

The Current Status of Central Bank Digital Currencies and Their Development

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Abstract. Relying on the big data era, economic growth is also undergoing an accelerated transformation towards digitalisation and has triggered digital changes in finance due to the accelerated development of information technology and the emergence of technologies such as blockchain, artificial intelligence, and big data. This is why the BIS (Bank for International Settlements) received worldwide attention when it introduced the concept of a central bank digital currency (CBDC) in 2017. CBDC has many advantages, will inject new vitality into the global monetary and financial system, may become a new cornerstone of payment transactions and future development; But it also brings potential risks and complex policy issues. In this paper, through a review of the research literature on CBDC in recent years, with a specific example of China's central digital currency (DC/EP), this paper provides a concise demonstration of the current state of CBDC and its development.

1. Introduction

1.1 Origin of CBDC

CBDC, is a form of currency that has been derived and evolved under the impetus of digital technology, but the specific concept and connotation does not have a specific definition in the international arena now. However, what we can learn about the CBDC is that it is designed and issued using financial innovations such as artificial intelligence, blockchain and cryptography. And it is a digital currency backed by national credit. Wang Xin, director of the research bureau of the central bank, said CBDC is positioned as M0 like other forms of central bank money including physical cash and reserves, but its unique operating mechanism greatly reduces transaction costs and increase M0 circulation efficiency and the status of central bank money. However, the emergence and issuance of CBDCs can have varying degrees of impact on monetary policy and the financial system.

The emergence of CBDC is not accidental, but the product of a combination of factors such as technology accumulation and private digital currency experience. Private digital currencies have continued to push the boundaries of blockchain and distributed ledger technology (DLT), and the market has continued to grow in size.[1] The digital economy has given rise to CBDCs, while at the same time the emergence of CBDCs will surely accelerate the development of the digital economy.

The emergence of the 2020 New Coronavirus outbreak has also brought CBDC into prominence even more. And because individual countries have also accelerated their research and rollout of CBDCs amidst

the accelerating evolution of the new world monetary competition landscape.

1.2 Classification of CBDC

CBDCs can be divided into retail CBDCs and interbank or wholesale CBDCs from the perspective of business models, which mainly reflect the type of issuance and application scenarios of CBDCs and determine who the CBDCs are issued to. Wholesale CBDCs are mainly used for large value transactions between financial institutions or other non-financial institutions. In a wholesale currency, the central bank assumes the function of an "information carrier" and can quickly and effectively attach transaction data to the digital currency, thus significantly improving the efficiency of information transmission and facilitating the settlement of large transactions between financial institutions, and is suitable for countries with large economies and frequent cross-border trade transactions. The main application scenarios for wholesale central bank digital currencies are the settlement of securities transactions, interbank settlement and cross-border settlement. Retail-type CBDC is mainly used for consumers' daily transaction activities, which is conducive to solving the problems of high operating costs and difficult supervision of paper money, helping to collect and track the money supply and demand situation of micro-entities in the market, and most importantly, helping to penetrate inclusive finance and improve the overall welfare level of society, and is suitable for countries with poorly managed paper money and poor circulation.[2]

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2. Appliance of CBDC (using the example of DC/EP)

2.1 Macro level

2.1.1 Improving circulation and payment efficiency

At this stage, the main payment instruments used by residents in China for daily consumption are physical cash, bank card payments or transfers, and third-party payment instruments such as WeChat or Alipay. Each of the instruments mentioned here has a cost of use and therefore causes friction for residents' consumption. Physical cash is legal tender and is legally reimbursable, but there are costs associated with its production and storage. Bank card payments rely on devices such as POS machines and are subject to fees for merchants, not all of whom will open them and the scope of payments is relatively small. The third is third-party payment tools (led by Alipay and WeChat), which have become widely used in China as the main tool for residents to pay for their daily consumption, but they are commercial credits with a low credit rating, are not legally solvent and require a fee for withdrawals. The platforms are independent of each other and funds are not interchangeable.

Although the CBDC only digitises legal tender notes in a non-interest-bearing scenario, it is the integration of new information technologies such as cryptography, distributed ledger technology and big data analytics that makes its currency operation system more secure, intelligent and efficient. Although the need for cash payments will be significantly reduced if the CBDC is put into circulation, it will circulate more quickly, making payments more efficient in this mode and greatly increasing the speed of currency circulation.

Due to the emergence of CBDC, which itself, as M0 (base money), already has the properties of money itself, only that the digital payment method will make payments easier and faster, and therefore will allow for an increase in the number of currency turnover and a faster circulation of money. Then relatively more of the value of the commodity can be realised, which can lead to higher public consumption, increased spending and an increase in national income.

2.1.2 Consolidation of the central bank's control over the currency

Digital currencies were in fact already present in people's daily lives before countries laid out legal digital currencies. China has taken the lead in the digital economy, especially in digital payments, moving directly from credit cards and cheques to digital payments in one fell swoop: third-party micropayments, as exemplified by Alibaba Group's Alipay, have become the preferred payment tool for the public within a few years. The development of mobile payments, as represented by Alipay and WeChat, has greatly contributed to the development of China's e-economy. But it has also

resulted in the weakening of the central bank's ability to monitor the circulation of money instantly and to adjust monetary policy. Thus CBDCs are issued using more advanced technology and effective data management, making it possible to achieve scientific and controlled currency management.[3] For CBDCs, the constant is the "peer-to-peer" and "cash" nature.

Bringing digital currencies under the control of the central bank and issuing legal digital currencies will be helpful for the central bank to regain better control of the currency. Helps to consolidate the central bank's control over the currency.

2.2 Micro level

2.2.1 Movement of circulation data from third-party platforms to the central bank to guide supply-consumption synergies

Tencent and Alibaba set up the CaiPay and Alipay platforms respectively, opening up the era of third-party quick payment applications, while paper money transactions at the time transitioned to cashless transactions for a while due to the iteration of smartphones and communication technology.

This has resulted in the CaiPay and Alipay platforms de facto assuming some of the functions of banks, while the digital money issued by the platforms assumes some of the payment functions of legal tender. This makes these platforms tied to e-commerce consumption behaviour, with payment records of different individuals, geographies and frequencies owned by the private sector. The central bank is unable to follow up on the current monetary circulation data of residents' consumption behaviour in a timely manner and lacks an adequate basis when formulating monetary adjustment policies. From the perspective of the monetary authority's access to residential consumption data, a legal digital currency issued and managed by the central bank can provide the central bank and other departments with complete and timely access to residential consumption data, detect the flow of funds and forecast residential consumption demand.

Guiding the synergistic development of supply-side reform and the upgrading of residents' consumption, thus realising the reshaping of their consumption behaviour.

2.2.2 Facilitating international settlement and promoting cross-border consumption.

As globalisation progresses, cross-border transactions become closer and the demand for related financial transactions increases, cross-border payments are becoming an important direction for CBDC to explore. As the traditional cross-border payment system often suffers from a series of problems such as high costs, low efficiency and low clarity. Digital technology, on the other hand, can effectively reduce the amount of money in the middle since it adopts a peer-to-peer transmission mode, making the convenience and security of payments greatly enhanced, which to a certain extent greatly

facilitates international calculations and makes CBDC a major source of power for international settlements.

3. The risks of CBDC and its regulation

3.1 Technical and regulatory issues in CBDC

CBDC will need to increase infrastructure for cybersecurity technology if they are to replace the existing cross-border settlement system. The BOI said the test will include comprehensive cybersecurity protection and, under the proposal, intermediaries will not be exposed to financial risk as a result of their customers storing or transferring digital currencies, thereby reducing risk and costs. Typically, commercial banks distribute central bank money to the general public. Even in digital payment systems, transferring funds from one end to the other usually exposes the intermediaries involved in the transaction to financial risk, albeit for a short period of time.

3.2 Information privacy protection issues

If central bank digital currencies are determined by the state to be the equivalent of cash for anonymous payments, one has to wonder if the right to personal privacy can be "purely" introduced into the digital future? Can this personal privacy really be protected? Explaining the idea of the future crypto ruble, Russian Finance Minister Siluanov elaborated "We have reached an agreement that the state regulates the process of issuing, mining and circulation of cryptocurrencies. The state must control everything." In other words, while we use this currency we carry a database of our own bright red, such as online purchases, banking information, identity documents, all in one place. Once such a system is set up, citizens will have to "voluntarily" dive into it and give their data to companies and government agencies "as a matter of practice". This means that data security and the protection of personal privacy become more difficult.

4. Future development of CBDC

4.1 Accelerating pilot roll-out

Introduce preferential welfare policies to attract more users. Starting from 2020, on the basis of the basic completion of the preliminary research and development work. In parallel with the launch of the digital RMB pilot, many local governments and pilot banks have also jointly launched a variety of payment incentives to drive local consumption. The Changsha Central Sub-branch of the People's Bank of China said that by the end of 2022, the Changsha Central Sub-branch had organised activities to benefit the public, such as digital RMB spending with full reductions and green travel, with an investment of over 130 million RMB, driving digital RMB spending of 500 million RMB and benefiting over 8 million people. Since the start of 2023, the pilot status of several

pilot areas, including Jiangsu Province, Fujian Province, Changsha City and Shenzhen City, has been announced, involving the number of accounts opened, number of transactions and transaction amounts. It is worth mentioning that local spending has further heated up with the help of digital RMB offers.

While the pilot cities have a bright track record, to be able to accelerate the pace of digital RMB even more, more preferential policies should definitely be implemented to prompt consumers to change their old ways of spending and try digital RMB payments.

4.2 Actively bridging the "digital divide"

Simplifying operations and account opening to achieve one-stop shopping. One of the major challenges encountered in the promotion of digital RMB is the operational difficulties and limitations. In particular, the further ageing of the country will make it easier to create a "digital divide" in these financial services, as older people are generally less educated and slower to learn and accept devices such as computers and the internet.

Therefore, when designing digital RMB, the "digital divide" should be taken into account and more concise and easy-to-understand digital RMB operation pages should be introduced as far as possible. At the same time, in the context of accelerated electronic, digital and non-contact financial services, the overall scale of traditional physical outlets and manual service resources continues to shrink, and the elderly are facing a digital divide along with a reduction in traditional financial services resources, further exacerbating the "digital divide". It is therefore imperative that financial institutions improve their financial services.[4] If they can provide point-to-point services to these people in need, help them open accounts, realise one-stop-shopping, and operate through one business channel to minimise operational difficulties, the "digital divide" will be largely reduced.

5. Challenges and opportunities brought by CBDC to traditional banking and financial institutions (using DC/EP as an example)

5.1 The emergence of and solutions to the phenomenon of financial disintermediation

Due to its nature, the CBDC is an upgrade to the traditional binary account system of money placement by issuing digital currency using a two-tier operational system approach. Therefore, under the two-tier operation system issuance model, commercial banks and other institutions, with their relatively mature IT technology and service system, the use of financial technology and the accumulation of experience in the relevant talent pool, give full play to the advantages of commercial banks and other institutions in terms of talent, technology and resources, and avoid the huge waste of duplicate construction. At the same time, it avoids financial disintermediation and the crowding-out

effect on commercial banks' deposits, which may lead to a reduction in commercial banks' ability to make loans.

5.2 Remaining third party payment platforms

The emergence of the CBDC will also have a significant impact on third party payment platforms. Although it may seem that the emergence of the digital RMB is just one more way of classifying money on these platforms, making payment methods more diverse. But in fact it still poses a strong competitive advantage for third party payment platforms. Firstly, the digital RMB has lower transaction fees. The digital RMB is formally equivalent to the digitisation of cash, so commercial banks do not charge additional service fees, whereas third party payment platforms often require fees for fund operations (such as withdrawals). Secondly, CBDC has greater privacy. It was developed with the idea that the digital RMB uses a centralised management model. Under a loosely-coupled account system, proxy depositories may be required to transmit transaction data to the central bank asynchronously on a daily basis." It is clear from this that third-party platforms are likely to have no access to digital RMB transaction data. However, in the era of big data, a very crucial point for third-party platforms to be able to profit is the collection, collation and finally re-use of data. If they lose the consumption data of users, they will not be able to use the data for secondary attraction and profit.

6. Conclusion

6.1 Central bank digital currency design aspects

In terms of interest-bearing, the features of the legal digital currency should be set in line with the national context. The impact of different set features of the legal digital currency should be carefully screened and its functions continuously optimised. Initially, digital RMB should be issued in a non-interest-bearing manner, which is an issuance method conducive to social welfare; in the future, when conditions are ripe, the digital RMB interest rate can be considered as a new monetary policy tool, enriching the monetary policy toolbox and expanding the monetary policy space.[5] But interest-bearing also has its unique advantages, and China can learn from the idea of a graded interest-bearing system in Europe, where interest is charged on different digital RMB holdings at variable rates, in order to mitigate the potential impact of digital RMB on the banking sector, financial stability and monetary policy transmission.

6.2 Strengthening international exchange and cooperation

"Digital currency + economic foundation + institutional credit" is the key to determining the future of the international monetary system. The same horse-race mechanism applies to international competition for

central bank digital currencies. The international influence of a country's currency is ultimately determined by the country's overall strength, national credit, and the stability of the currency. The competition for central bank digital currencies may introduce new factors, including technological prowess and the stage of development of the digital economy, but the determinants of the status of currencies will not change fundamentally, and emerging countries will need to make efforts in many aspects on the road to enhancing the international competitiveness of their currencies. It is therefore particularly important to increase global communication and collaboration, fully absorb and draw on international research and development experience and technology, strengthen international regulatory collaboration and coordination of cross-border data flows, create a technical path and circulation path suitable for the cross-border circulation of digital currencies, and create a domestic and international circulation and regulatory environment that promotes the healthy development of digital currencies.

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