

A unified ledger in practice: lessons from Project Hangang

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Disclaimer: The views expressed in this presentation are those of the authors and do not necessarily reflect the official views of the Bank of Korea or its Monetary Policy Board.



BANK OF KOREA

Throughout history, innovations in the monetary system have coincided with major leaps in economic activity



Sources: Shin (2023, 2024).

Money in the form of book entries overseen by trusted intermediaries opened the door to new financial instruments that spurred trade and commerce



Sources: Shin (2023, 2024).

Paper ledgers gave way to their digital counterparts; digitalisation and the dematerialisation of money have wrought profound changes on society at large



Sources: Shin (2023, 2024).

Following dematerialisation and digitalisation, what could be the next step in the evolution of the monetary and financial system?



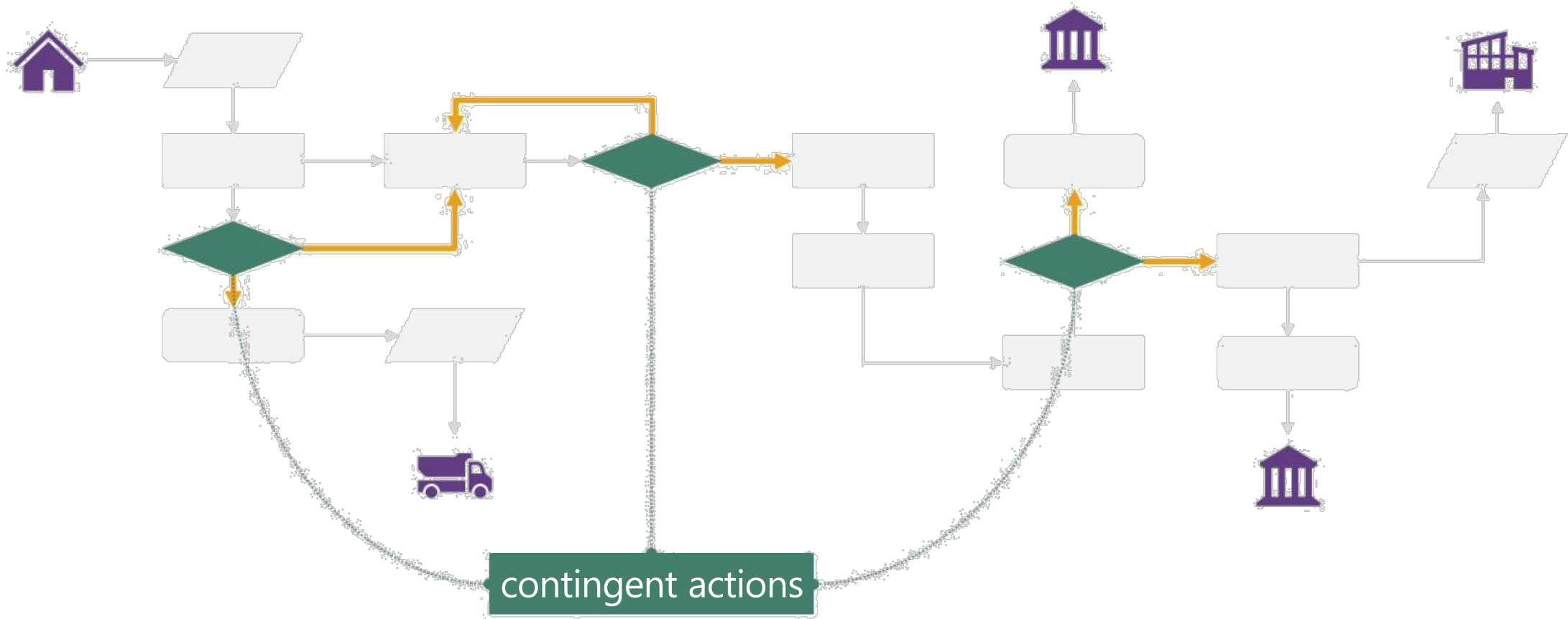
Sources: Shin (2023, 2024).

Tokenisation is the next step in the development of the monetary system,
unlocking new economic arrangement



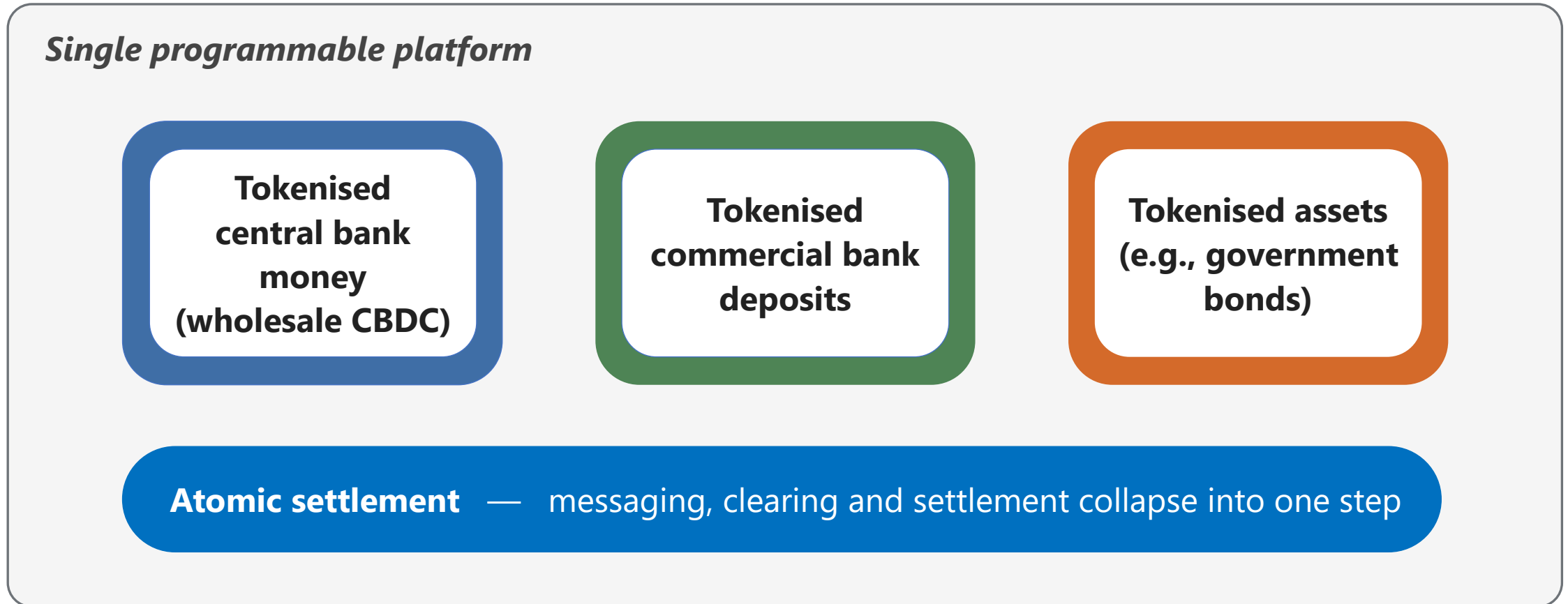
Sources: Shin (2023, 2024).

Tokenisation enables the contingent performance of actions



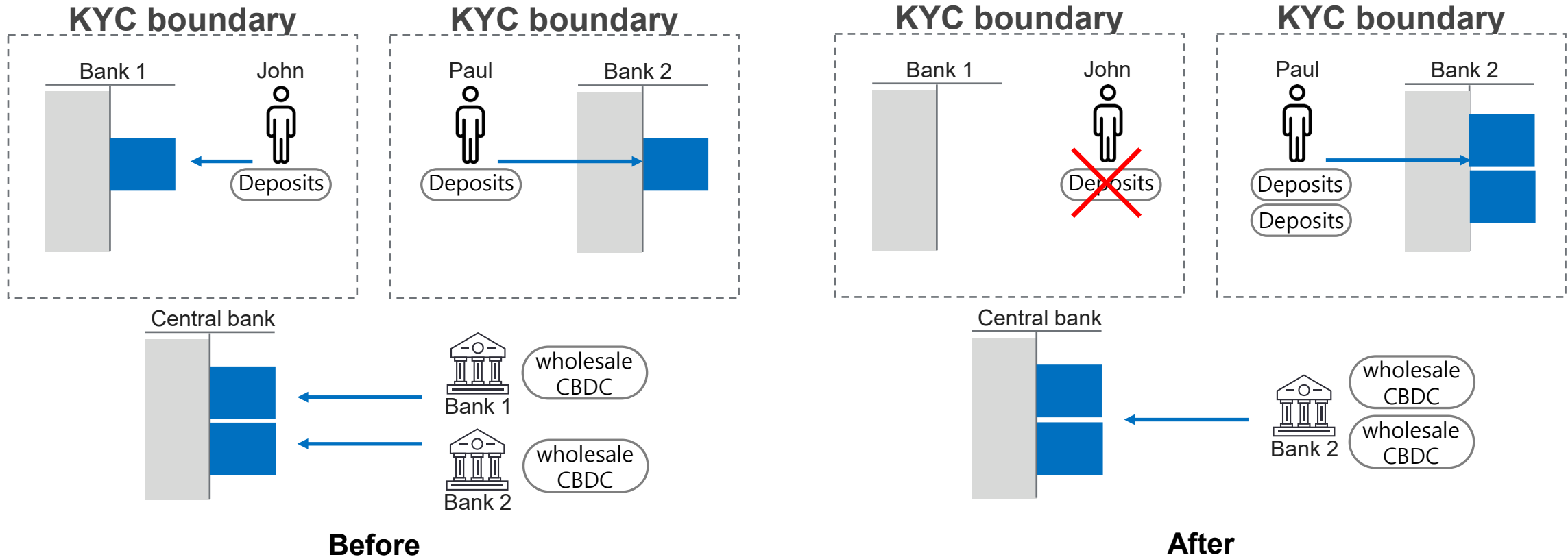
Source: Shin (2024).

Unified ledger is a tokenisation platform that preserves the two-tier monetary system; tokenised central bank money is provided in the same venue as other claims



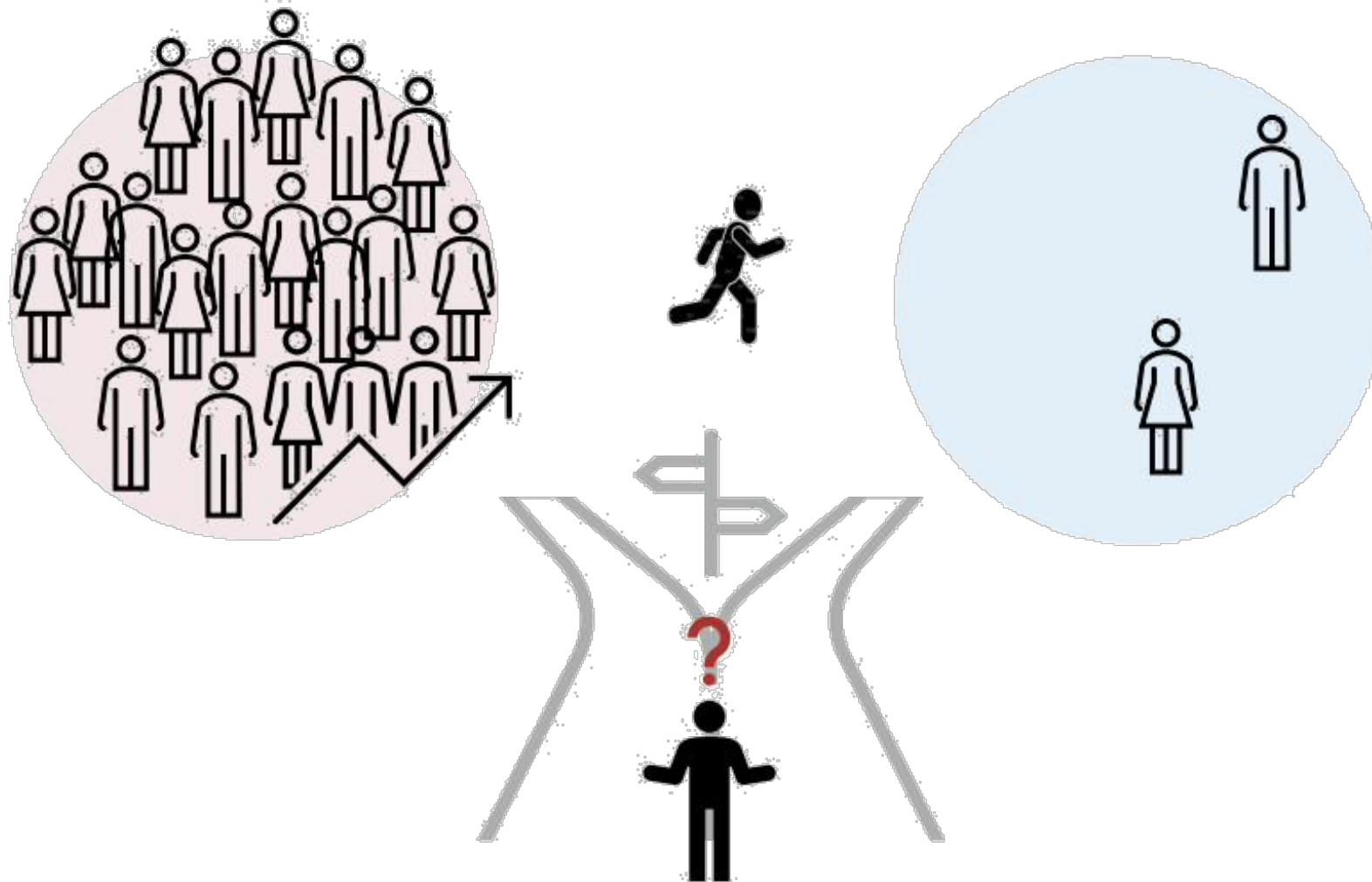
Sources: adapted from BIS (2023, 2025).

Unified ledger preserves the **singleness of money** through settlement using central bank money



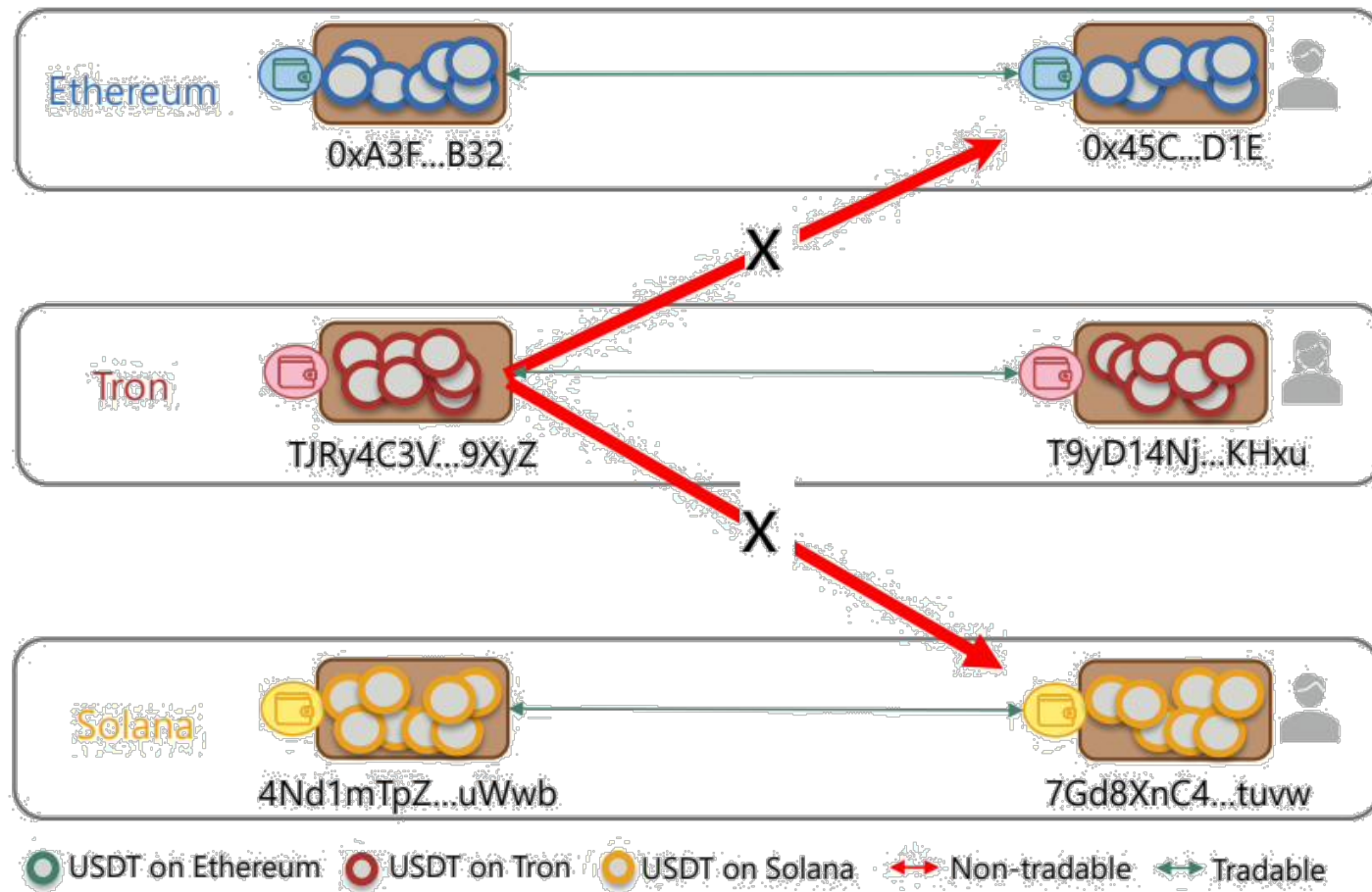
Source: Garratt and Shin (2023); reproduced in BIS (2023).

Unified ledger rests on trusted role of central bank settlement rather than decentralised consensus mechanisms that fragment the monetary system and undercut the network effects of money



Source: Shin (2026).

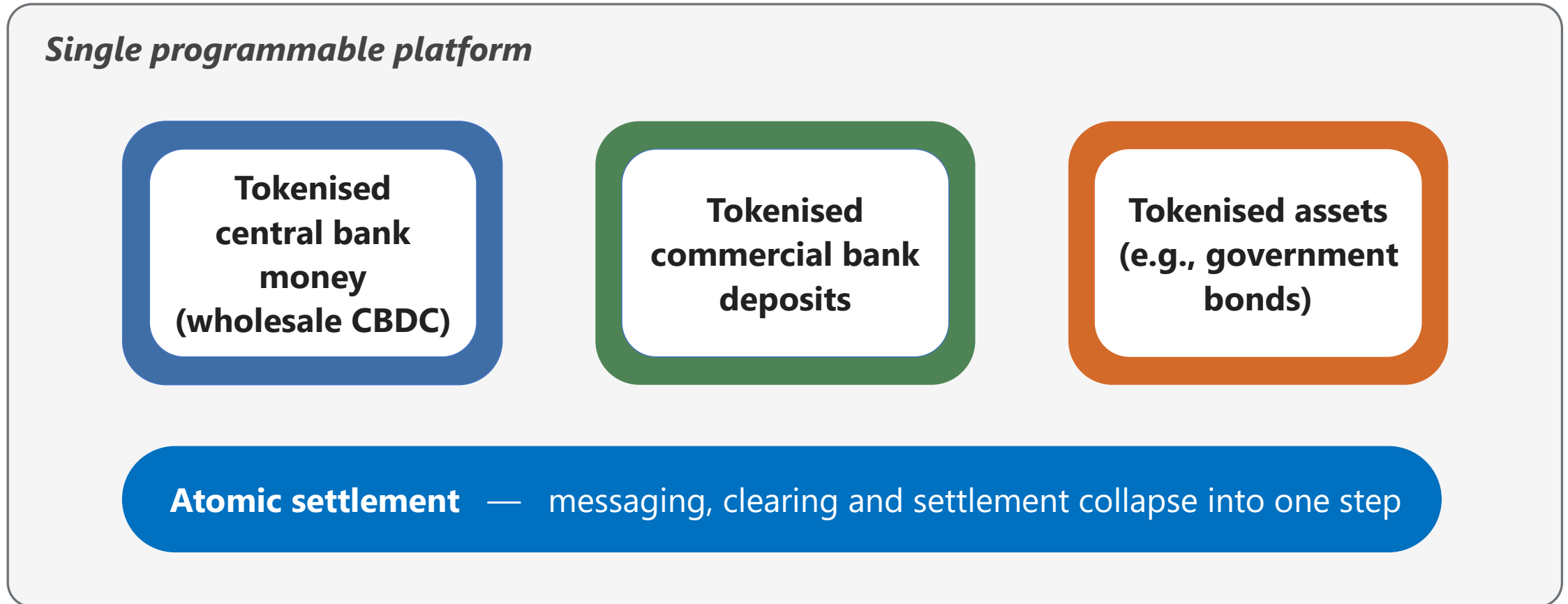
Stablecoins are not interoperable across blockchains; users need to resort to “bridges” or to intermediaries (e.g., exchanges)



Source: Shin (2026).

Project Hangang

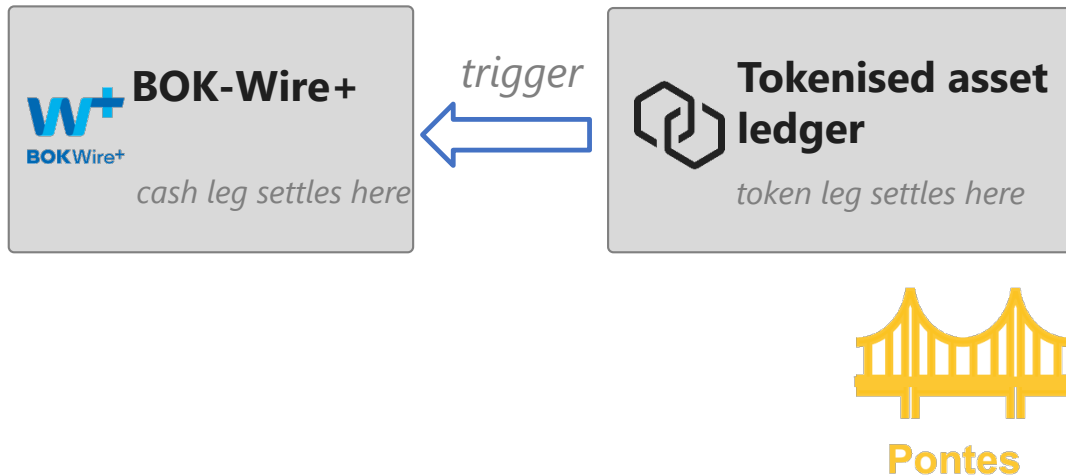
Project Hangang is a unified ledger: named the Digital Currency System (DCS)



Sources: adapted from BIS (2023, 2025).

Two approaches to providing central bank money on a unified ledger

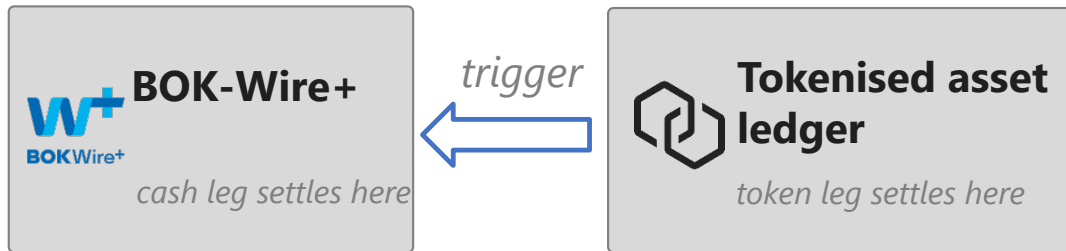
Link to the RTGS



- + Reuses BOK-Wire+ liquidity-saving mechanisms
- + No ring-fenced liquidity pool
- Operating-hours mismatch limits interoperability
- Lack of true atomic settlement

Two approaches to providing central bank money on a unified ledger

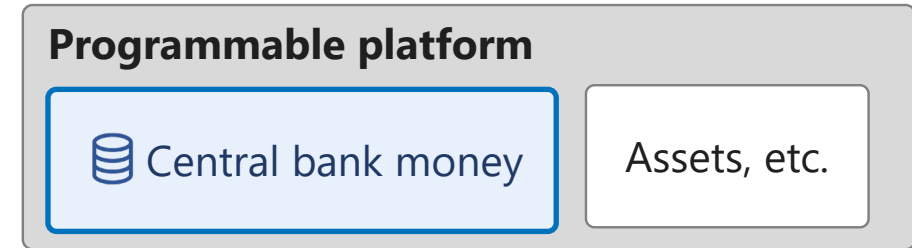
Link to the RTGS



Pontes

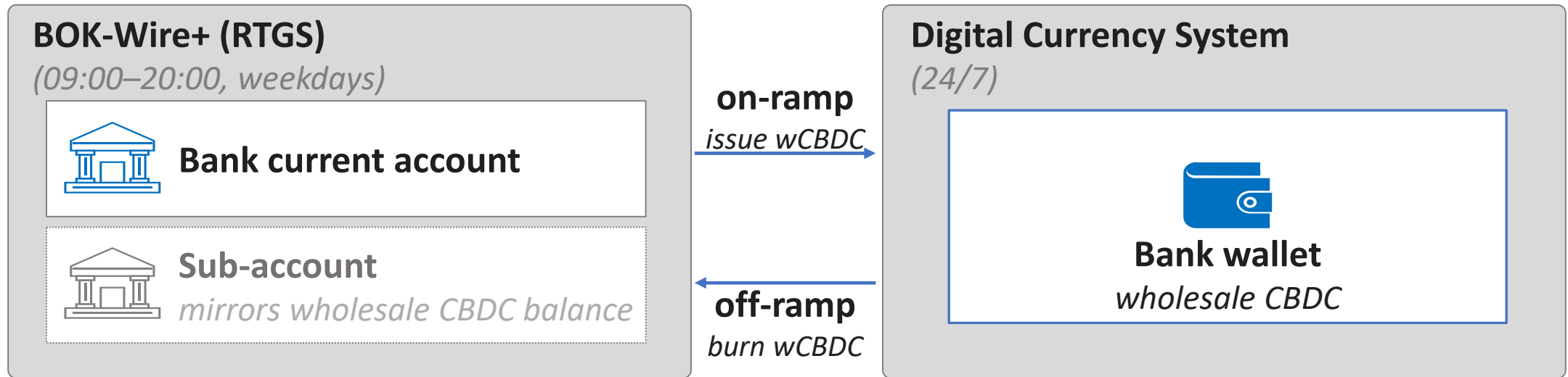
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Tokenised central bank money on the ledger

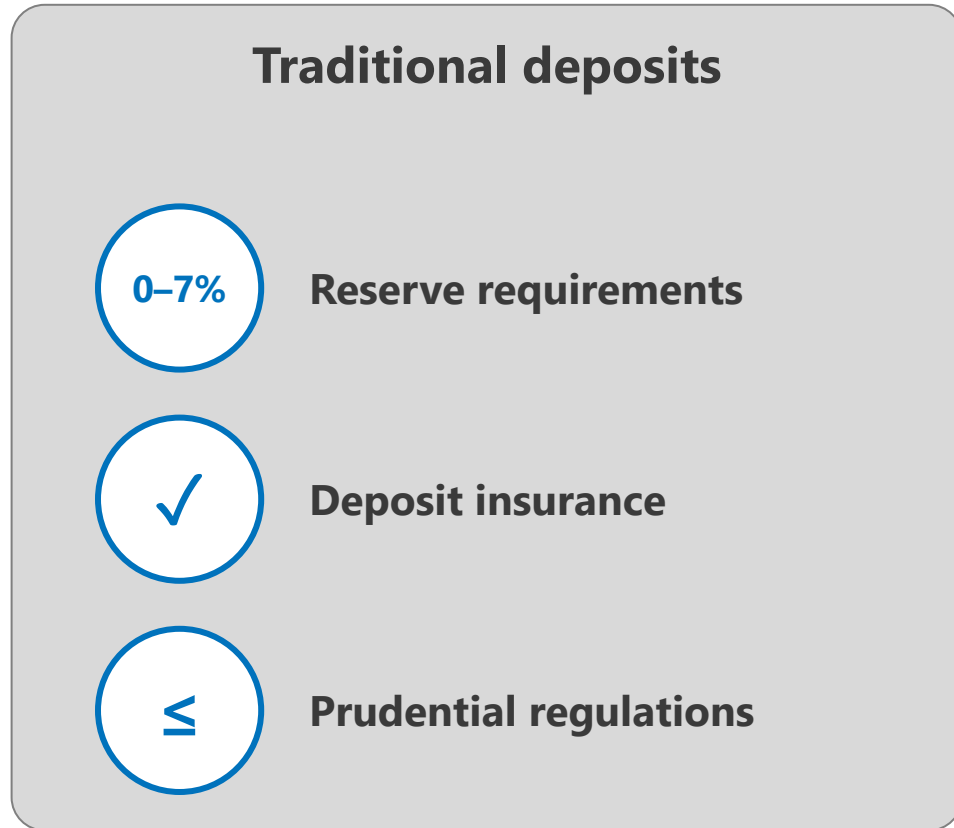


- + Full atomic settlement and composability
- + More flexible conditional disbursement
- Needs 24/7 support and an operating-hours review
- Liquidity fragmentation; intraday liquidity on the ledger

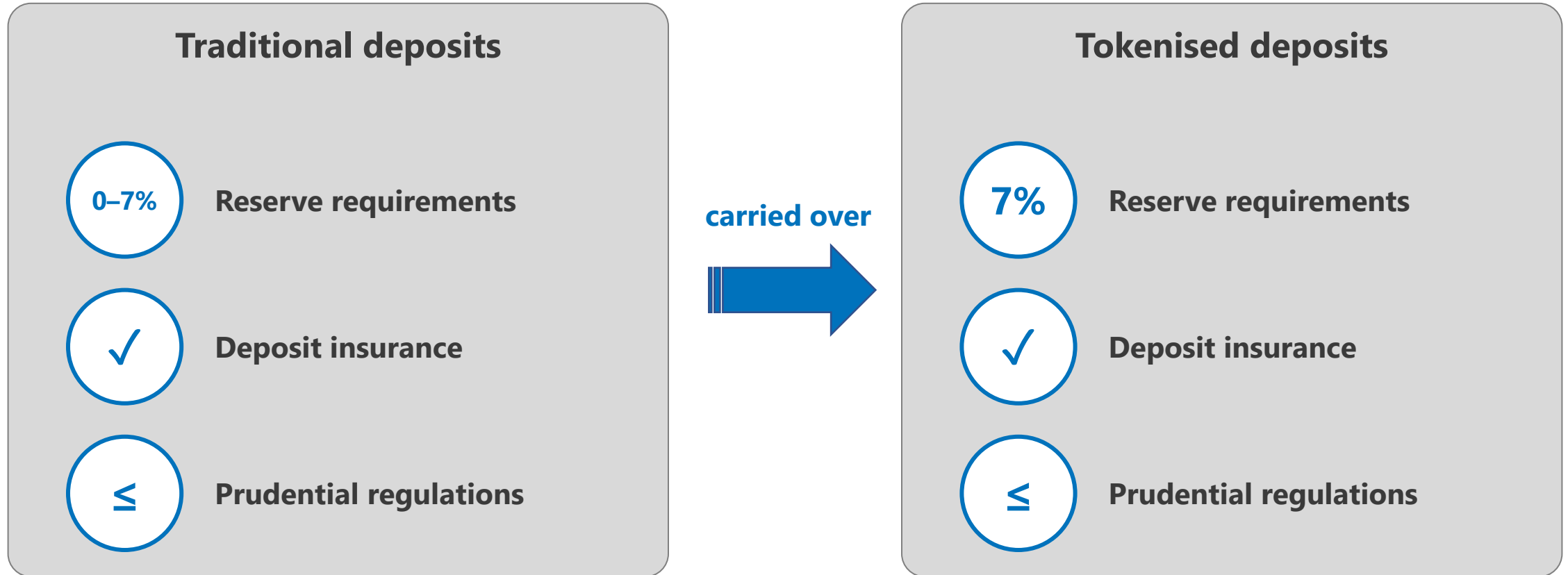
The DCS chooses the second route, using on- and off-ramps from the RTGS (BOK-Wire+)



Traditional bank deposits sit within a well-established institutional envelope



Tokenised deposits carry existing core deposit rules under the regulatory sandbox regime



Design choice (1): separating the currency layer from the programming layer allows flexibility while keeping money fungible at par

Programming layer (*ERC-1155, ERC-3525 — non-fungible, condition-aware*)



Conditions: merchants, categories, expiry, etc.



instructs execution

Currency layer (*ERC-20 — value-bearing, fungible, settles at par*)

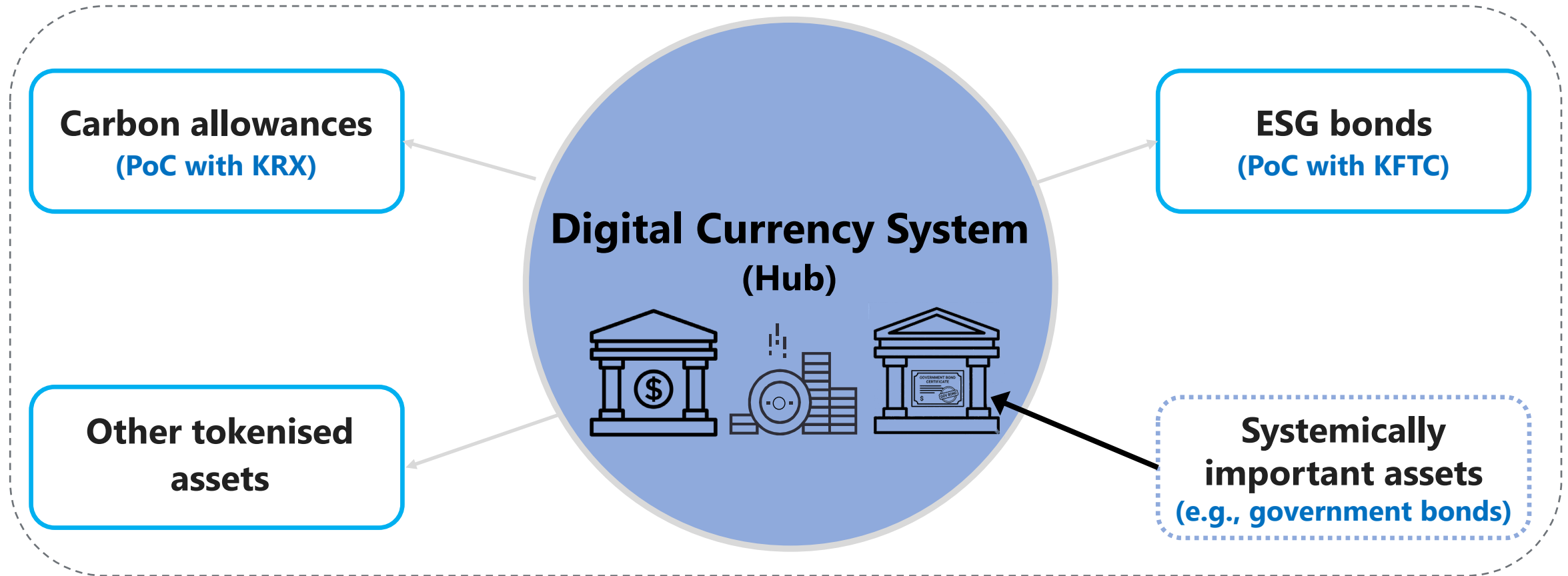


Wholesale CBDC



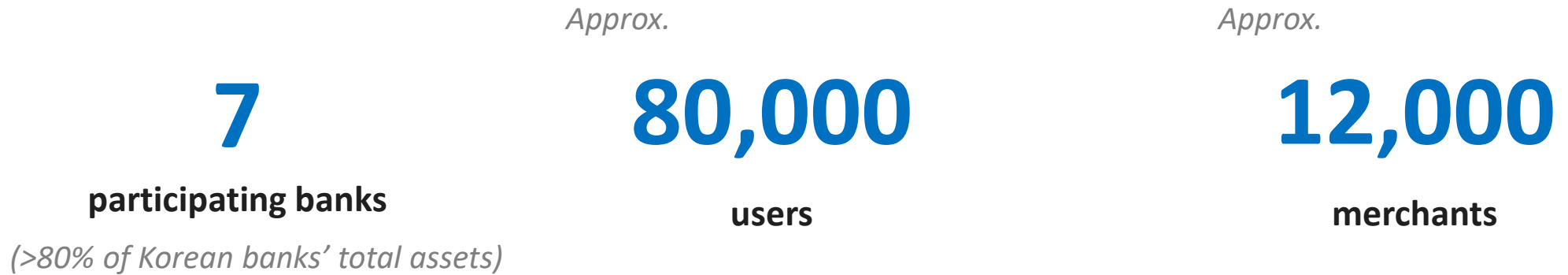
Tokenised deposits

Design choice (2): hub-and-spoke arrangement until governance catches up with technology; intermediate step before unified ledger



Phase I: demonstrate that DCS (unified ledger) works at scale for everyday payments

1 April – 30 June 2025 (non-scripted, public-facing)



Use-case scenarios

- **General payment**
(payments at the point of sale and P2P funds transfer)

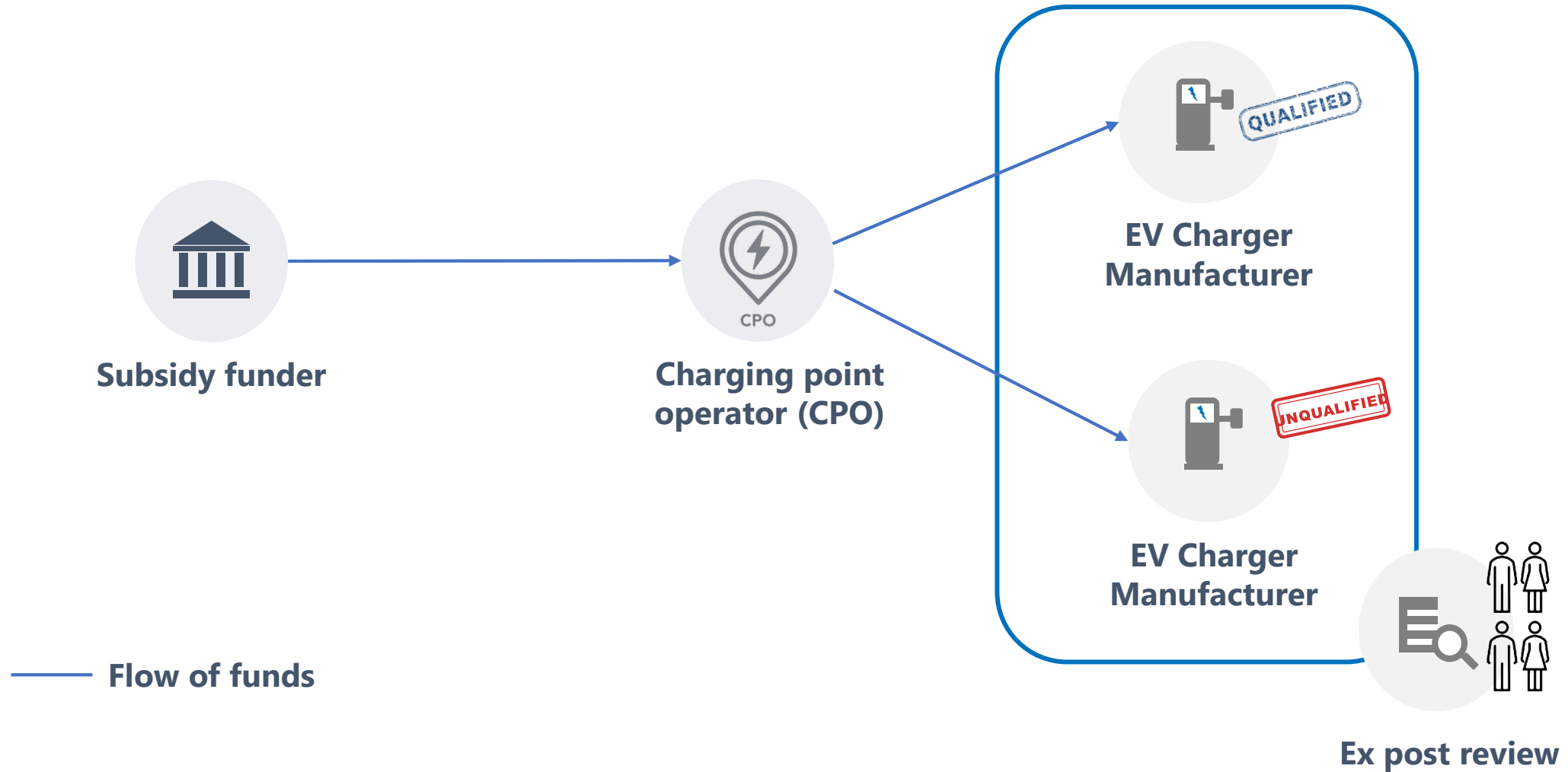
- **Programmable digital vouchers**
(conditions verified at the point of sale)

Source: Bank of Korea (2025).

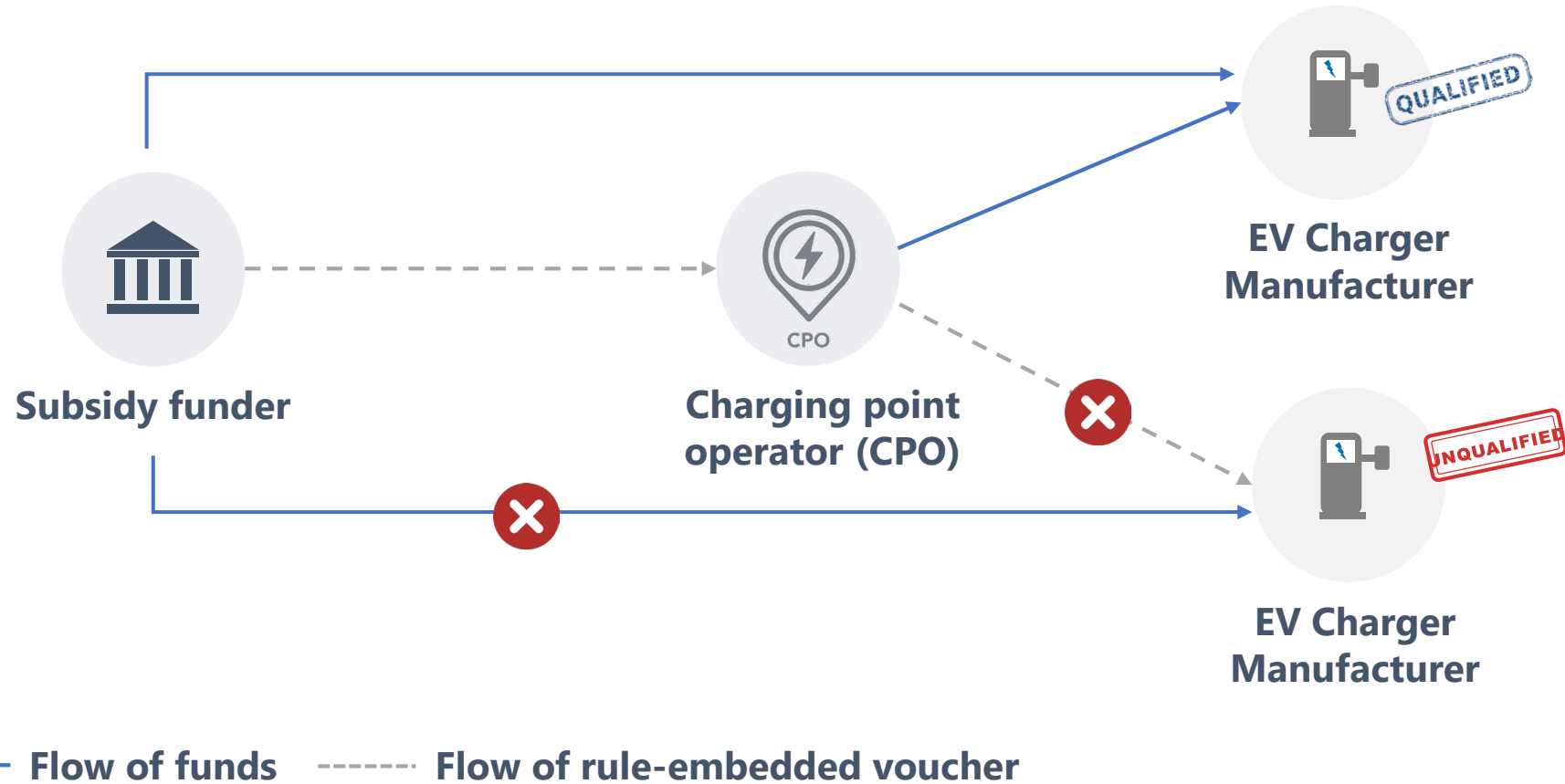
Project Hangang Phase II:

Harness programmability for the disbursement of public funds

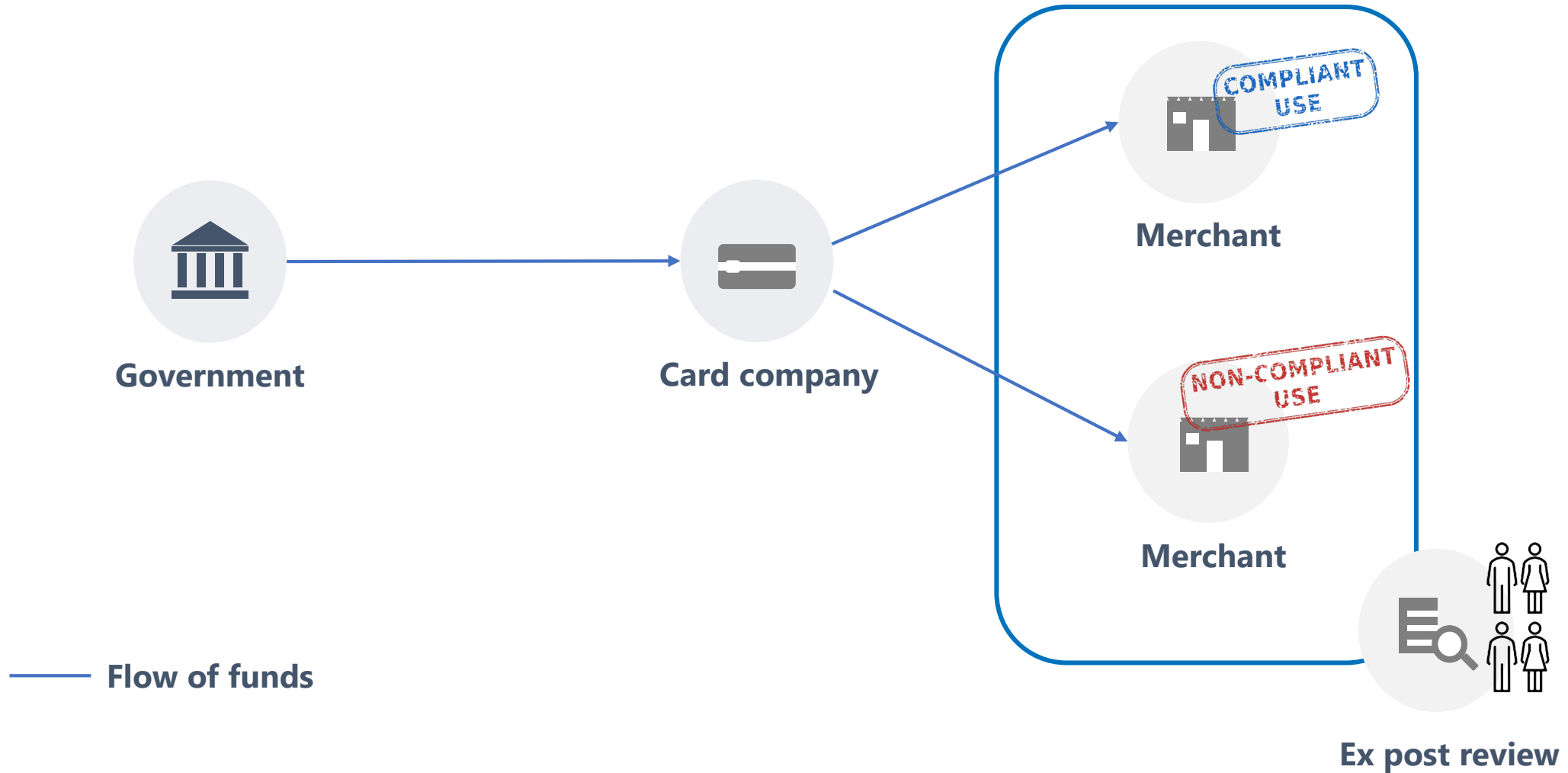
Use case (1): streamline EV charging infrastructure subsidies; reduce costs of “disburse first, verify ex post” system



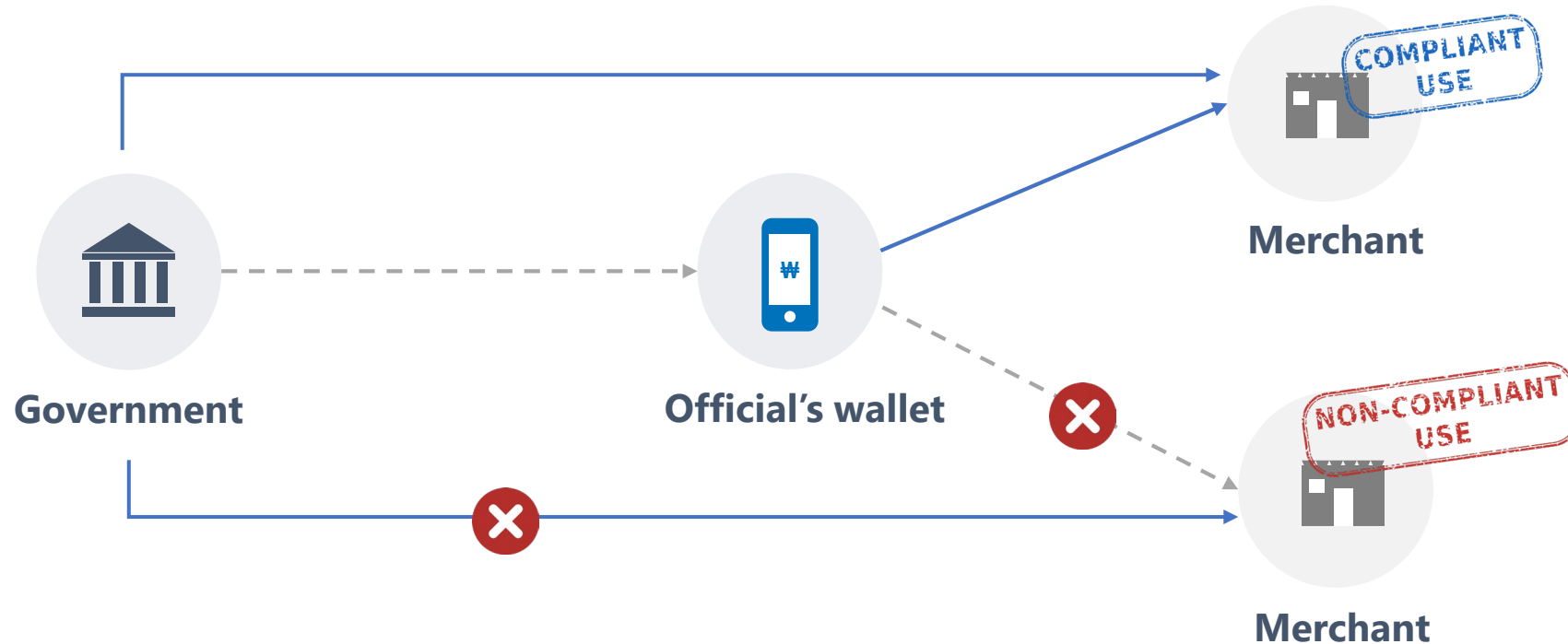
Use case (1): programmability enforces eligibility ex ante, payment executed directly on the DCS; no ex post reconciliation needed



Use case (2): dealing with expenses of public officials; currently, transactions are verified ex post, and interchange fees are borne by merchants



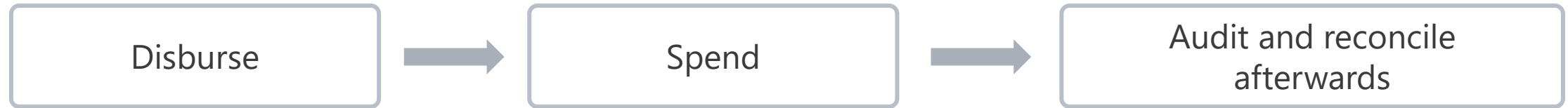
Use case (2): moving procurement card spending to tokenised deposits-based spending replaces ex post audit with ex ante rules coded into smart contracts



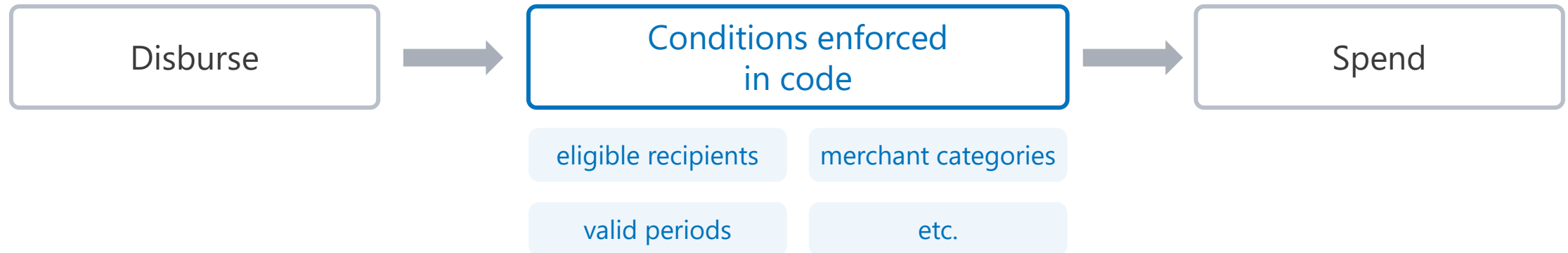
— Flow of funds - - - - - Flow of rule-embedded voucher

Programmability moves the point of control from ex post audit to ex ante contingent actions, changing the economics of fraud, reconciliation and fees

ex post audit (today)



ex ante rule



Looking ahead

Tokenisation of the Korean Treasury Bond (KTB) market

Unified ledger (DCS)



1 Pledge collateral

A bank pledges tokenised government bonds

2 Automated checks

A smart contract checks eligibility, haircut and pricing

3 Release liquidity

Wholesale CBDCs are released to the bank, atomically

4 Repay at maturity

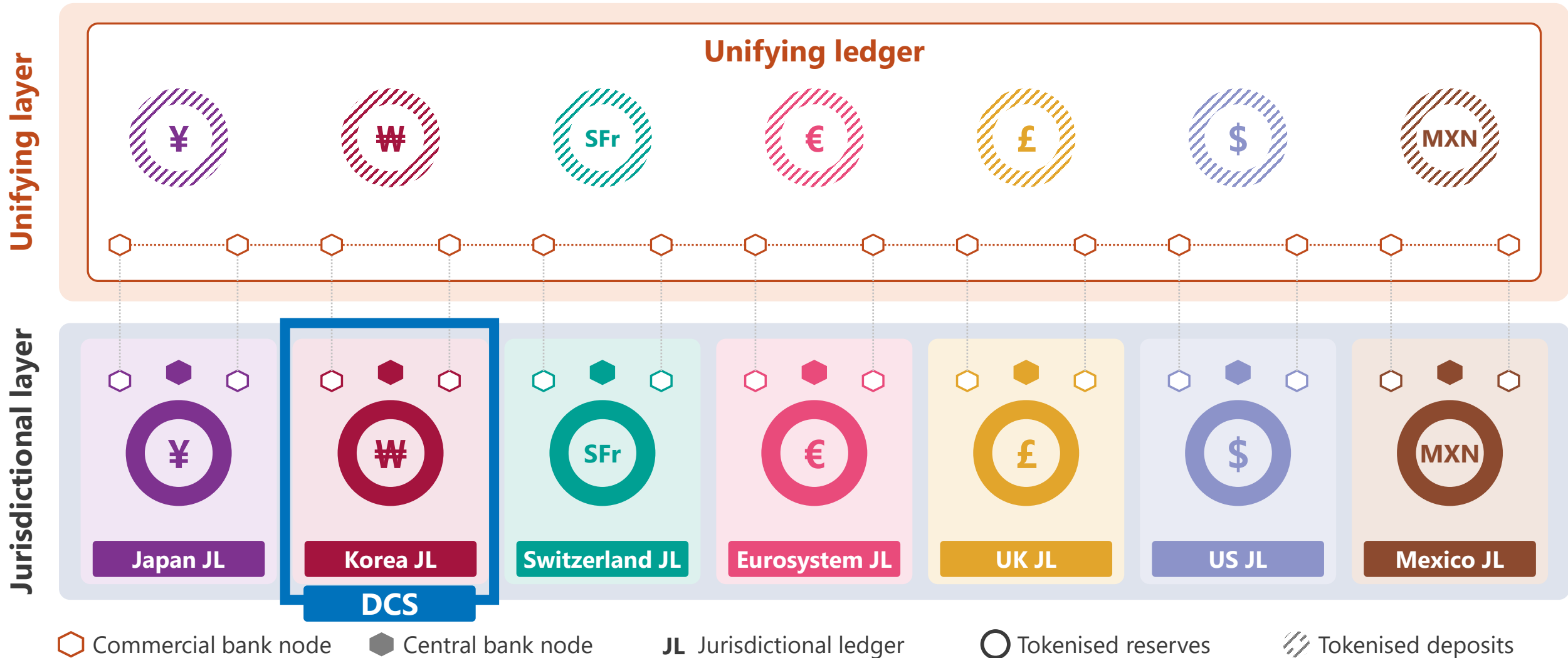
Repaid with interest at maturity; collateral returned



Run by smart contracts, without manual intervention

Source: authors' simplification based on BIS (2025).

Forge cross-border links through Project Agorá



Source: adapted from BIS (2026).