

Would a retail CBDC achieve its intended purpose?



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Keywords: Central bank digital currency (CBDC), central bank, digital money, fractional-reserve banking, Gresham's law, medium of exchange.

While an unattractive interest rate or a quantity ceiling may limit the demand for retail CBDC and the transfer of risk to the central bank, these mechanisms would – as Gresham's law teaches us – undermine the use of CBDC as a medium of exchange. Retail CBDC could thus miss its intended purpose.

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Introduction

The decline in the use of cash, the economy's increasing reliance on electronic payment systems and advances in new technologies, such as distributed ledger technology (DLT), have prompted central banks and international financial institutions to explore the pros and cons of central bank digital currency available to the public (retail central bank digital currency, CBDC, henceforth).² In a world where everything is becoming digital, the digitisation of banknotes could almost seem banal. And yet this could have severe consequences for the banking system. Indeed, the substitution of CBDC, free of credit risk, for risky bank deposits could lead to a significant transfer of credit risk from commercial banks to the central bank. It thus seems sensible to limit the demand for and supply of CBDC in order to limit this transfer of risk. The central bank could do this by applying an unattractive interest rate to CBDC, or by setting an individual quantity ceiling for CBDC holdings.

These mechanisms, however, are likely to undermine the demand for CBDC as a medium of exchange and thus the achievement of the intended purposes for issuing CBDC.

In this article, after describing the main purposes for issuing a CBDC, we explain how the unlimited provision of CBDC leads to a transfer of credit risk to the central bank. We then show how mechanisms to limit the demand for and supply of CBDC undermine the intended purposes of issuing a CBDC.

Purposes of issuing a retail CBDC

An array of arguments has been made for CBDC issuance (BIS 2020). The main purposes can be regrouped under three headings: 1) providing the public with a digital central bank money as the use of cash is declining; 2) improving the resilience of digital payments by providing a back-up system; and 3) promoting diversity and sovereignty in payment systems.

On the first argument, Ingves (2018) made the case for an e-krona in Sweden as a way to provide the public with central bank money, as the use of banknotes is in decline. Since a bank deposit is a claim against the commercial bank payable in central bank money on demand, public access to central bank money is a prerequisite for the enforcement of the deposit claim. Without public access to central bank money, the bank's contractual obligation to redeem deposits in central bank money is impossible to fulfil. Thus, if the use of banknotes declines, CBDC could substitute for cash in this role of providing public access to central bank money.

On the second, the issuance of CBDC may improve the resilience of the payment system. CBDC could serve as a back-up emergency medium of exchange in the event of a disruption to the current electronic banking system. Such a back-up would be superior to cash in terms of speed, convenience and ease of emergency distribution.

On the third, the diversity and sovereignty argument for CBDC relies on its potential to mitigate the anti-competitive effects of some financial innovations. The economies of scale and network effects that could arise with the adoption of new technologies (DLT, big data, and artificial intelligence among them) would tend to foster concentration and work against competitive provision of financial services and of payment systems in particular. As a result, payment systems today are highly concentrated in a few large companies that dominate electronic payment networks, and the importance of electronic payments will further grow with the rise of online

² For information on central bank attitudes towards CBDC and pilot studies, see, for instance, ECB (2020), Mancini-Griffoli et al. (2018), CPMI (2018), Barontini and Holden (2019) and the references therein.

commerce. By providing a generally accessible alternative medium of exchange, CBDC would make for increased contestability and diversity in payment systems.

Moreover, if an economy depends heavily on payment systems that are in the hands of foreign companies and regulated by foreign authorities, its sovereignty is at stake. CBDC would be a means of ensuring the sovereignty of at least one electronic payment system as it is issued by the domestic central bank.

Implications for the conduct of monetary policy and the related risk transfer

How would the issuance of a CBDC influence the conduct of monetary policy? The challenge of issuing CBDC in the current monetary system stems from the transfer of risk from commercial banks to the central bank. This risk transfer comes from the coexistence of two kinds of money, i.e., central bank money and bank deposits.

As its name suggests, central bank money is issued by the central bank and consists of cash (banknotes), sight deposits that commercial banks hold at the central bank (reserves), and, potentially, CBDC. Importantly, central bank money is an economic good free of credit risk, unredeemable, as it embodies no credit claim against anyone. Of course, central bank money is not free of valuation risk with respect to domestic goods (i.e., inflation) or foreign currencies (i.e., depreciation).

In contrast, bank deposits are claims issued by commercial banks redeemable on demand in central bank money. Redemption can be made in cash, possibly in CBDC, or by transferring client deposits and thus reserves to another bank. Because their redemption depends on the solvency of the issuing bank, deposits carry a credit risk. They are, however, not (or less) subject to the risk of loss or theft and more convenient to make payments than cash.

How would the demand for CBDC affect the money market? When non-banks request redemption of their deposits in cash or in CBDC, the reserves held by banks with the central bank decrease, which affects money market conditions differently depending on whether excess reserves are small or large. The amount of reserves that banks hold in excess of what is legally required (minimum reserve requirement) or of what banks voluntarily demand for their liquidity management determines the impact of reserve fluctuations on the money market.

When excess reserves are small, the decline in banks' reserves following an increase in the demand for cash or CBDC by the public leads to tighter money market conditions and higher short-term interest rates. To prevent an undesired tightening of monetary conditions, the central bank needs to accommodate this demand with a corresponding increase in banks' reserves. This accommodation implies an expansion of the central bank's balance sheet and, thereby, a transfer of risk to the central bank. Moreover, if the central bank expands its balance sheet by lending against collateral, the choice of the portfolio of eligible collateral will shape the allocation of bank lending in the economy.

When excess reserves are large, the decline in banks' reserves does not lead to tighter money market conditions and higher short-term interest rates. Thus, the central bank does not have to accommodate the demand for cash or CBDC by non-banks to maintain its monetary policy stance. However, because banks' excess reserves decline, the central bank loses its ability to reduce subsequently its balance sheet and the risk associated with it in case this becomes necessary. Large excess reserves are the result of previous increases in the central bank's balance sheet. By reducing excess reserves, the redemption of deposits into cash or CBDC "locks in" the risk on the central bank's balance sheet.

Unattractive interest rate and quantity ceiling as means to limit risk transfer

The previous section has shown that the issuance of CBDC leads to a transfer of risk from commercial banks to the central bank. At least two mechanisms can be imagined to limit the amount of CBDC demanded by the public and issued by the central bank. The transfer of risk can be limited by charging interest on CBDC holdings, much like negative interest rates have been applied in recent years to bank reserves in the euro area or in Switzerland. Another way to limit the risk transfer is to set a maximum amount of CBDC that each person or firm can hold. A quantity ceiling can be strictly enforced so that any surplus above an individual threshold is automatically transferred into another account at a commercial bank (related to the CBDC account). Alternatively, it can be implemented in a more flexible way by applying an unattractive interest rate to any surplus above a specific threshold, which would induce the holders to rapidly reduce their CBDC holdings. Bindseil (2020) suggests, for example, applying an attractive interest rate up to a ceiling and an unattractive rate on the amount above that ceiling.

Does limiting risk transfer hinder the achievement of CBDC’s purposes?

What are the implications of these mechanisms for achieving the various purposes put forward for issuing a CBDC? Table 1 provides an overview.

Table 1: Effects of mechanisms limiting the demand for CBDC on the achievement of CBDC purposes

		Mechanisms limiting the demand for CBDC	
		Unattractive interest rate	Quantity ceiling
Intended purposes of retail CBDC	Providing central bank money to the public	Effective central bank money function of CBDC since deposit claims against banks would be fully payable in CBDC	Impeded central bank money function of CBDC since deposit claims against banks would be payable in CBDC only up to the ceiling
	Improving resilience of payment system	Ineffective backup system as most people would not hold CBDC	Effective backup system as most people would hold CBDC
	Promoting payment diversity and sovereignty	Impeded use of CBDC as medium of exchange since paying with unattractive CBDC does not benefit the payer	Impeded use of CBDC as medium of exchange since it would be hoarded as a store of value (Gresham’s law)

Providing the public with central bank money: The mechanisms to limit the demand for and supply of CBDC have differentiated effects on the success of CBDC in providing the public with central bank money. If the central bank applies an unattractive interest rate to CBDC, CBDC will be an effective provision of central bank money because the deposit claim against the bank will be fully payable in CBDC (as well as in cash). Although the demand for redemption of deposits in CBDC may be low due to unattractive remuneration, such a CBDC would enable the bank to fulfil its legal obligation to the depositor. However, if the central bank instead applies a

quantity ceiling to CBDC holdings, the deposit claim against the bank will be payable in CBDC only up to the ceiling. This naturally hampers the role that CBDC would be intended to play.

Improving the resilience of the payment system: The mechanisms to limit the demand for CBDC also have differentiated effects on the achievement of a CBDC-based back-up payment system. To be useful, a back-up payment system must be usable by a large part of the population at all times. This requires that the vast majority of people permanently hold a certain amount of CBDC. If the central bank charges an unattractive interest rate on CBDC, then most people will probably not hold CBDC permanently, thereby making a CBDC-based payment system ineffective as a back-up. If instead the central bank applies a quantity ceiling to CBDC holdings, then most people will probably hold CBDC permanently, provided that no unattractive interest rate is charged on those deposits. In this way, CBDC could be used as a means of payment if the current electronic system fails.

Promoting diversity and sovereignty in payments: Mechanisms to limit the issuance of CBDC greatly reduce the chances of widespread use of a CBDC-based payment system for everyday transactions. If CBDC earns an unattractive interest rate, no one would hold CBDC to make payments. The comparison with cash is useful because it pays no interest, which is, in normal times, unattractive compared to the interest rate on bank deposits. However, cash has the advantages of being free of credit risk and of offering a different technology from the electronic banking payment system, which guarantees anonymity. Those who value the absence of credit risk demand cash as a store of value, while those who value cash technology demand cash as a medium of exchange. In contrast, a CBDC-based payment system does not offer a fundamentally different technology to its users than the current electronic banking payment system. Therefore, the main reason why people would hold CBDC with an unattractive interest rate is the absence of credit risk, which is valuable for money hoarded as store of value, not for money to be spent in daily transactions.

If instead a quantity ceiling applies to CBDC, one may question why people would use CBDC rather than bank deposits to settle transactions. Since CBDC is, unlike bank deposits, free of credit risk, Gresham's law teaches us that people will hoard CBDC (i.e., the "good" money) as a store of value and get rid of bank deposits (i.e., the "bad" money) by making payments with them. This is true regardless of the interest rate applied up to the CBDC ceiling. If CBDC earns an attractive interest rate (compared to bank deposits) up to the ceiling, people would maximise their profits by continuously hoarding their CBDC holdings at the ceiling. In contrast, if CBDC earns an unattractive interest rate (compared to bank deposits) up to the ceiling, people would not hold this unattractive CBDC as medium of exchange.

Conclusions

The issuance of a retail CBDC entails a transfer of credit risk from commercial banks to the central bank. Mechanisms to limit this risk transfer make the use of CBDC as a medium of exchange unlikely. There is thus a trade-off between limiting the risk transfer to central banks and achieving certain CBDC purposes.

If the purpose for issuing CBDC is to provide the public with central bank money, its holding should not be subject to quantity ceilings. Applying an unattractive interest rate to CBDC may then contain its demand in normal times; an unattractive interest rate, however, is much less likely to contain demand in times of financial crisis.

If the purpose for introducing CBDC is to improve the resilience of the payment system as a back-up, the vast majority of people need to hold a certain amount of CBDC at all times. This requires that the remuneration of CBDC is non-negative or possibly positive up to a certain quantity ceiling. By applying an attractive interest rate

up to a ceiling and an unattractive interest rate above that ceiling, CBDC would be able to fulfil its roles as central bank money available to the public and as a back-up payment system.

However, mechanisms limiting the quantity of CBDC would undermine its widespread use as a medium of exchange for everyday transactions. As Gresham's law teaches us, people will hoard their CBDC free of credit risk and spend their risky bank deposits instead. A CBDC-based payment system is therefore unlikely to promote the diversity and sovereignty of payment systems. This purpose would be more easily achieved with a system based on privately issued bank deposits rather than on central bank money. One example is the Twint system, developed and operated by a consortium of Swiss banks, which allows transferring money with a smartphone from one bank account to another, from one individual or company to another. While the application promotes diversity and sovereignty of payment systems, it does not suffer from the disadvantages that CBDC would entail. ■

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