

The Impact of the Issuance of Central Bank Digital Currency on the Effectiveness of Monetary Policy

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ABSTRACT

Facebook's efforts to launch its Libra cryptocurrency elicited heated debates over who will control money in the future, major economies have started to examine how central bank digital currencies could become reality. In this paper, clear boundaries between central bank digital currency and cryptocurrency are clarified, including the value and the purposes of issuing different currencies. Figuring out the pros and cons raised from different characteristics of them will be found out. CBDCs also exert tremendous influences on the monetary policy, both positively and negatively, like the issuance of CBDC will maintain the independence of central banks and solve the liquidity issues to resolve the problems on quantitative easing. Moreover, the expansion of issuance of CBDC is taken into consideration, inspecting the transition of CBDC through cost-benefit analysis; as a result, agreement on the issuance of CBDC will be concluded to show the positive side of CBDC.

Keywords: Central bank digital currency; monetary policy; zero lower bound; quantitative easing; IS-LM analysis

1. INTRODUCTION

The modern world is a digital entity, and the demand for the paper-based cash has gradually deteriorated. Online payment enables people to have a totally different way of trading with each other. In China, with the introduction of online payment like Alipay, citizens now tend to use online payment measures rather than banknotes, simply because scanning a QR code with a mobile phone is much more convenient. The central bank's potential to manage economy by issuing paper money has also been threatened by those online payment measures. Thus, many central banks in countries all over the world are considering a similar approach-developing a new kind of digital currency. The goal of this paper is to examine the influence the issuance of digital currency has on the monetary policy and give advice on the transition of CBDC. In this paper, the efficiency of CBDC is comprehensively discussed on a cost-benefit analysis basis.

2. DIFFERENCES BETWEEN CBDC AND CRYPTOCURRENCY

Some may doubt whether the central bank's digital currency is another kind of cryptocurrency. Nevertheless, CBDCs are traditional money with government authorization, only in digital form; while cryptocurrency, like bitcoin, is created by using blockchain algorithms to solve complex mathematic puzzles regarding a "public key" online, which contributes to its decentralized nature. In addition, CBDCs are managed by a centralized body, which is the central bank, while privately issued cryptocurrencies do not have specified governor [2].

The value of CBDC and cryptocurrencies are determined by totally different factors. Since CBDC is directly issued and managed by the central bank, the value of the currency will be influenced by the monetary policies and trade surpluses; while the value of cryptocurrencies, like bitcoin, is determined totally by the trade in the market, which means the value of those currencies is severely volatile. The volatility of the cryptocurrencies cannot be controlled by a centralized force. In fact, many purchases cryptocurrencies not aiming at using it as a store of value or a median of exchange, but instead is speculation-driven; while CBDC will be more like a quotidian fiat money with its monetary value strictly controlled.

In addition, Cryptocurrency is a blockchain asset and not the liability of anyone. Central bank-issued digital currency is based on a fractional reserve banking system based on debt and the liability of an increasingly highly indebted nation-state central bank [3].

Finally, the main purpose of introducing CBDC is to enable the general public to have access to a secure legal tender when paper cash is no longer widely available [4], while the purpose of cryptocurrency is just simply to give people access to a secure platform to trade by using cryptocurrency.

3. IMPACT ON MONETARY POLICY AND POLICY MAKERS

The issuance of CBDC and the obsolescence of traditional cash-based system would ensure the economic position of the monetary policymakers (central bank) is not abated and they will be empowered to adjust the economy through more effective monetary tools.

3.1. Maintaining the Role of Central Bank (CB)

As mentioned above, one underpinning thought that supports the development of private-issued cryptocurrency is the belief that the digital currency may play a major role in increasing global economic participation by secure transfer and low barriers of entry. Cryptocurrencies are confronting the traditional pillars of the financial system and the role of central banks will be harmed if individuals could store and transfer their assets without the reliance on CB-issued fiat money. Therefore, CBs would be more critical regarding cryptocurrencies because a part of the monetary system out of its control would damage its traditional role as the last resort in the financial system. CB in China has been considering regulating the development of such currency. [5]

However, the problem would be solved if digital currency, just like another fiat money, can be CB-issued and is declared as a secure legal tender. CBDC would outcompete private-issued money because 1) it is a perfect substitute with equally easy access and low barriers of entry; 2) it is a CB-backed legal tender, which prevents legal risk in large transactions and is of higher credibility; 3) its monetary value is much less volatile than cryptocurrencies because CB would ensure it is used for transaction instead of speculation, and because the CB could employ nominal anchors that controls the monetary value of CBDC over time in terms of CPI. By issuing, monitoring, and controlling a CBDC, CB would guarantee its importance in the financial system even if the society quickly transits into cashless.

3.2. Interest Rate-Driven Policy

Under the premises that CBDC will be interest-bearing just like current fiat money and can be held without limit, the investors in the economy would be affected because of this new liquid and low-risk financial instrument. Households can choose to move part of their monetary assets to a CBDC account directly at CB. This move grants significant flexibility on CB's discretion over the interest rate of CBDC because the problems that arose in the traditional fractional banking system may cease to exist. For example, the CB could set a hard floor of the interest rate of CBDC without worrying about a bank run [1], as it is already the last lender. An interest-bearing CBDC could provide a risk-free store of value and will be generally adopted; its interest rate will hopefully serve as the main way through which CB conducts monetary policies. The policy time lag would be greatly reduced because CB will have the ability to regulate interest rates directly online, managing money supply through open-market operations that can be finished instantaneously. One concept that prevents most CBs from lowering their interest rates too much is the zero-lower bound of the real interest rate. Under the current system, if the real interest rate falls too much, especially when it is negative, depositors

can easily withdraw their money and hold cash to prevent loss. Even if the CB overcomes the problem of the liquidity trap, that interest rate lower bound would be a floor of any monetary policy aiming at lowering the interest rate to stimulate aggregate demand. This lower bound is eliminated in a pure CBDC system [6]. The obsolescence of traditional banknotes would make it possible to adopt a negative interest rate, as people will be less able and willing to hold cash, thus magnify the power of monetary policy in correcting recession and stabilizing the business cycle. This future would come quickly when the CB phased out current fiat money, especially in a scheme where banknotes with high denomination value are firstly abandoned to unleash people from the reliance on traditional money in large transactions [7].

A side-effect of this more effective interest tool is the potential that CBDC renders the unnecessary for CB to resort to monetary measures that greatly modify the size of its balance sheet, known as quantitative easing.

Quantitative easing is mostly used in severe recession or when the inflation target cannot be met. To quickly expand the liquidity, the CB would purchase financial assets directly from commercial banks to inject money into the country. The introduction of CBDC provides two ways to better resolve the situation where QE is applied: 1) by distributing the money instantly to individuals to reduce the policy time lag [9][8]; 2) by conducting many precise and smaller interest-rate driven monetary operations, taking the advantage of CBDC's managerial convenience to avoid the need for quantitative easing. In the second way, the CB would be able to accurately control the liquidity on the market on a second-by-second basis, thus minimizing the possibility of injecting too much money that commonly happens with traditional QE.

3.3. IS-LM Analysis

As mentioned above, the introduction of CBDC smooths the pathway whereby real interest rate affects the GDP as investment and consumption are more encouraged during low or negative interest rate than holding cash. That is to say, with CBDC, the responsiveness of investment (and thus saving) to real interest rate increases: with a given change in the minimum or the actual interest rate, the amount change of investment-saving is now greater, namely a bigger shift in the investment function and the saving function. As both functions are crucial components of GDP and the price level is prone to stable in a central-bank properly intervened recession or expansion, the real GDP and the national income will be affected with extra strength. Consequently, the central bank's interested rate-driven monetary policy would better stabilize the economy.

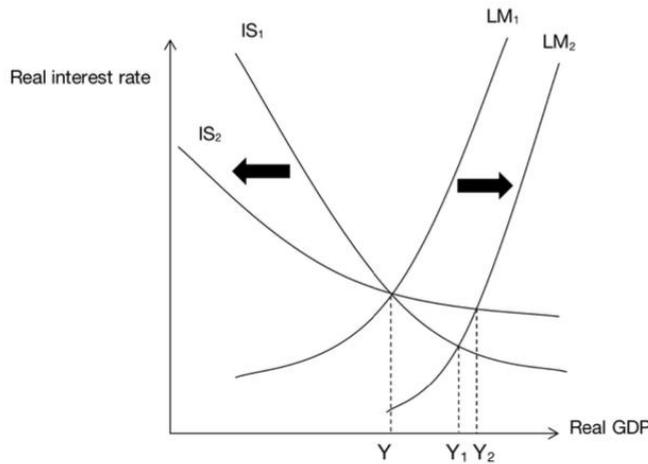


Figure 1 IS-LM graph showing effect of CBDC on monetary policy

The above explanation is well shown in the figure 1. The increased responsiveness of investment and saving to a change in real interest rate causes a more elastic IS curve from IS₁ to IS₂. Let's assume there's a recession going on in the economy and the central bank decides to employ expansionary monetary policy to fight against the recession. Through open-market operation, the central bank expands money supply and, correspondingly, the LM curve shifts rightward. Now we can compare the world with and without CBDC. In the reformed one with CBDC, the real GDP will, from initial position Y, go up to Y₂, moving further than the case without CBDC, which is Y₁. This IS-LM analysis justifies the power of CBDC in making monetary policies more efficient.

4. COST-BENEFIT ANALYSIS-BASED ADVICE

4.1. Benefits

CBDC has various advantages when comparing to other types of currencies. Firstly, it breaks the monopoly of Bitcoin in the digital market. Bitcoin, the prominent digital currency under presence, is rather regulation-free and tax-free. This means that the currency can be used for illegal activities, such as money laundering and terrorist financing and the government lose some potential tax revenues. By issuing and expanding the access of CBDC, however, we would be able produce a substitute for Bitcoin. With this substitute, the central bank can include more business transactions into the financial system, increasing tax revenue and restrict illegal activities. The increase in tax revenue means the government can spend more on infrastructure, healthcare and education, which would then promote the long-term growth of the economy.

Also, the increase in government spending means more aggregate demand, leading to lower unemployment in the economy. Secondly, CBDC can safeguard the financial system and boost competition. In recent years, there has been a decline in the use of physical cash. Rather, we become more reliant on private financial institutions. This increases the instability of the financial market, for that there is more exposure to the risk of exclusion from basic services. For example, financial crisis will let people lose faith in private institution and the financial market will face big threat, making government intervention necessary. If the central bank gradually loses its influence over the wholesale and retail system, its policies to deal with economic fluctuation will have reduced effect. Thus, it is crucial for the issuance of CBDC to fill the void [10].

Thirdly, CBDC will allow money to have higher velocity. CBDC eliminates the need for face-to-face transactions and financial services such as making loans can be carried out online instantly. Though some may say Bitcoin has the same effect, CBDC as a fiat money supported by the government will have much wider coverage of population. The increase in money velocity, as according to the Fisher's equation of exchange, indicates a potential increase in aggregate output, stimulating the economy. At the same time, it is important to notice the improvement of CBDC on monetary policies, as mentioned in the previous sections. Other advantages include spurring innovation in payment system by mitigating the role of tradition bands, which adds stability to the system and fulfilling the globalization of finance.

4.2. Drawbacks

Nevertheless, the downside of CBDC are just as compelling.

First, CBDC causes bank runs as times of economic instability. As warned by the bank of international

settlement (BIS), the central bank digital currency could allow for digital runs towards the central bank with unprecedented speed and scale at the click of a button. This theory sometimes does not stand because with CBDC, the central bank is already the last lender and will not face the awkward situation that happens in a fractional banking system. Similarly, the currency might trigger volatile transfer of money through borders to safe-haven, state-backed cryptocurrency, which will have tremendous distortion effect in the foreign exchange market.

Secondly, the privacy aspect of CBDC seems to rise a concern. Unlike Bitcoin, CBDC would leave a traceable digital footprint, holding none of the anonymity of cash. Features in the currency would identify users, allowing governments to track every payment right down, yet people would like more privacy in their financial dealings. Also, the transaction system might be compromised and lead to disclosure of personal information.

Thirdly, if CBDC replace tradition currency to a large extent, the financial services in use will become obsolete, leading to large scale structure unemployment, which will be against the central banks aim of economic stability. Moreover, disintermediation can be the direct result of CBDC. That is the elimination of financial intermediaries such as banks and brokers in transactions between principals. This is dangerous, as the current financial system will be changed from the bottom to top. Other concerns are the countries in lack of technology infrastructure, regulatory capacity, government involvement, or inadequate central bank independence.

4.3. Advice on Transition to CBDC

Though these are facts at the moment, since it is only the experimental stage, there can still be many changes to reduce the negative effects of CBDC. To address the problem of transfer between traditional currency and CBDC, the central bank can impose limits or use interest rate to influence the transfer amount between traditional banks and digital account. There could also be international co-operations on policies to reduce transfer through borders. As for the problem of privacy issues, the government has higher credential on protecting personal information. Official database and systems are usually protected with the highest priority. Thus, the risk of cyber-attacks is low. Since the central bank is totally in charge of planning the replacement of cash with CBDC, there could be retraining for employees in the former financial services. The process of transformation can also be a prolonged period of time, as to deal with occupational rigidity. The disintermediation effect can be eliminated with the recent proposed sCBDC (synthetic CBDC). This is type of CBDC that retains that traditional financial structure. Since there is still a long way to final issuance, the lack of infrastructure and regulations can be solved with long-term planning. The whole process is shown in the above flowchart.

To sum up, total agreement is given to the trial issuance of CBDC, or that it is a perfect chance to test for methods in

fixing the downside and convince people of the positive side.

5. CONCLUSION

In conclusion, CBDC as a digital form of fiat money with government authorization, its volatility can be strictly controlled by central banks and, more importantly, general public can get access to a more secure legal lender. In addition, an interest-bearing CBDC can solve the problem of liquidity trap by eliminating the zero-lower bound in the pure CBDC system. Thus, the power of monetary policy will be enhanced through negative interest rate to boost consumption and investment. After reviewing the effects of CBDC on monetary sector and also the broad society, such as preventing illegal activities and increasing business transactions to increase tax revenues, the expansion of CBDC scheme from the current experimentative one would be supported by the government. Admittedly, privacy is a significant concern about CBDC since the transparent transactions through it. Hence, the future research should focus on how to protect the private information of depositors of CBDC according to the official database and technology problems on the issuance of CBDC during the expansion. The government must carefully monitor the economy and adjust its plan accordingly.

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