BANK FOR INTERNATIONAL SETTLEMENTS

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Central bank digital currencies – Executive Summary

Today, money exists in two forms. Public money is issued by a central bank via banknotes and central bank reserves, while private money is issued by commercial banks in the form of deposits and non-bank financial institutions in the form of electronic money (e-money). Banknotes are the only form of public money available to the general public. Banks, in contrast, also have access to public money in electronic form, via central bank reserves.

The only digital money to which the general public currently has access is issued by commercial banks or e-money issuers. As a liability on their balance sheets, such money carries the credit risk of its issuer. In contrast, central bank digital currencies (CBDCs) are a *direct liability* of the central bank and as such do not carry any credit risk.

There are two types of CBDC. Retail CBDCs (rCBDCs) are intended for the general public, aiming to provide a risk-free and digital means of payment for everyday transactions. Wholesale CBDCs (wCBDCs), on the other hand, are designed for use among financial intermediaries and operate like central bank reserves but with added functionalities enabled by tokenisation.[1]

Benefits and challenges

A risk-free, digital and programmable means of payment can offer a range of benefits:

- Access to digital money facilitates participation in digital economies. rCBDCs can promote *financial inclusion* and *innovation* where the profit potential is insufficient to attract the private sector.
- Programming transactions makes payment processes automatic, where a payment is effected if, and only if, all payment conditions are met.[2] CBDCs may thus eliminate settlement risk.
- CBDCs may help reduce the cost of payments by providing a public infrastructure for payments.

Introducing rCBDCs may come with challenges. Key among those are the following:

- *Disintermediation* refers to commercial banks being deprived of retail deposits as retail depositors shift towards rCBDCs from bank deposits, complicating banks' role in credit intermediation. Also, an exacerbated version of disintermediation may occur in times of distress, as bank creditors may *run for risk-free rCBDCs*, thereby creating financial stability risks.
- The use of rCBDCs implies that the user leaves behind a digital footprint, raising questions and issues relating to *data governance* and *privacy*.

Approaches to mitigating these risks include caps to CBDC holdings, remuneration policies that imply a premium for commercial bank money and robust data governance regimes.

[1] Tokenisation is the process of representing claims, eg for money, digitally on a programmable platform. As tokenised assets, CBDCs could be programmed for automatic transfer if certain conditions are met. See the BIS AER 2023 for more on tokenisation.

[2] This is referred to as atomic settlement because the legs of a transaction cannot be split.

Architecture

Introducing CBDCs requires an adjusted division of labour between the central bank and providers of private money in respect of execution and recording of payments and client servicing. In that regard, three models have emerged:

- In a *one-tier system*, the central bank handles all payments itself, onboards clients (including implementing know your customer (KYC) rules) and provides day-to-day services. Such a model is widely considered to be inefficient, as it detracts from the central bank's main role of providing monetary and financial stability, may hinder innovation by the private sector, and may cause the central bank to assume an undesirable role as financial intermediary and as the manager of data privacy issues.
- In a *pure two-tier system*, payments and client onboarding and servicing are handled largely by the private sector, while the central bank handles the wholesale balances that result as an aggregate of retail transactions. The benefits of such an "intermediated" CBDC architecture would include a diminished need for centralised data collection and perhaps better data security due to the decentralised nature of record-keeping.
- A *hybrid CBDC architecture* incorporates a two-tier structure with direct claims on the central bank, while real-time payments are handled by intermediaries. In such a model, client onboarding and servicing are handled largely by the private sector. The same applies to the execution and recording of individual transactions but, in addition to wholesale records, the central bank periodically updates its records of retail transactions. This allows it to step in, if a payment provider fails, to ensure the continuity of payment services.

Assessing the merits of each approach is an area of ongoing research. A key design choice is whether a CBDC should rely on a trusted central authority to maintain the transactions ledger, or whether it should be based on a platform with decentralised governance as provided by *distributed ledger technology* (DLT).[3]

Cross-border aspects

International cooperation is required to allow for the cross-border use of CBDCs. A challenge in that regard is the use of a digital identity (digital ID) outside the country of origin. Overcoming this challenge by working towards a supranational digital ID does not appear to be realistic. Instead, international efforts towards mutually recognising national ID credentials are a more promising approach.[4]

This approach includes work on (i) strengthening KYC rules and sharing information on identity across borders; (ii) reviewing the interaction between data frameworks and cross-border payments; and (iii) reflecting cross-border usage in CBDC designs. A way to achieve these objectives is through multi-CBDC (mCBDC) arrangements, which coordinate national CBDCs. Three models for mCBDC arrangements have been identified:

- mCBDC Model 1 *enhances* the compatibility of national CBDC systems by aligning regulatory frameworks, practices and messaging formats. This includes coordinated national ID schemes.

[3] DLT enables nodes in a network to securely propose, validate and record changes or updates to a synchronised ledger that is distributed across the network's nodes.

[4] See the G20 roadmap for enhancing cross-border payments.

- mCBCD Model 2 seeks to *interlink* national CBDC systems, eg via technical interfaces that process transaction information across currency areas. This includes mutual recognition of national ID schemes.
- mCBDC Model 3 creates a single mCBDC system that hosts several national CBDCs on a *single platform*. This approach lessens the need to largely align national CBDC systems (as required for Model 1) while going beyond merely interlinking national systems (as in Model 2).

This Executive Summary and related tutorials are also available in FSI Connect, the online learning tool of the Bank for International Settlements.