDC might be a good option.

CONCLUSIONS

Central bank digital currency could have many advantages to physical cash in terms of effectiveness, lower costs, convenience in monetary policy. At the same time, it could generate or increase many risks related to cyber security, lack of anonymity etc. It also might require significant investment in infrastructure, networks, security, education of personnel and users etc. Risks could be even higher depending on the design of CBDC. Two of the most important options to choose whether CBDC would be interest-bearing and what would be the transaction fees. As far as CBDC would be a substitute for cash impacts on the economy could be more easily manageable. The other option where CBDC would substitute for bank deposits on the account of reserves is ambiguous because of negative impacts on commercial banks market share, deposit and lending interest rates, and profitability. Still, there is no immediate need to switch to CBDC. There are also some viable alternatives like incentives for private companies, fast payments and sCBDC that could avoid some risks and costs associated to CBDC.

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