CBDCs and the challenges for central banks

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World Bank
17 March 2022
Just like cash, CBDCs are direct claims on the central bank but in digital form.
CBDCs work best as part of the two-tier system; central bank provides foundations of the monetary system and consumer-facing activity done by private sector.
Centrality of data in the digital economy gives rise to the “triple imperative”

CBDCs are a response to this triple imperative

- Competition and inclusion
- Privacy and data governance
- Integrity (KYC, AML)
Concentration and market power
DNA (Data-Network-Activities) loop
Walled garden
Rapid inroads made by bigtechs and stablecoins into the monetary system calls for policy that *anticipates* future developments, not just *reacting* to them.

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3 Tenpay includes Tencent pay and QQ Wallet (Source: BIS Bulletin #45 [https://www.bis.org/publ/bisbull45.pdf](https://www.bis.org/publ/bisbull45.pdf))
Three scenarios

- Bigtech ecosystems establish strong presence in financial system, combining digital services in e-commerce, messaging and social media with financial services
  - BIS Annual Economic Report 2019, Chapter III

- Stablecoins establish alternatives forms of money

- Stablecoins that are also bigtechs establish large footprint
  - Likely rapid adoption due to data-network-activities (DNA) loop
  - Central bank loses status as sole issuer of money
  - Possible fragmentation of monetary system and dilution of monetary sovereignty
  - Migration of deposits from commercial banks to stablecoin setting off structural change
    - US President’s Working Group report on stablecoins, November 2021
From walled garden to public square
An open marketplace can channel network effects into a virtuous circle

- Entry of competing sellers with differentiated goods can make other sellers better off
- Customers benefit twice over

Source: BIS Annual Economic Report, 2020 Chapter III “Central banks and payments in the digital era”
Combination of data portability and APIs to breach the walled garden

- Data portability allows individual user to give consent on personal data to competing payment service providers (PSPs)
- But data portability by itself is not sufficient to breach the walled garden
  - Portability as a "data dump" will have limited impact
- Need for common technical standards for data transfer, promoting interoperability
- **Application programming interfaces (APIs)**
  - Account information service (AIS) individual user gives consent to competing payment service providers (PSPs) to access data held by existing PSP
  - Payment initiation service (PIS) authentication of user from third party platform to initiate payment
Central bank’s settlement accounts as a public square

Source: BIS Annual Economic Report, 2020 Chapter III “Central banks and payments in the digital era”
Example of Pix in Brazil: since its launch in November 2020, it has signed up 66% of adult population in Brazil

- **118.5 million users**
- **110 million individuals** (66% of Brazil's adult population)
- **8.5 million companies** (57% of companies with relationship in the National Financial System)
- **Of the 110 million individuals, 50.1 million of Pix users did not use bank transfers before Pix was launched**

In Brazil, the Pix instant payment system is rapidly gaining traction

The cost to merchants of Pix payments is much lower than credit or debit cards.

Data for 2021.

In spite of technological progress and declining information processing costs, card payments are still more expensive than cash for a €25 transaction.
Access to transaction accounts is not universal – even in the United States

Data for 2017.

Sources: World Bank, Findex; FDIC, National Survey of Unbanked and Underbanked Households.
Data governance: squaring the circle between privacy and integrity
There is a continuum of governance arrangements for digital ID

Separate private digital ID systems

Government-issued digital ID

Private party  Government
Jigsaw puzzle principle: each provider should have access only to data that are strictly necessary for their task
...and shares only what is needed in a specific case
No provider holds all the pieces of the puzzle; only the individual user does
CBDC architectures and the financial system
The “direct model” of CBDCs entails a large operational role for the central bank.
Users and merchants have claims on the central bank without an intermediary
Payment information flows directly from users and merchants to the central bank...
...and the central bank maintains the full ledger of retail transactions
In the “intermediated model”, the central bank has a wholesale ledger of only payments between PSPs, not those between the individual users.
In the “hybrid model”, the central bank retains a copy of the full retail ledger.
Operational involvement of the central bank is highest in the direct model, and lowest in the intermediated model.
The international dimension of CBDC issuance
CBDCs could simplify the monetary architecture and substantially streamline the cross-border payment chain.
Four models for interlinking payment systems

Four models for interlinking payment systems

Single access point

Bilateral link

Hub and spoke

Common platform

Common platform BIS CBDC projects of the BIS Innovation Hub

BIS partners: central banks of Switzerland and France
- Platform: **Corda**, with separate subnetworks for EUR and CHF wholesale CBDCs
  - respective central bank settles its wholesale CBDCs
- **Dual-notary** signing that allows tokens to be exchanged while residing on subnetworks

BIS partners: central banks of Thailand, Hong Kong, China and United Arab Emirates
- Prototype on **Hyperledger Besu**, with central banks as validating nodes, commercial banks as standard nodes
- **Direct model**, where non-local banks can hold and transact without “sponsor” banks for AML purposes

BIS partners: central banks of Australia, Malaysia, South Africa and Singapore
- Prototypes on **Corda** and **Quorum**
- **Hybrid model** with “sponsor banks” for AML purposes but which allows all banks to hold CBDCs from foreign jurisdictions without affiliates