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"Smart" Monetary Policy with CBDC

The emergence of central bank digital currency (CBDC) is most timely and necessary as the widespread adoption of competing means of payment not denominated in domestic fiat currency, such as digital foreign sovereign currency and cryptocurrencies could potentially imperil the central bank's ability to achieve its monetary policy objectives.

The CBDC also presents golden opportunity for a country to improve the effectiveness of monetary policy implementation.

At present, the effectiveness of central bank's monetary policy transmission is sometime affected by time-lag or less than ideal resource allocation. The economic entities in urgent need of development are not allocated with the required funding and hence, their production capacities cannot be expanded. On the other hand, economic entities which are in sunset industries may continue to be fed with funding and survive, or in the case of quantitative easing, excessive monies are attracted to speculate in stock markets and engender financial bubbles, instead of being deployed to fund productive activities in the real economy. Worst still, this ensues with financial crisis inflicting enormous pain for the society and livelihood of ordinary people and widening wealth and social inequality.

Combining the advantages of traceability offered by blockchain technology and the programmability of smart contracts which would be self-enforced on blockchain, the CBDC now being actively researched and developed by many countries in the world, has the technical capability to potentially optimize and vastly improve the central bank's monetary policy transmission, with pre-set conditions to incorporate forward-looking and counter-cyclical features.

Basically, central banks can programme digital currency with logic so it can be spent only for a designated purpose. Central banks can accurately control the amount, direction and intensity of liquidity or money supply flowing to the desired industries. This allows industries to achieve optimal level of production based on market demand and reduce the risk of inflation or deflation due to under- or over-production.

Speedy and Precision Monetary Policy Implementation

When interest-bearing CBDC is widely adopted, the interest rate on CBDC would serve as the primary tool of monetary policy. Any changes in central bank's policy rate, via CBDC, could be passed on speedily and more fully to the interest rates faced by households and companies.

Next, monetary policy can be implemented with precision. Based on its own circumstances and needs, an economy firstly classifies the categories of industries it wants to develop and promote. After careful study and planning, the CBDC will be issued in desirable amount and then be programmed in such a way that they are designated and tagged to different industry categories. When central bank issues and commercial bank makes loan, the CBDC disbursed must correspond to the category of the economic entity receiving the loan, otherwise it will be rendered invalid.

With such a system of classified currency issuance and credit creation, the central bank can implement targeted monetary policies for different industries with different statutory reserve ratios, interest rate adjustment mechanisms, and liquidity supply mechanisms. Central bank can also pre-set clear forward conditions through writing computer codes into the CBDC to support or promote specific industries.

Dr Yao Qian, Director of the Science and Technology Supervision Bureau of China Securities Regulatory Commission and former Director of the Digital Currency Research Institute at People's Bank of China (PBoC), in a China Economic Journal paper published in March 2019, suggested that CBDC can enhance the effectiveness of monetary policy implementation by programming forward conditions into CBDC to address the issue of time-lag in traditional policy transmission, to ensure funding is used as intended and the government guidance on interest rate is followed, and finally to counter any economic cyclical effect, as illustrated below.

In the t_0 period, a central bank sets forward conditions on time, industry sector, loan interest rate, and economic state in the design of CBDC, and the conditions become effective after the issuance of CBDC. During the t_1 period, a commercial bank plans to lend money and report the loan information to the CBDC system. If the loan information meets the requirements of the time, industry sector, and loan interest rate conditions set by the central bank in advance, the loan will be approved and the corresponding amount of CBDC will be activated. During the t_2 period, the commercial bank returns the digital currency to central bank. If the economic situation is normal, the loan interest rate will not change. Otherwise, it will be automatically adjusted according to the rules set in the t_0 period. For example, when the economy is overheating, the loan interest rate will become higher; when it enters a recession, the loan interest rate will become lower, effectively serving as a counter-cyclical mechanism.

The issuance method of CBDC means that the central bank must determine the amount of money during design phase in the t_0 period. Leveraging on digital technologies, central banks can easily obtain, track and monitor historical transaction data in the entire life cycle of CBDC previously issued, accurately measure the speed and velocity of currency circulation, and combine with big data technology in the extensive collection of payment data of social and economic entities, in the analysis of consumption and investment behavior of the private and public sector, eventually providing a high-quality database for the review and re-formulation of monetary policy including adjusting the amount of CBDC for each of the industry categories and putting in place the necessary policy incentives targeted at specific industry categories.

Negative Interest Rate

Another advantage of CBDC is the effective implementation of the negative interest rate policy, which enriches the central bank's non-conventional monetary policy toolbox. Under traditional physical currency or cash system, the effective lowest interest rate the central bank can adjust to is zero, because people can convert deposits into cash to avoid the impact of negative interest rate. Even in the case where cash system and CBDC co-exist, for large institutions, holding cash also incur storage, transportation, insurance, and transaction costs, etc. Whether there will be large-scale conversion of deposits into cash depends on the comparison of negative deposit interest rate and the cost of holding cash. If the negative deposit interest rate is greater than the cost of holding cash, it will cause a large-scale transfer of deposits into cash. With CBDC replacing cash, the central bank can break the zero-interest rate lowest limit and apply negative interest rate policy effectively by reducing interest rate as much as needed to avert a deflationary spiral.

Issues and Risks

With higher speed and velocity of digital currency circulation, central bank's swift response is required. It also means the review cycle of monetary policy is likely to become shorter.

Technical risks of using CBDC central banks should watch out for include unintended consequences due to design faults and programming errors resulting in lack of flexibility and inclusiveness in the conduct of monetary policy.

There are also potential macro-finance issues to be addressed. For example, if people prefer CBDC over

bank deposits because of higher interest rate offered by interest-bearing CBDC, or people fleeing bank deposits and seeking refuge in risk-free CBDC in time of market stress or crisis, there is increased risk of disintermediation of the banking sector resulting in fall in the total amount of bank deposits and loans. Then, the importance of bank lending in the overall transmission of monetary policy will be weakened, and other more important channels of transmission would have to be identified.

"Smart" vs "Mechanized" Monetary Policy

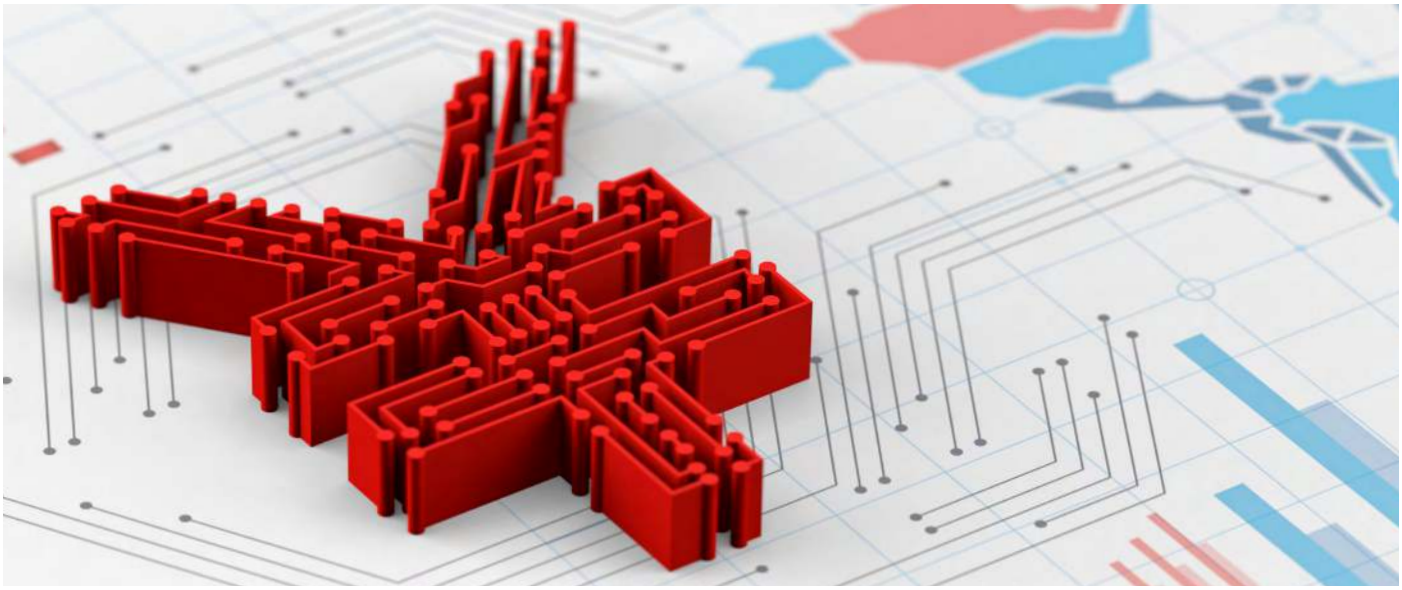
The emergence of programmable money will allow conduct of monetary policy of the future to be more targeted, precise, and transparent. The CBDC is innovative smart currency which will help strengthen the management of market expectation, improve the efficacy of monetary policy transmission, and finally achieve what we might call a "***smart monetary policy***" which brings about efficient resource allocation.

On the other hand, with the ability to pre-set rules, the programmable money also increases central bank's power to impose more direct administrative intervention and potentially weaken the role of financial intermediaries in directing how the money should be circulated. It is therefore important for the central bank to continuously master the full understanding of the changing development goals, macroeconomic dynamics, and market forces to strike a good and prudent balance between market self-adjusting ability and direct administrative intervention, thereby avoiding excessive or overly writing of pre-conditions for the money circulation liking the case of a "***mechanized monetary policy***"!

China's Journey with CBDC

China has been working on its CBDC since 2014. In 2016, PBoC successfully built the digital yuan prototype. In May of 2019, China became the first major country to launch a large-scale pilot project for its CBDC in cities like Shenzhen, Suzhou, Chengdu, and Xiong'an. According to a white paper "Progress of Research & Development of E-CNY in China" published by the PBoC in July 2021, the pilot project now spans the Yangtze River Delta; the Pearl River Delta; the Beijing-Tianjin-Hebei region; and China's central, western, north-eastern, and north-western regions.

Most significantly in March 2021, China gave out wages to builders using its digital Yuan known as e-CNY in Xiong'an district in Hebei Province. The Xiong'an district government called this China's first "on-chain" payments used for wages, which means blockchain technology is used to keep track of and give out builders' wages. This marks China's first "blockchain plus digital yuan" application scenario. With its leading edge in the research and development of CBDC, it should not be a surprise to see China being one of the first few countries to experiment "smart monetary policy" with the use of programmable money.



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