

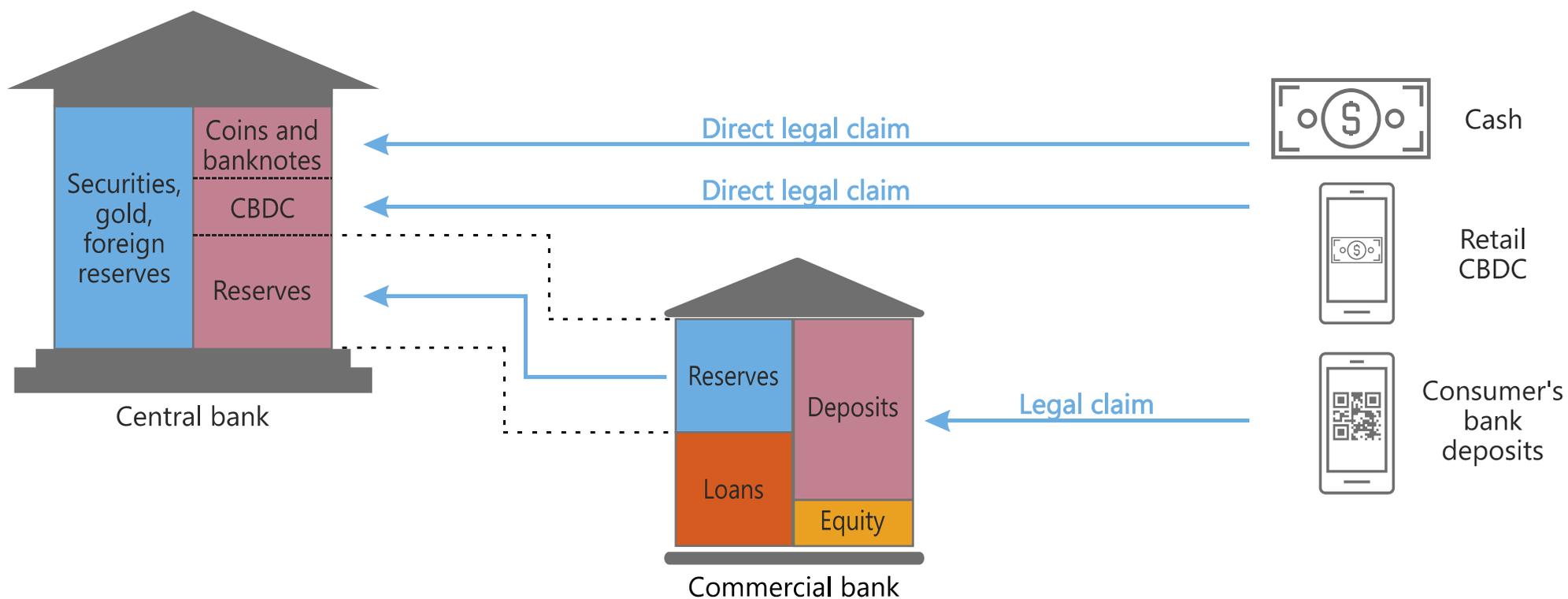


CBDCs and the challenges for central banks

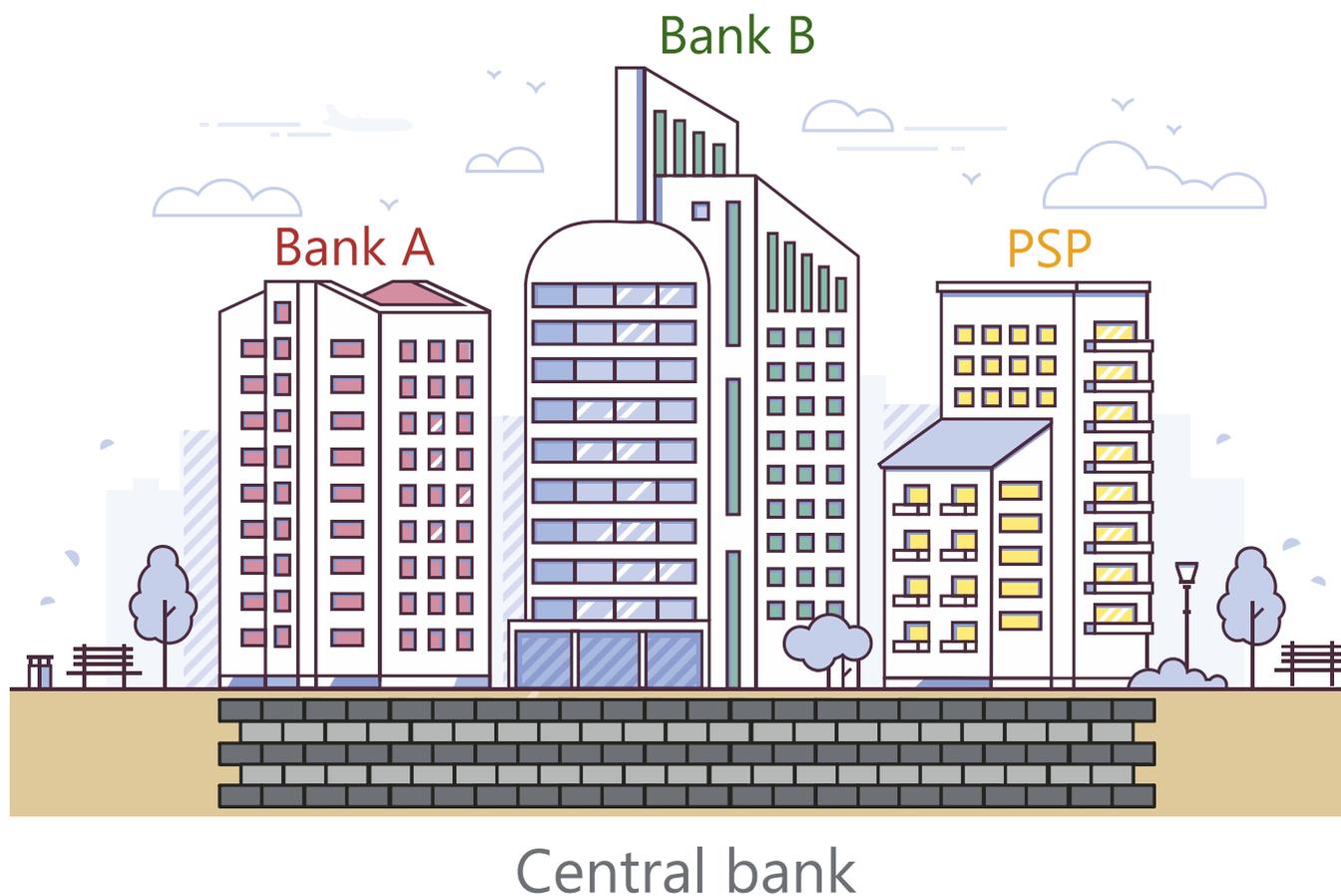
Hyun Song Shin, Economic Adviser and Head of Research, BIS

World Bank
17 March 2022

Just like cash, CBDCs are direct claims on the central bank but in digital form

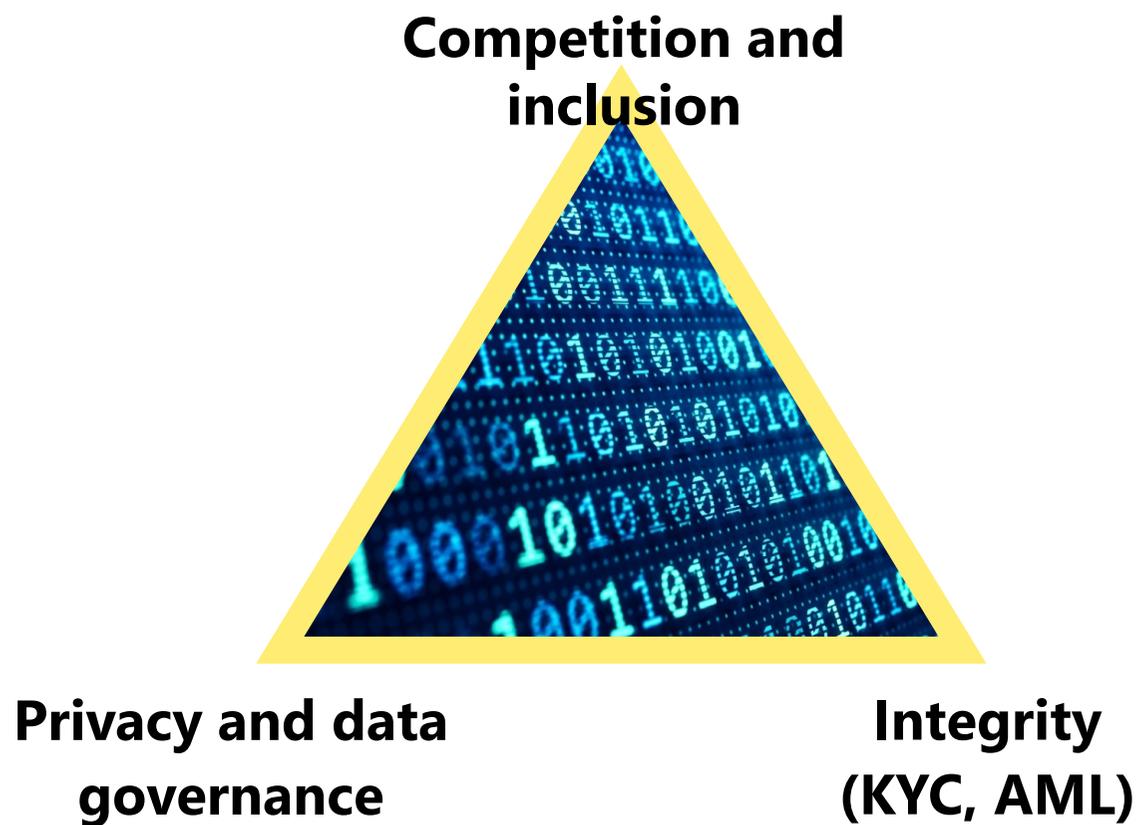


CBDCs work best as part of the two-tier system; central bank provides foundations of the monetary system and consumer-facing activity done by private sector



Centrality of data in the digital economy gives rise to the “**triple imperative**”

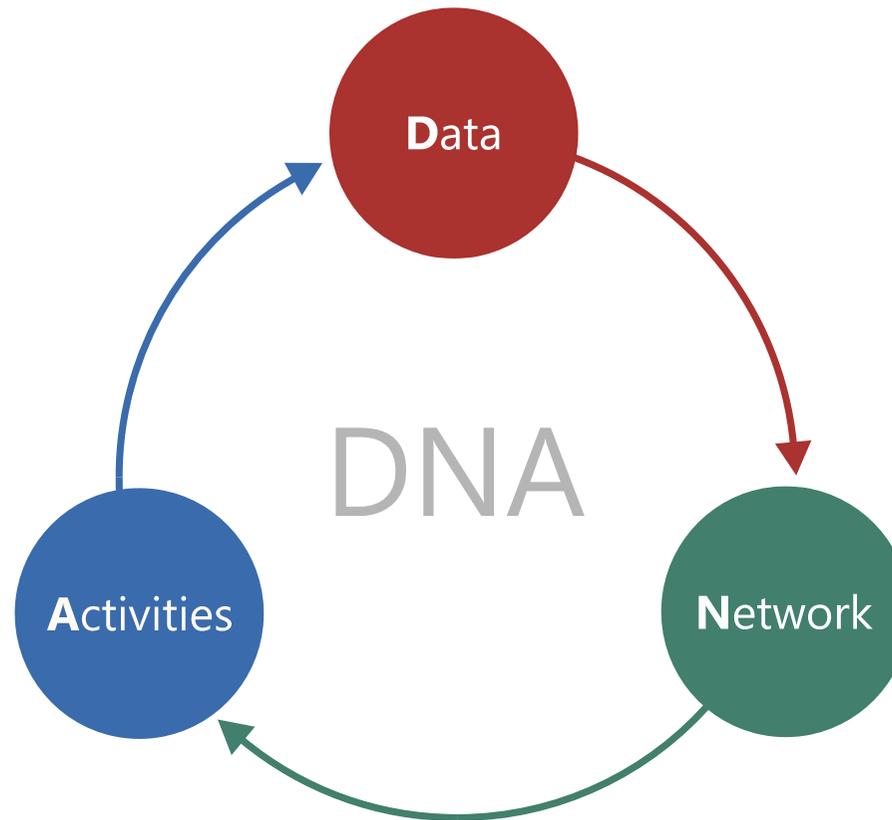
CBDCs are a response to this triple imperative





Concentration and market power

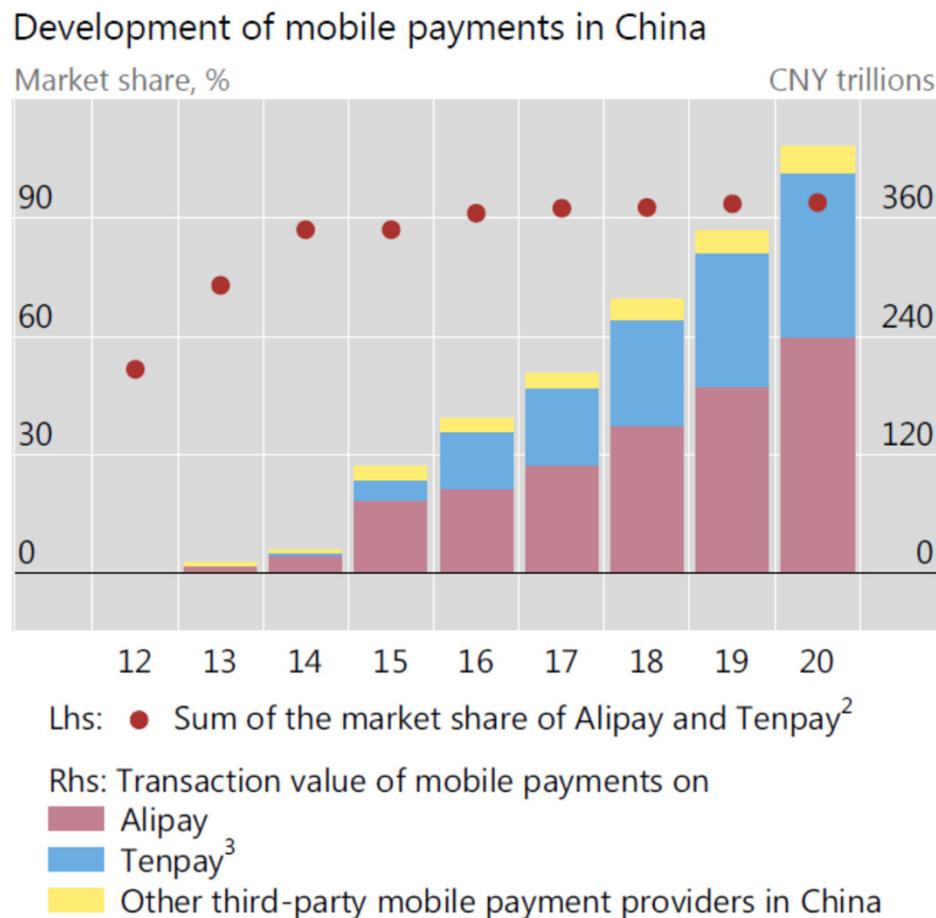
DNA (Data-Network-Activities) loop





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



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

Three scenarios

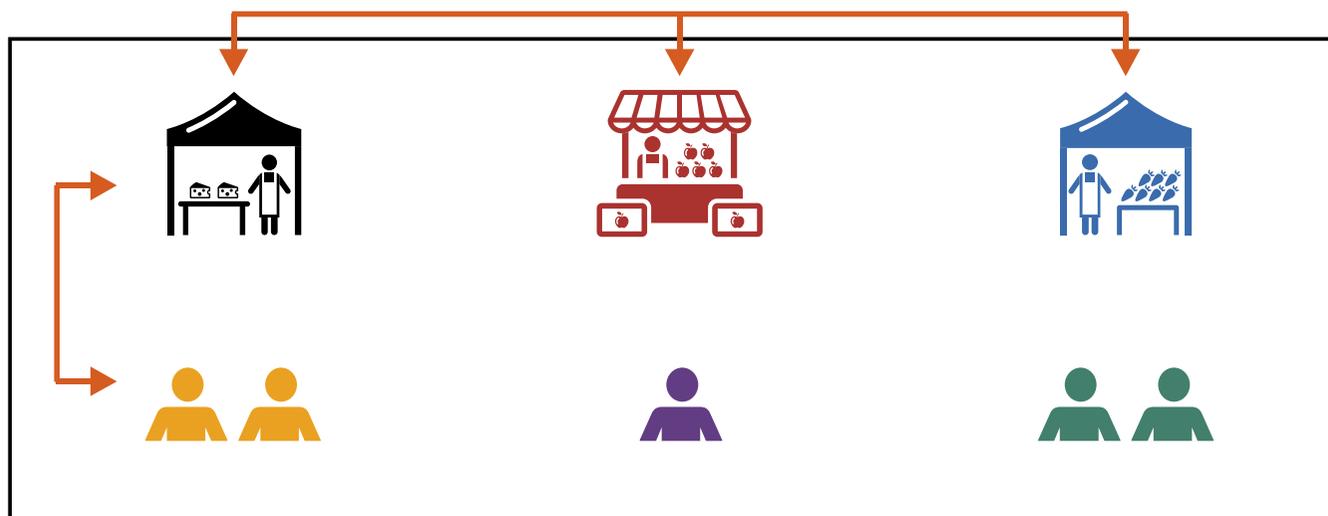
- Bigtech ecosystems establish strong presence in financial system, combining digital services in e-commerce, messaging and social media with financial services
 - BIS Annual Economic Report 2019, Chapter III
- Stablecoins establish alternatives forms of money
- Stablecoins that are also bigtechs establish 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
https://home.treasury.gov/system/files/136/StableCoinReport_Nov1_508.pdf

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

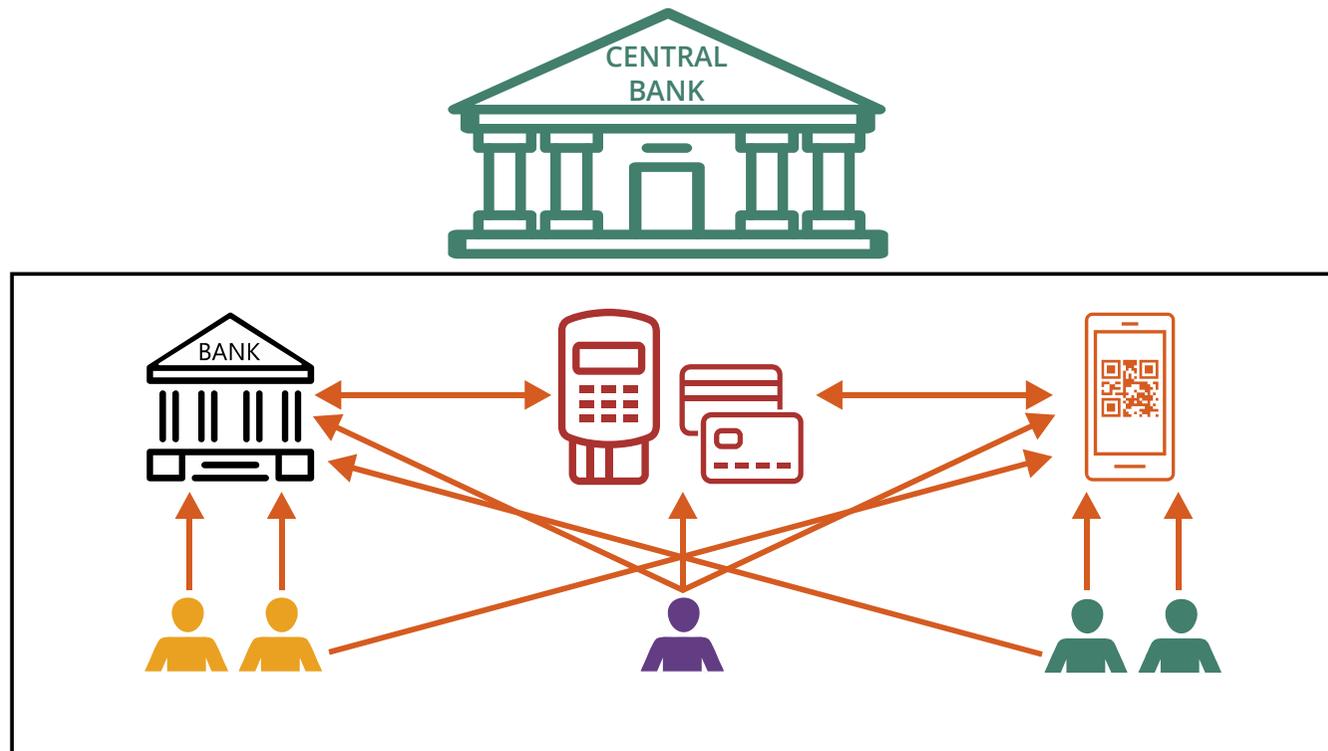


Source: BIS Annual Economic Report, 2020 Chapter III "Central banks and payments in the digital era"

Combination of **data portability** and **APIs** to breach the walled garden

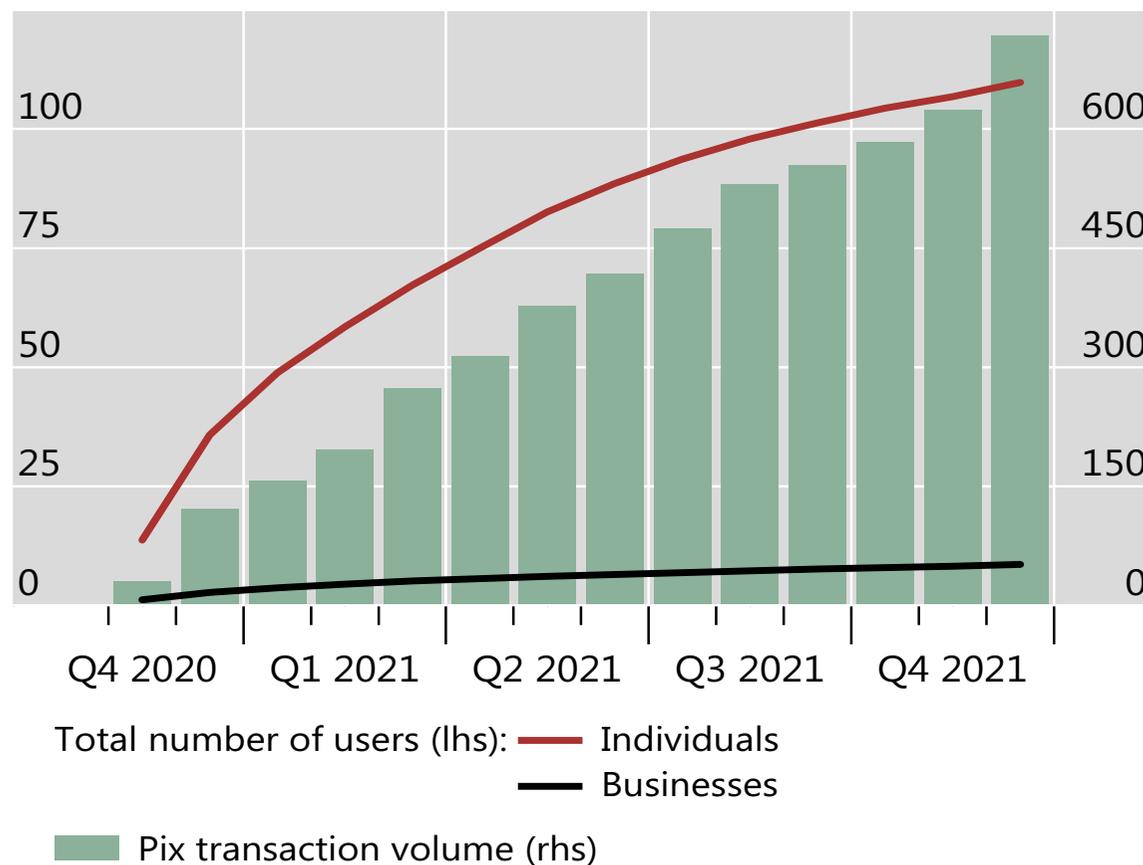
- Data portability allows individual user to give consent on personal data to competing payment service providers (PSPs)
- But data portability by itself is not sufficient to breach the walled garden
 - Portability as a “data dump” will have limited impact
- Need for common technical standards for data 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"

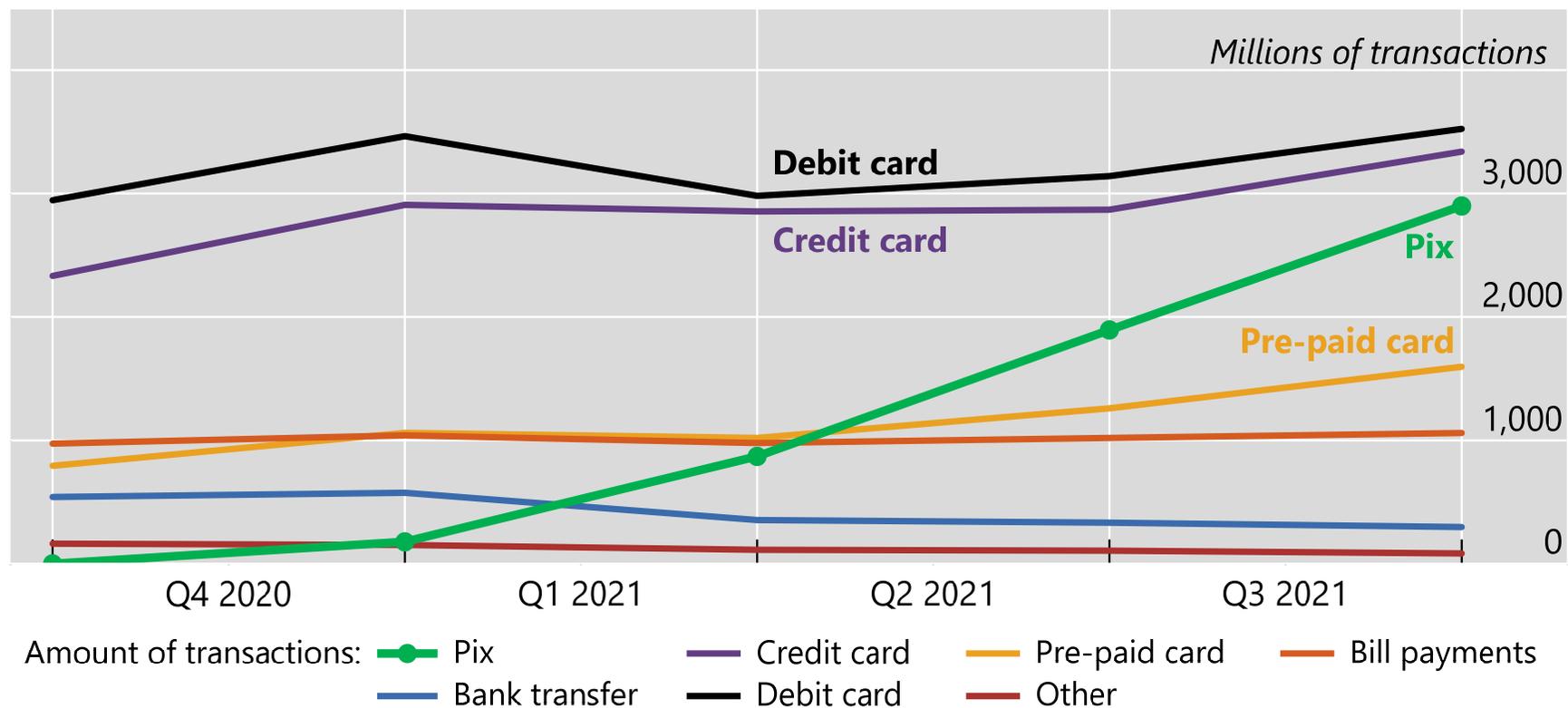
Example of Pix in Brazil: since its launch in November 2020, it has signed up 66% of adult population in Brazil



- **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

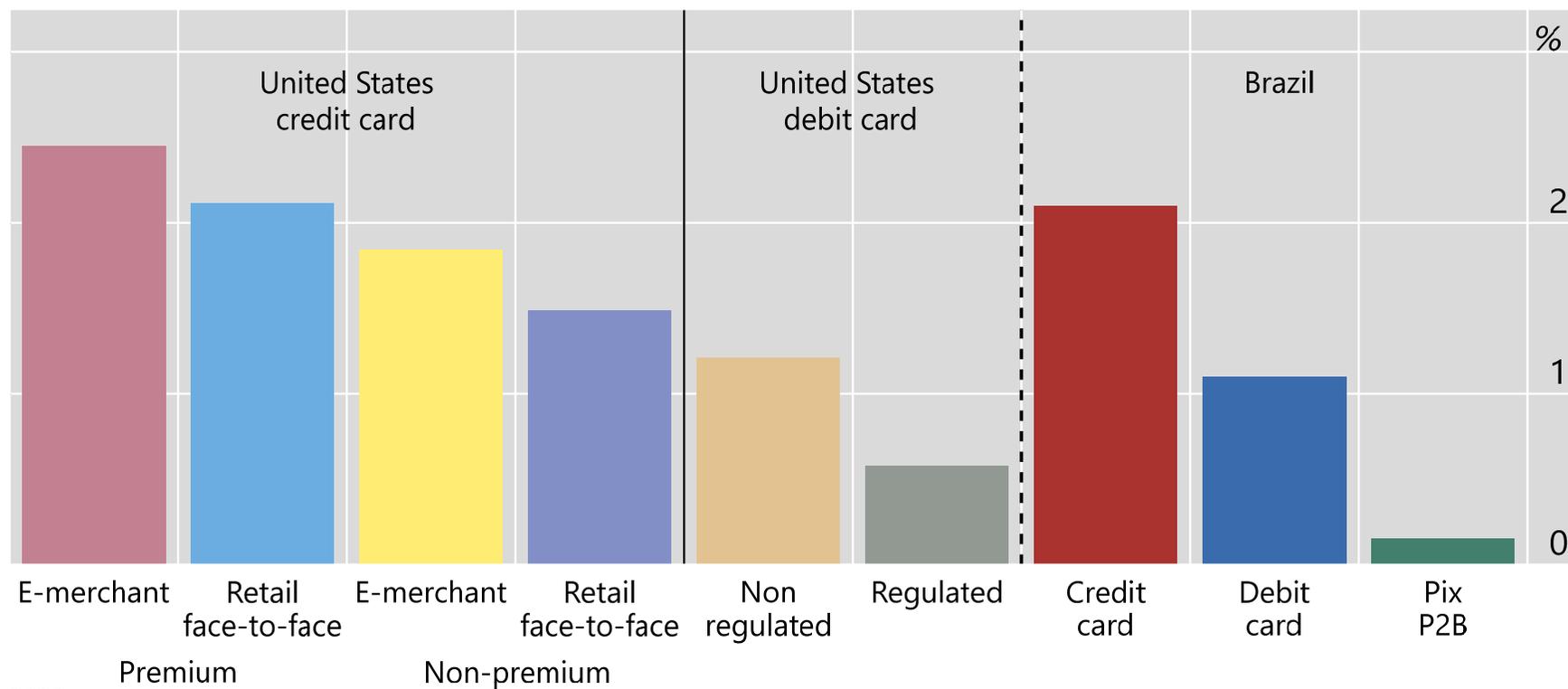
Source: A Duarte, J Frost, L Gambacorta, P Koo and H S Shin, "Central bank provision of public payment infrastructures: lessons from Brazil's Pix", *BIS Bulletins*, forthcoming.

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



Source: A Duarte, J Frost, L Gambacorta, P Koo and H S Shin, "Central bank provision of public payment infrastructures: lessons from Brazil's Pix", *BIS Bulletins*, forthcoming.

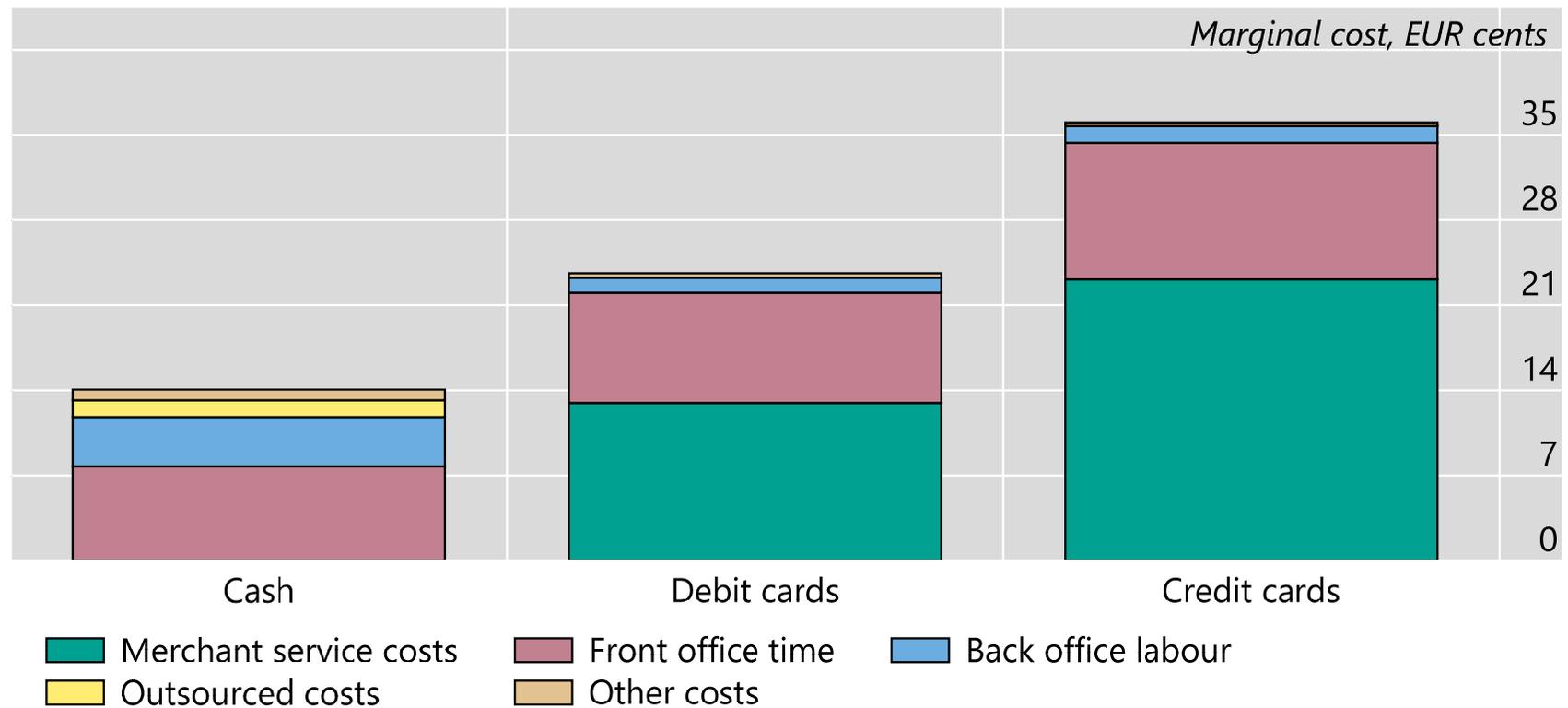
The cost to merchants of Pix payments is much lower than credit or debit cards



Data for 2021.

Sources: A Duarte, J Frost, L Gambacorta, P Koo and H S Shin, "Central bank provision of public payment infrastructures: lessons from Brazil's Pix", *BIS Bulletins*, forthcoming; F Hayashi, and V Nimmo, "Credit and debit card interchange fees in various countries", *Federal Reserve Bank of Kansas City, Payments System Research*, August 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.

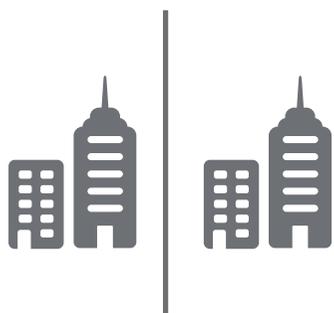
Sources: World Bank, *Findex*; FDIC, *National Survey of Unbanked and Underbanked Households*.



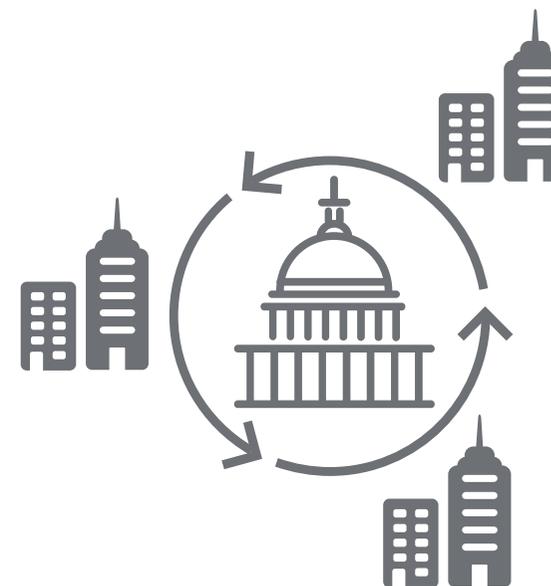
Data governance: squaring the circle between privacy and integrity

There is a continuum of governance arrangements for digital ID

Separate private
digital ID systems



Government-issued
digital ID

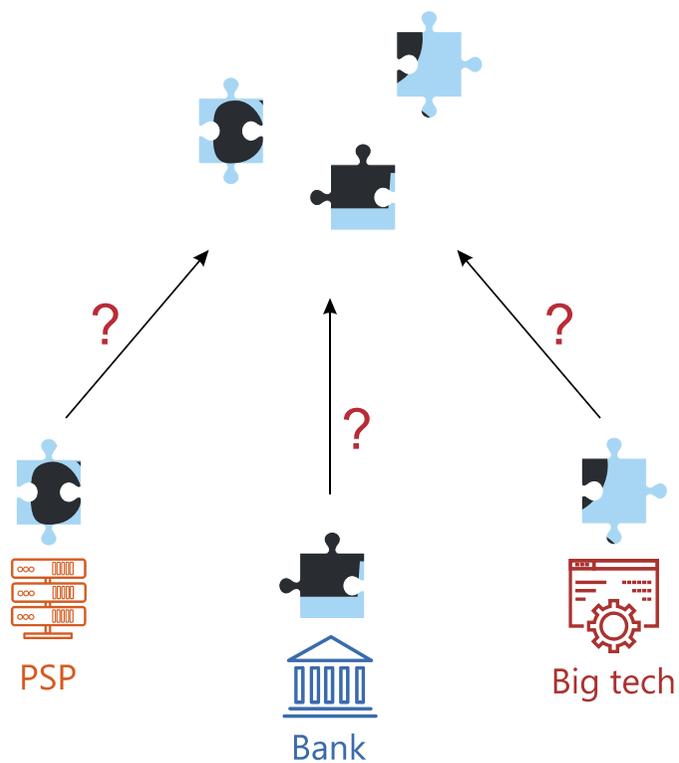


Private party

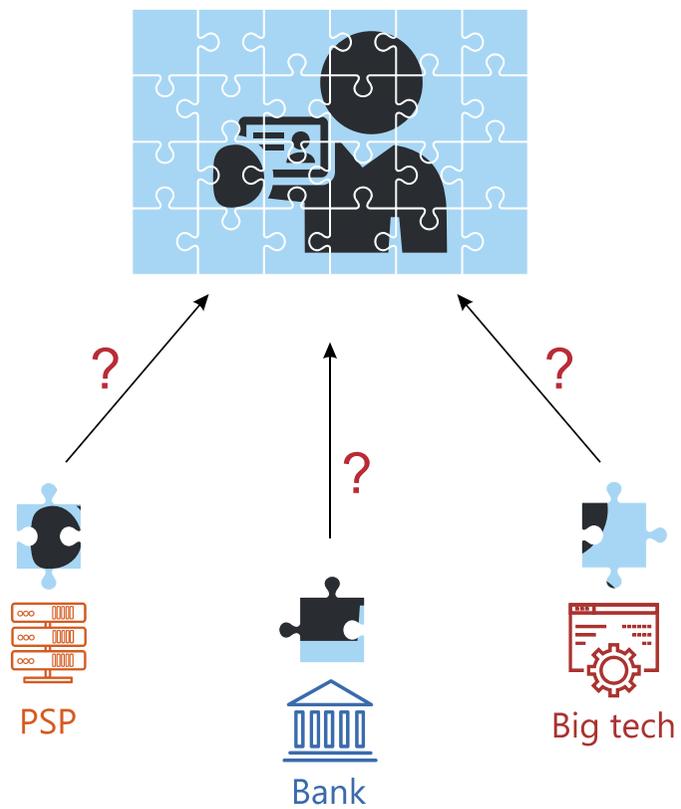


Government

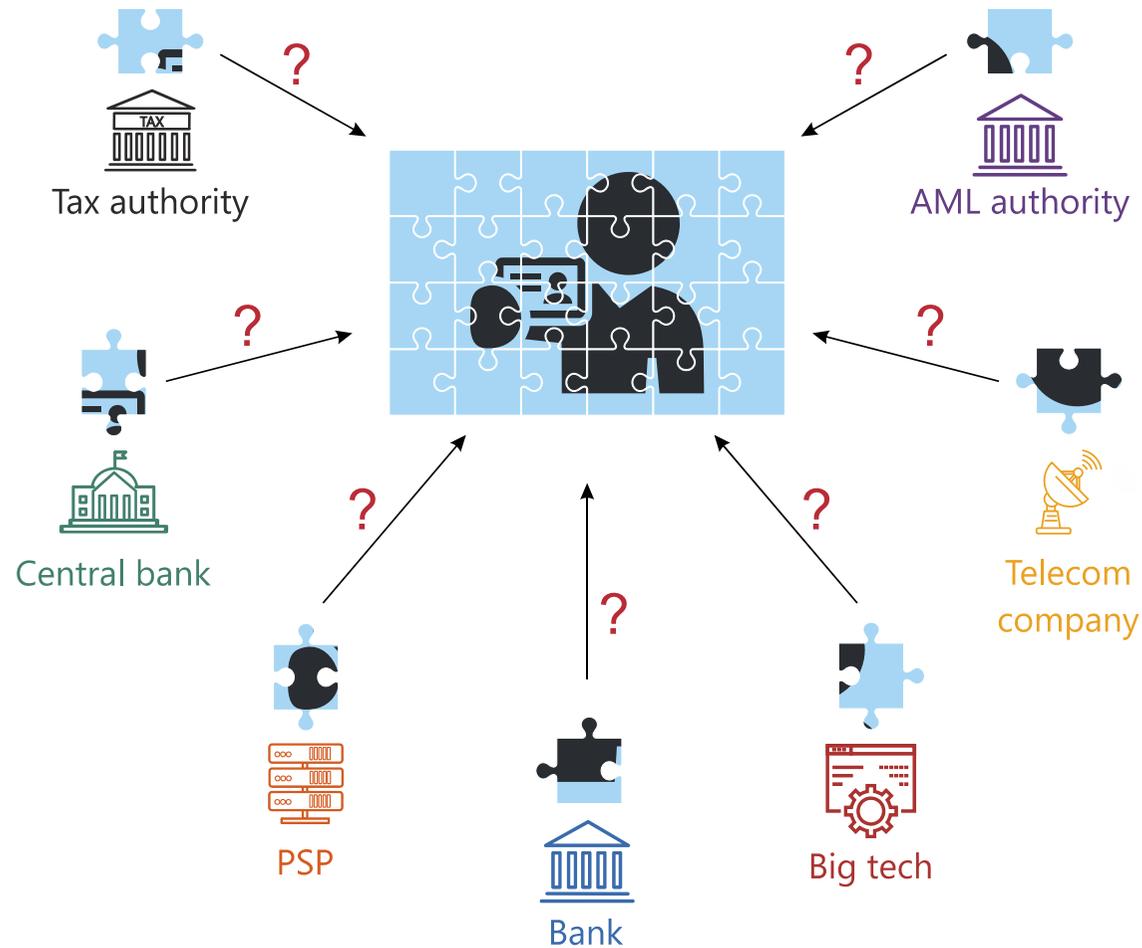
Jigsaw puzzle principle: each provider should have access only to data that are strictly necessary for their task



...and shares only what is needed in a specific case



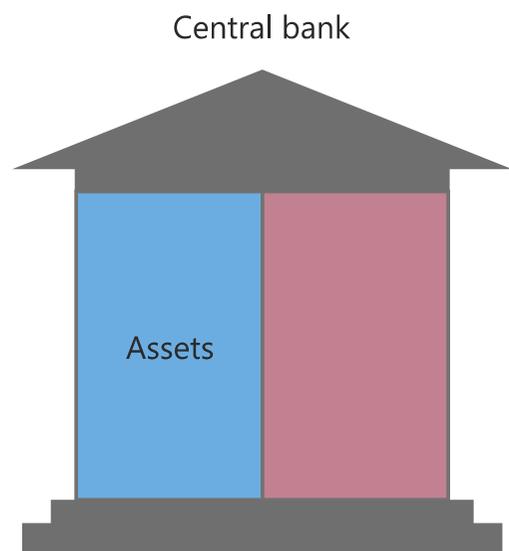
No provider holds all the pieces of the puzzle; only the individual user does



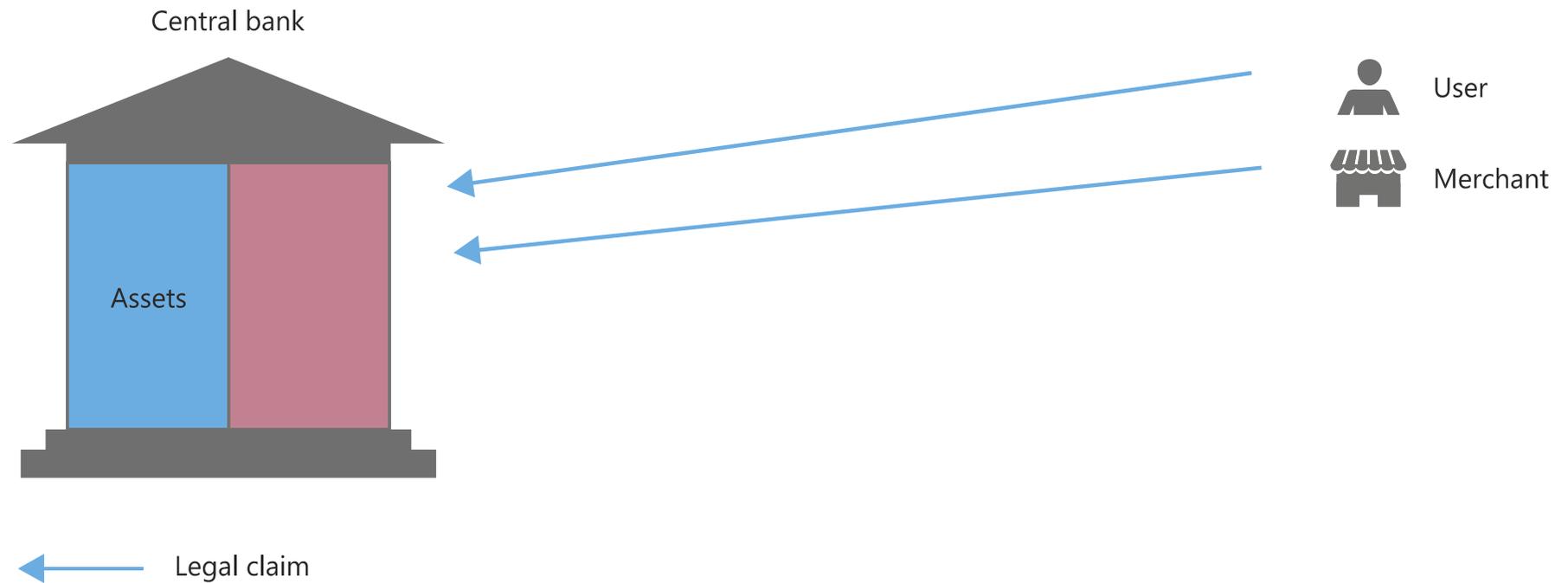


CBDC architectures and the financial system

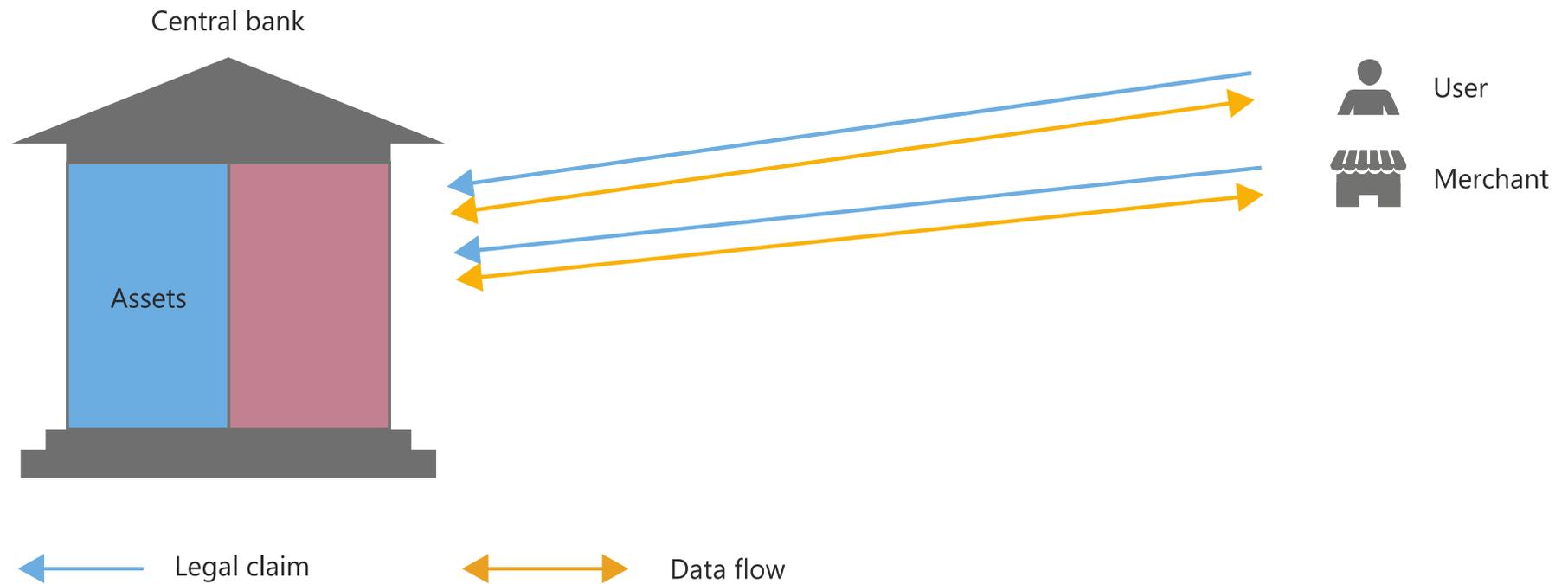
The “direct model” of CBDCs entails a large operational role for the central bank



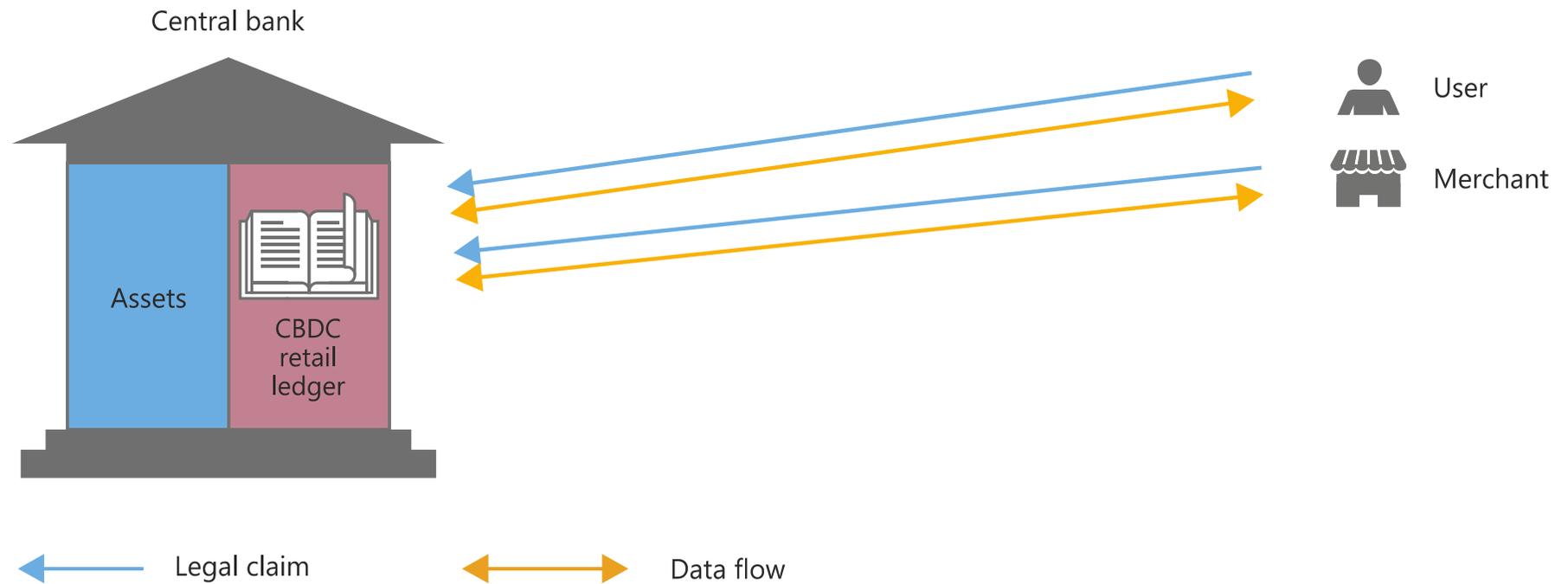
Users and merchants have claims on the central bank without an intermediary



Payment information flows directly from users and merchants to the central bank...

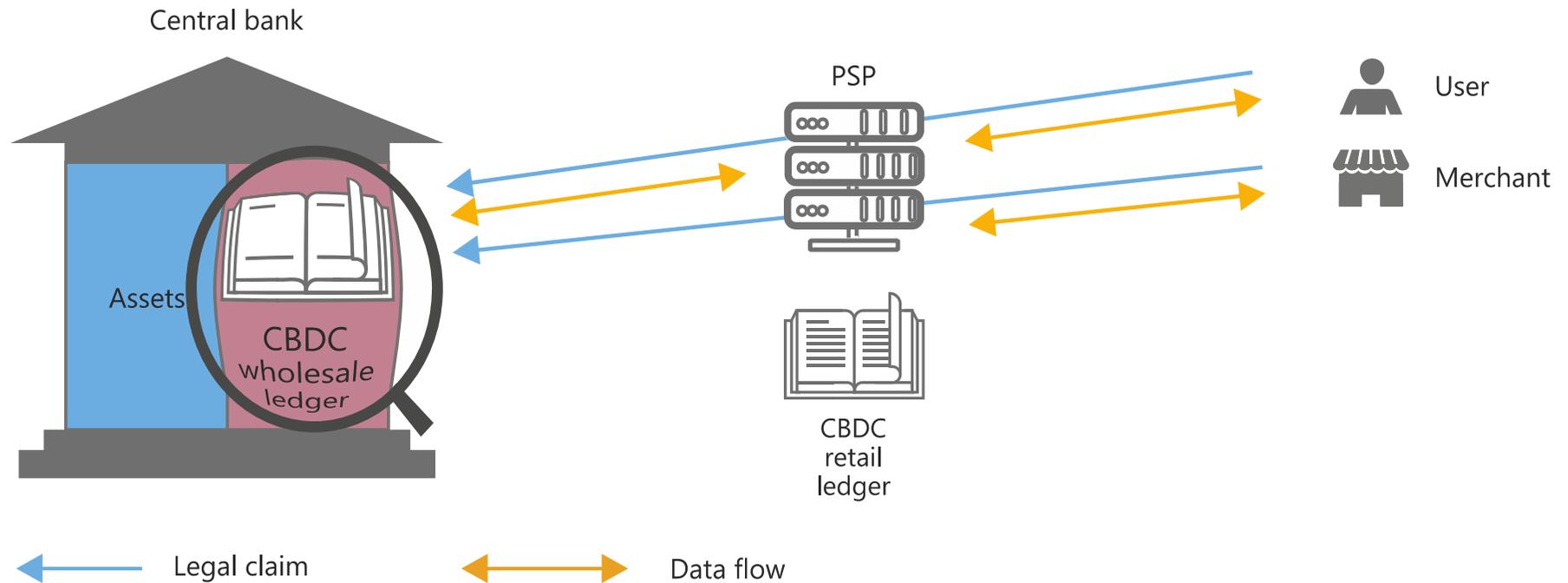


...and the central bank maintains the full ledger of retail transactions



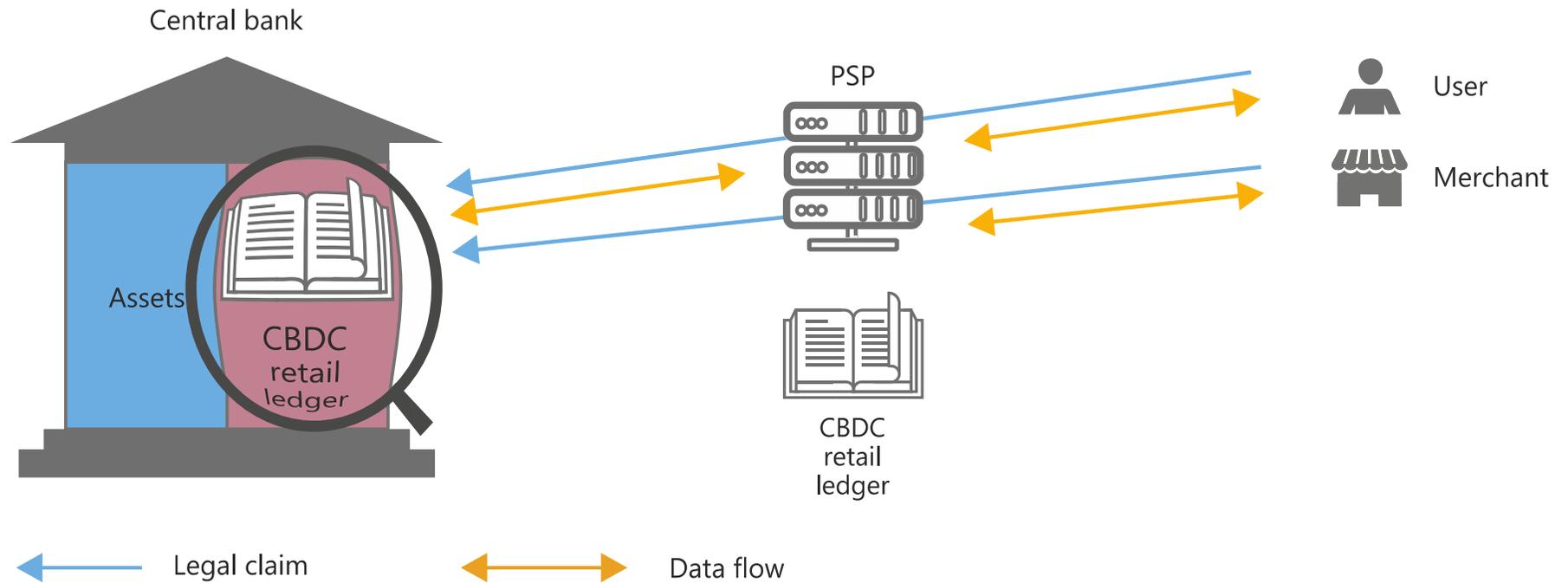
In the “intermediated model”, the central bank has a wholesale ledger of only payments between PSPs, not those between the individual users

Central bank records wholesale balances

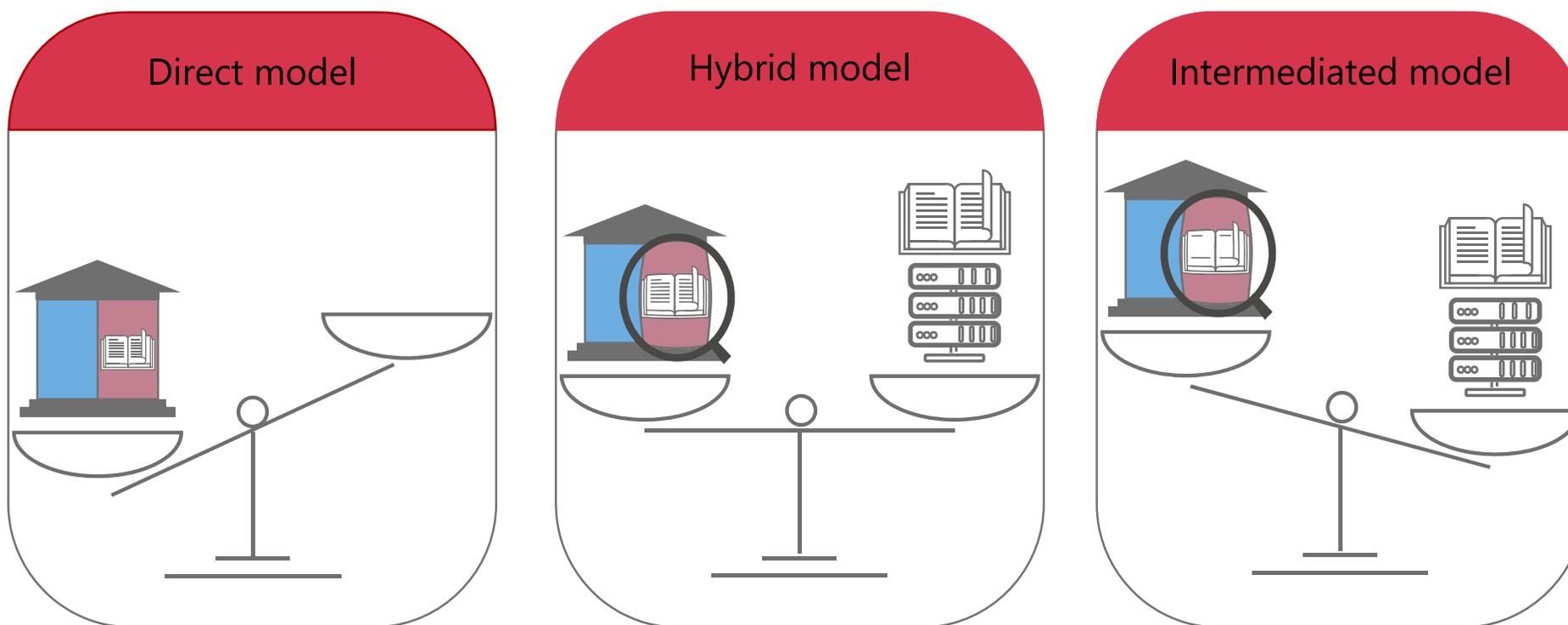


In the "hybrid model", the central bank retains a copy of the full retail ledger

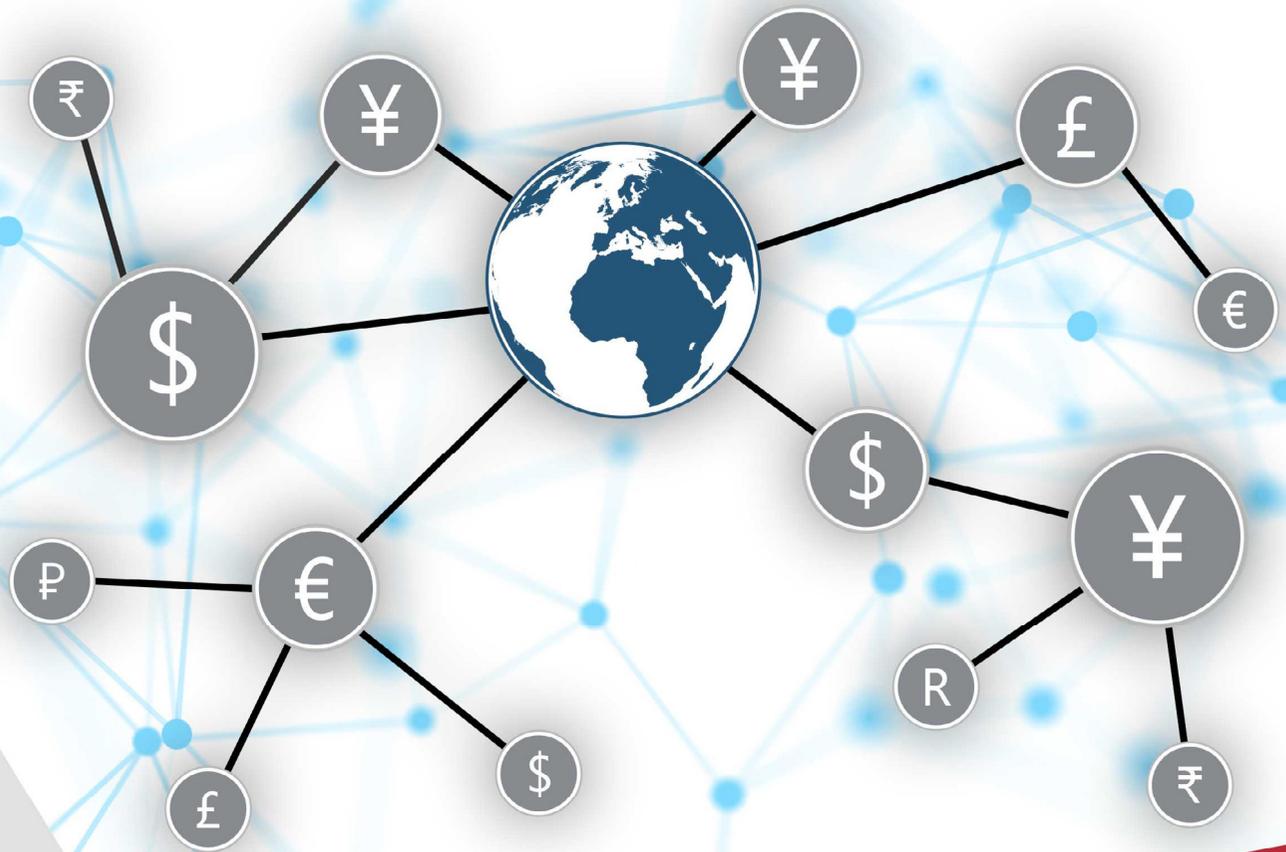
Central bank records retail balances



Operational involvement of the central bank is highest in the direct model, and lowest in the intermediated model

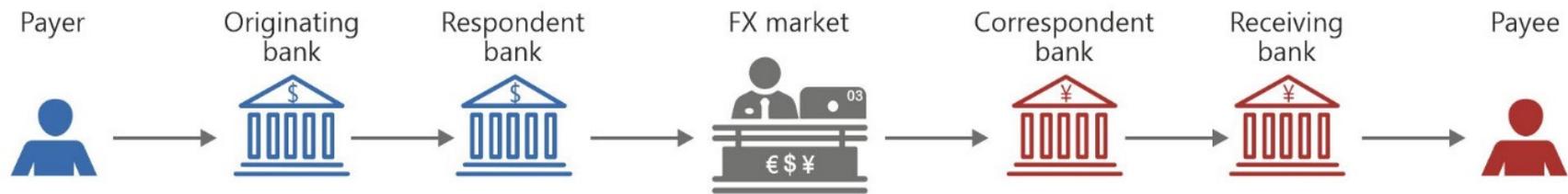


The international dimension of CBDC issuance

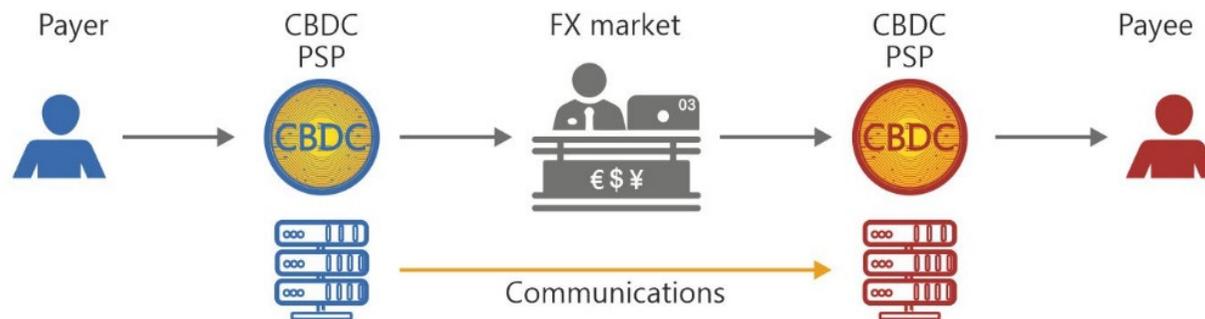


CBDCs could simplify the monetary architecture and substantially streamline the cross-border payment chain

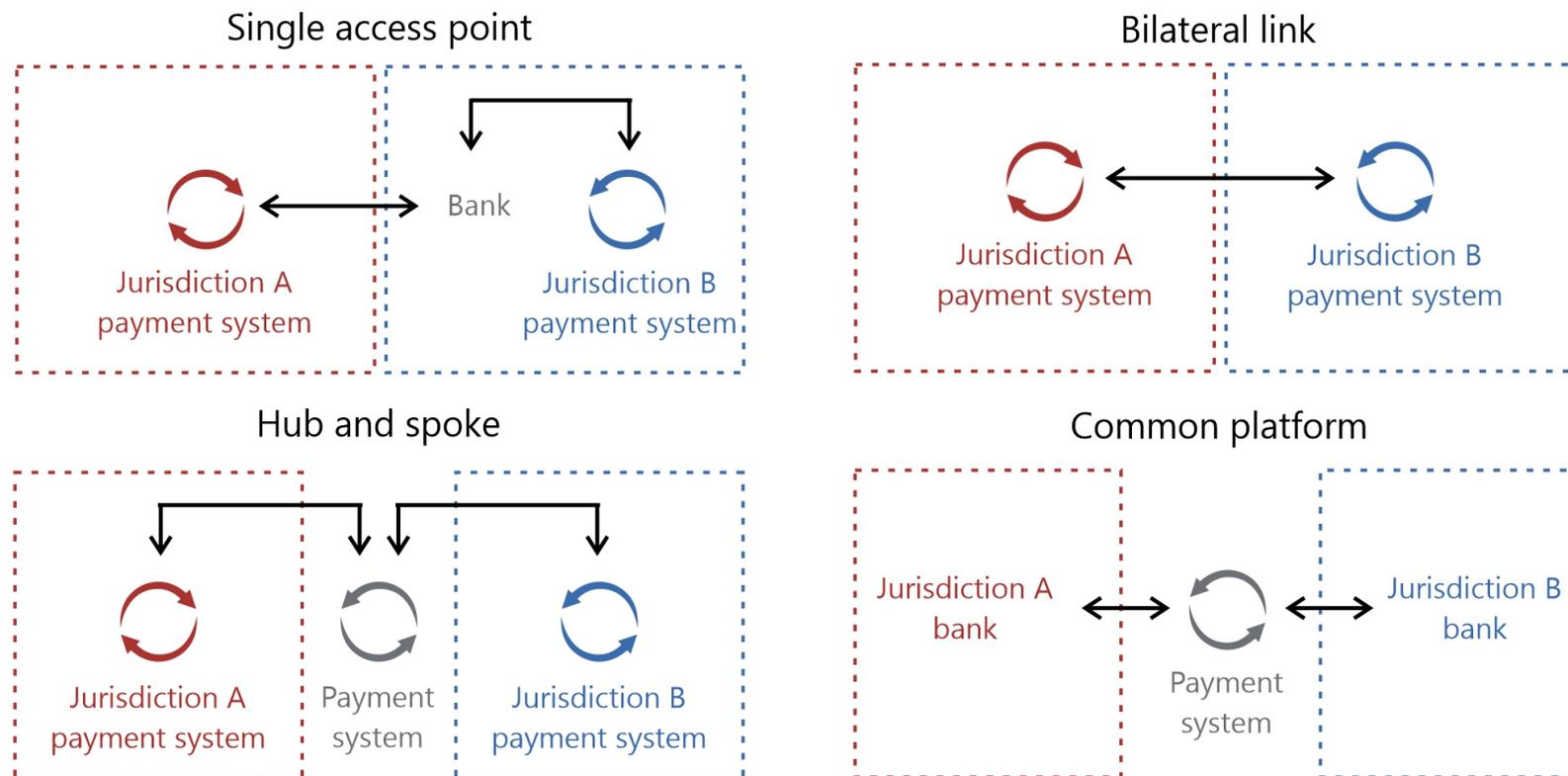
Today's arrangement



mCBDC arrangement

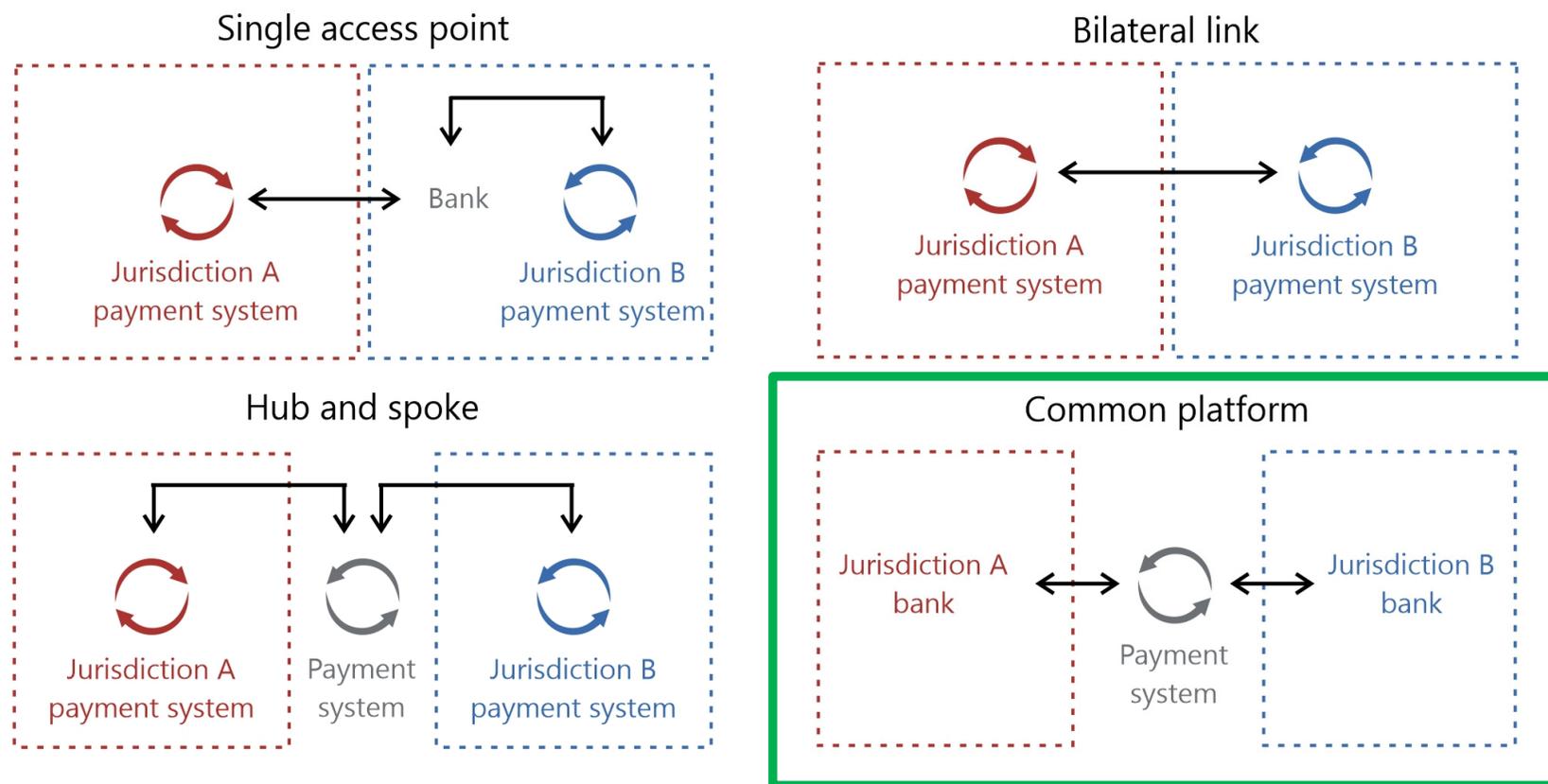


Four models for interlinking payment systems



Source: Boar, C, S Claessens, A Kosse, R Leckow and T Rice (2021): "Interoperability between payment systems across borders", *BIS Bulletin*, No 49

Four models for interlinking payment systems



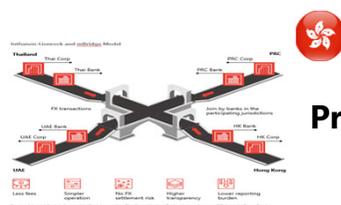
Source: Boar, C, S Claessens, A Kosse, R Leckow and T Rice (2021): "Interoperability between payment systems across borders", *BIS Bulletin*, No 49

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



Project mCBDC Bridge

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