



## How deposits can harness tokenisation<sup>1</sup>

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### Introduction

Good afternoon.

It is a great privilege to join you as we celebrate the 10th anniversary of the Singapore Fintech Festival.

This year's theme, "Technology blueprint for the next decade of finance", could not be more fitting. In a world of rapid technological change, innovation is reshaping financial services. Over recent decades, we have digitalised. Now, over the next decade, we will tokenise.

Distributed ledger technology (DLT) – and tokenisation more generally – have not only challenged the way we think about money; they also promise another major leap in how the financial system functions. Today's financial transactions are recorded as book entries in electronic accounts and updated centrally by trusted intermediaries. Tokenisation creates digital tokens that represent assets on a programmable decentralised platform, potentially expanding the universe of economic arrangements in the same way as with the shift from cash to electronic money.

But technology is rarely only about technological change. It is about pushing new frontiers. And in the case of tokenisation, one of the new frontiers is the possibility to create new forms of programmable money and assets. Understanding the technology behind tokenisation, together with the opportunities and risks it presents, is crucial. For central banks, as guardians of the financial system, the monetary system must keep up with technological advances, and it must do so while maintaining its most precious asset: trust in money. This requires identifying the fundamental principles that foster trust and stability and understanding how these translate in a tokenised ecosystem.

To look into the future, let me take a step back and revisit the foundations of today's financial and monetary system.

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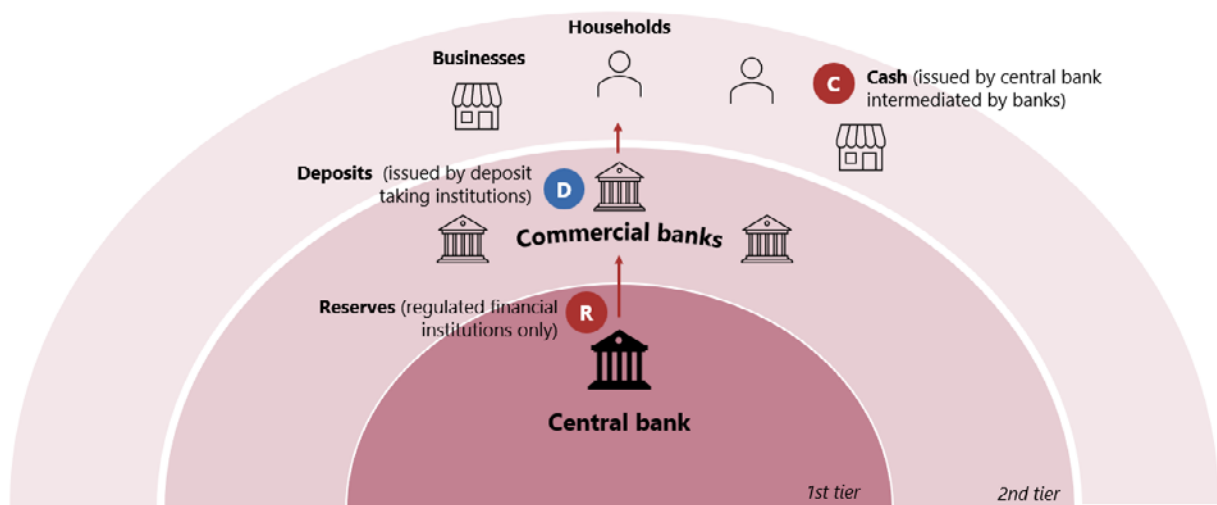
<sup>1</sup> I would like to thank Maha El Dimachki, Jon Frost, Friedrich Klinger, Raunak Mittal, Tom Rosewall, Takeshi Shirakami and Andrew Turner for their valuable inputs, insightful comments and thought-provoking discussions, which tremendously improved the quality of my remarks. I also want to thank them for their graphical creativity. The views expressed are not necessarily those of the BIS or its member central banks.

## Today's two-tier system

At the core of the financial system lies a two-tier structure. This system combines the strengths of central banks as guarantors of trust in money and financial stability, and financial institutions as issuers of private money to meet the credit needs of the private sector. Let me use a highly stylised picture to explain.

**Today's traditional two-tier system** provides a clear allocation of roles between the central bank, financial institutions and the private sector

Graph 1



Source: BIS.

At the core the system (the inner red circle in Graph 1), central banks issue and provide central bank money in the form of cash (depicted as C in the outer layer), which is available to the general public through banks, and reserves (depicted as R in the inner core), which are only available to commercial banks, and in some jurisdictions, certain regulated non-banks.

Central banks are critical to uphold trust in money. They do so in three ways: (i) they safeguard the purchasing power of money through monetary policy; (ii) they ensure that money can be saved over time by upholding financial stability through adequate regulation and supervision (and their lender of last resort function); and (iii) they ensure that money can be used for payments when needed by ensuring the safe and reliable settlement (by performing payment system oversight and operating wholesale payment systems).

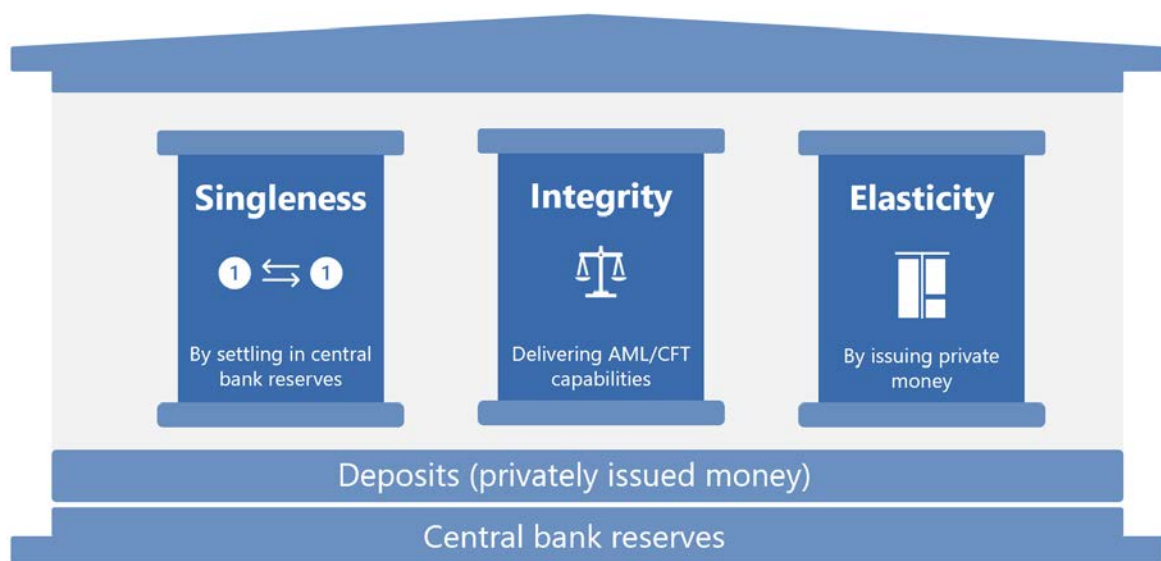
Deposit-taking institutions such as commercial banks provide credit to the private sector by issuing private money in the form of deposits (D in the middle layer of Graph 1). They do so by crediting deposits on their deposit holders' accounts. These deposits can then be used to make payments in the real economy (in the outer layer of Graph 1). In this sense, banks serve as the interface to the real economy, providing households and firms credit and determining the conditions.

## Key attributes of deposits

Trust in money and financial stability is a fundamental feature of a robust and vibrant economic and financial system. Without this trust, no economy can prosper. Today, the features that underlie trust in money and financial stability are also closely intertwined with the role of deposits (Graph 2).

Deposits exhibit key attributes that support trust in money and financial stability

Graph 2



Source: BIS.

- **Deposits exhibit the singleness of money principle**, which is fundamental to trust in money. Singleness is the ability for private money issued by different deposit-taking institutions to be convertible at par on a “no-questions-asked” basis.

How does this work in practice? Singleness is made possible by central banks’ ability to issue a risk-free asset (in the form of central bank reserves) that banks can use to settle their financial obligations on transactions between them in a final and irrevocable way. Instead of exchanging deposits directly among themselves, banks exchange their deposits against central bank reserves, which are then readily accepted by the other banks. *The ability to settle transactions in risk-free central bank reserves ensures that institution-specific deposits are accepted on a no-questions-asked basis across the entire financial system.*<sup>2</sup>

- **The account-based nature of deposits helps safeguard the financial integrity of money.** As trusted intermediaries, banks and other financial institutions are held accountable to perform essential control functions on the accounts they maintain and through which deposits flow (eg customer due diligence, anti-money laundering and combating the

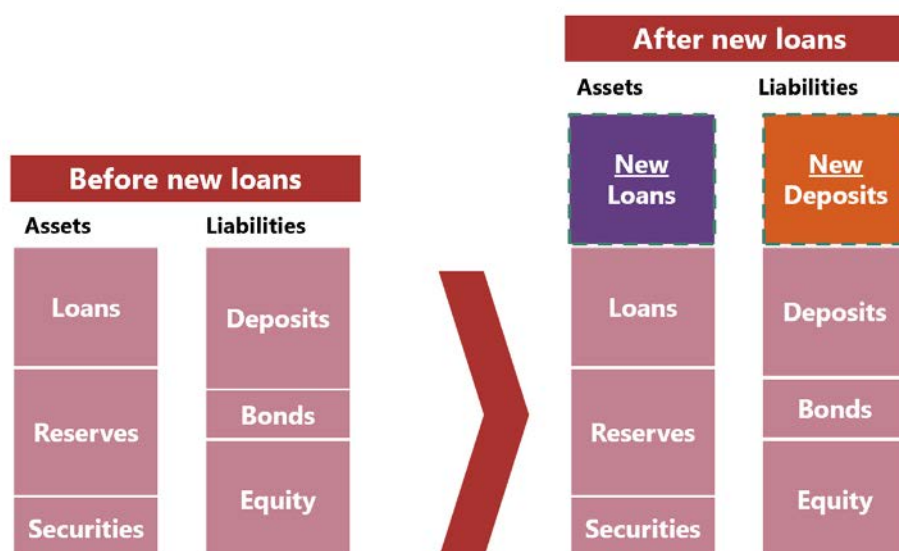
<sup>2</sup> Trust in money relies on an invisible scaffolding. The settlement function of central banks is augmented by public infrastructures and policies, from central banks’ lender of last resort function to regulatory oversight and deposit insurance.

financing of terrorism (AML/CFT) checks, fraud monitoring).<sup>3</sup> *By enabling key controls on the accounts through which deposits flow, today's account-based financial system helps uphold the financial integrity of the financial system.*<sup>4</sup>

- **The elasticity of deposits reflects banks' ability to provide credit to the private sector by issuing private money in the form of deposits** (Graph 3). Banks' ability to issue private money in the form of deposits that can be used to make payments in the economy is a unique feature of the two-tier financial system. This privilege is neither free nor unchecked. Banks must exhibit adequate risk absorption capacity and fulfil stringent regulatory requirements, and are constrained by their obligations to hold sufficient central bank reserves to settle their transactions. Banks' ability to extend credit is also steered by the monetary stance set by their central bank. If excessive credit expansion risks fuelling inflation, monetary tightening will prompt banks to curb lending and thus deposit creation. *The elastic nature of deposits helps banks respond to the demands of the private sector, while reflecting the monetary stance of the central bank and the prudential regulatory framework.*

The role of deposits – private money creation by commercial banks

Graph 3



Source: BIS.

<sup>3</sup> There is a constant need to improve the integrity of system, particularly in a world of rapid technological change and where transactions are expected to be settled within seconds. The BIS Innovation Hub aims to tackle such challenges through practical explorations. One example is Project Nadim, which looks at using machine learning to identify emerging fraud patterns in instant payment platforms and share these typologies with multiple jurisdictions.

<sup>4</sup> This is different in decentralised finance (DeFi), in which financial services are provided without traditional centralised intermediaries that operate customer accounts and perform compliance controls.

## The role of tokenisation

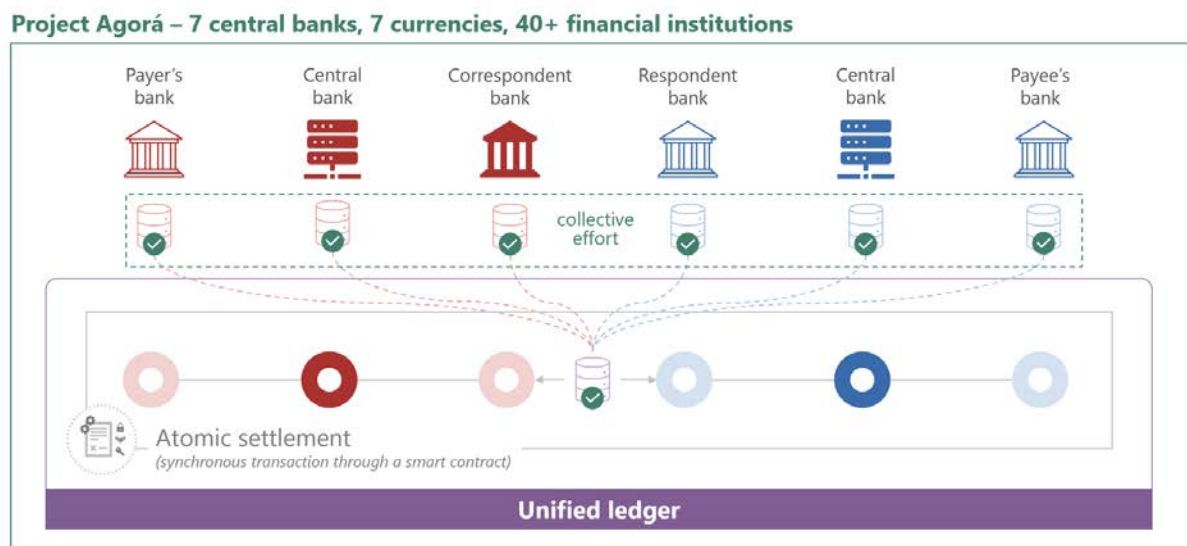
I have highlighted the central role of deposits in today's financial system. A key question going forward is how deposits could evolve to harness the benefits of tokenisation.

Tokenisation turns static records of financial assets into verifiable digital tokens that can operate on programmable platforms. The programmability and composability of tokenised platforms mean that multiple steps and transactions can be automated and bundled, enabling major efficiency gains and entirely new contracting possibilities.<sup>5</sup> For example, programmable platforms allow atomic settlement, where messaging, reconciliation, asset transfer and cash settlement can be integrated into a single seamless operation. And streamlined, 24/7 atomic settlements reduce complexity, reconciliation costs and risks, potentially leading to tremendous efficiency gains.

The BIS Innovation Hub's Project Agorá is a concrete example of how programmable platforms can improve cross-border payments.<sup>6</sup> Agorá is a pioneering project. It brings together seven central banks and more than 40 regulated financial institutions. It combines tokenised deposits and tokenised reserves on a programmable platform, thereby enabling the bundling of multiple steps involved in a cross-border payment in one seamless atomic transaction, including the settlement in central bank money (Graph 4).

Tokenisation brings atomic settlement – Project Agorá explores how to settle tokenised deposits atomically with tokenised reserves on a cross-border basis

Graph 4



Source: BIS.

<sup>5</sup> See BIS and Committee on Payments and Market Infrastructures (CPMI), *Tokenisation in the context of money and other assets: concepts and implications for central banks*, report to the G20, October 2024.

<sup>6</sup> See BIS, "Project Agorá: exploring tokenisation of cross-border payments", updated 14 October 2025.

Beyond payments, tokenisation opens the way to new business models, products and services. For example, bond markets are a promising setting for tokenisation.<sup>7</sup> With \$80 trillion in outstanding value, government bonds are the largest and most critical global asset market, and experiments there are showing a lot of potential. Another example is to combine programmable tokens with AI agents to carry out new use cases like machine-to-machine micropayments or complex trade finance invoicing. And some impactful applications of tokenisation may lie in the overlooked corners of finance. For example, in Project Promissa, the BIS Innovation Hub is collaborating with the World Bank and others to tokenise traditional, paper-based promissory notes – instruments that governments worldwide use to fund multilateral development banks and other critical development initiatives.

Tokenisation continues to gather global momentum, driven also by the recent emergence of legal and regulatory frameworks for tokenised money and assets, including stablecoins. While momentum is building, we are still in the early stages of this transformation, and the deployment of tokenised deposits has remained limited.

## Can tokenised deposits exhibit the same appeal as deposits?

So why has the development of tokenised deposits been slow so far? A key reason is that tokenised deposits are not yet easily interoperable, due to the lack of enabling technical infrastructure. This is illustrated by the **“multiple-fragmented”** example in Graph 5, where banks operate their platforms independently.

For tokenised deposits to become widespread, banks will need to find ways to make them interoperable across institutions, just as they found ways to operate interbank retail payment systems. This could be achieved by making individual tokenised bank deposit platforms interoperable illustrated by the **“multiple-interoperable”** example in Graph 5.

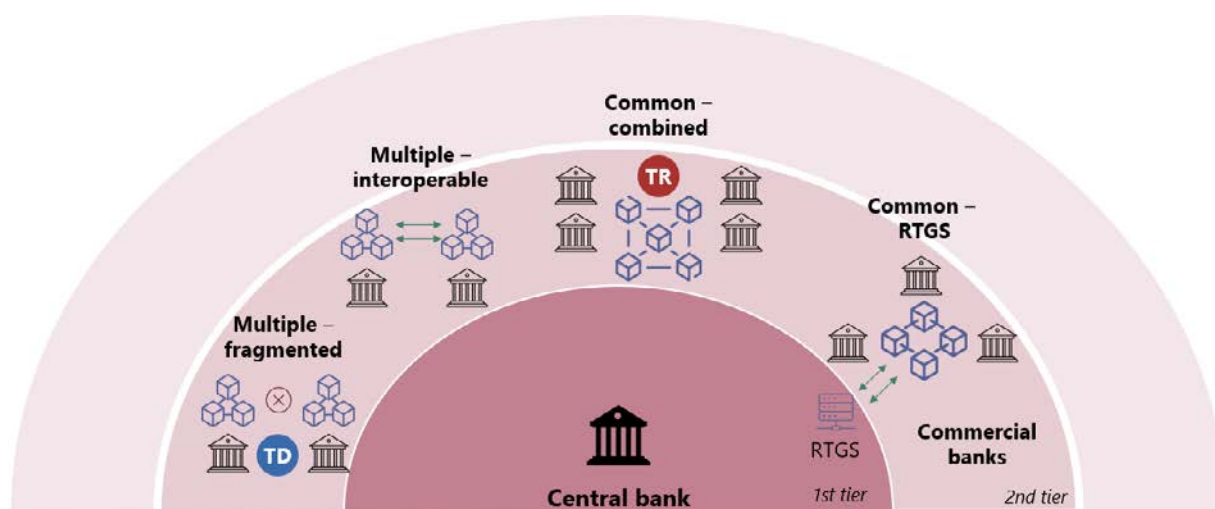
Alternatively, banks could instead develop a common platform to issue and settle their tokenised deposits. This is illustrated by the **“common-combined”** example, where banks share a common programmable platform.

To ensure singleness of money at scale, tokenised deposits will need a tokenised risk-free settlement asset – just like deposits use central bank reserves to settle wholesale payments across banks. This could be achieved, for example, by linking the DLT ledgers to the traditional real-time gross settlement (RTGS) system (as illustrated by the **“common-RTGS”** example in Graph 5) or by issuing tokenised central bank reserves directly on the platform (as illustrated by **“TR”** in the “common-combined” example in Graph 5). All of these options are being tested actively by central banks, including in the context of BIS Innovation Hub projects.<sup>8</sup>

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<sup>7</sup> I Aldasoro, G Cornelli, J Frost, P Koo Wilkens, U Lewrick and V Shreeti, [“Tokenisation of government bonds: assessment and roadmap”](#), *BIS Bulletin*, no 107, July 2025. See also P Cipollone, [“Towards a digital capital markets union”](#), keynote speech at the Bundesbank Symposium on the Future of Payments, 7 October 2024.

<sup>8</sup> BIS Innovation Hub [Project Meridian FX](#) tested synchronisation models to connect RTGS systems with DLT based ledgers including tokenised central bank reserves across jurisdictions. [Project Rialto](#) explored how instant cross-border payments could be improved using a modular foreign exchange (FX) component combined with settlement in tokenised wholesale



Source: BIS.

A tokenised ecosystem will also require seamless integration into the existing financial system. This is because the financial value of assets is closely linked to economic agents' confidence in their ability to convert these assets into a trusted form of money, irrespective of their underlying technology. Such convertibility will demand more than technical connectivity. It will require merging fundamentally different worlds: integrating real-time, tokenised platforms with legacy systems built for wholesale settlement, and reconciling account-based architectures with decentralised ledger environments. This will mean re-engineering infrastructures and operational processes. To support financial integrity, the BIS Innovation Hub, together with the Monetary of Authority of Singapore and other central banks, are exploring how programmable compliance can be extended for digital assets in [Project Mandala](#).

## What about other tokenised instruments?

Distributed ledger technology and tokenisation offer an interesting technological paradigm shift: the same technology can be used to create fundamentally different worlds. Importantly, these worlds may not be easily bridged. This is relevant from a trust perspective because tokenisation may open the door to new forms of money, such as stablecoins. But to truly qualify as money, these tokenised instruments must ensure they meet the singleness and integrity requirements of money to preserve public trust and financial stability. To assess these attributes, it is important to examine tokenised instruments through the lens of the world in which they operate.

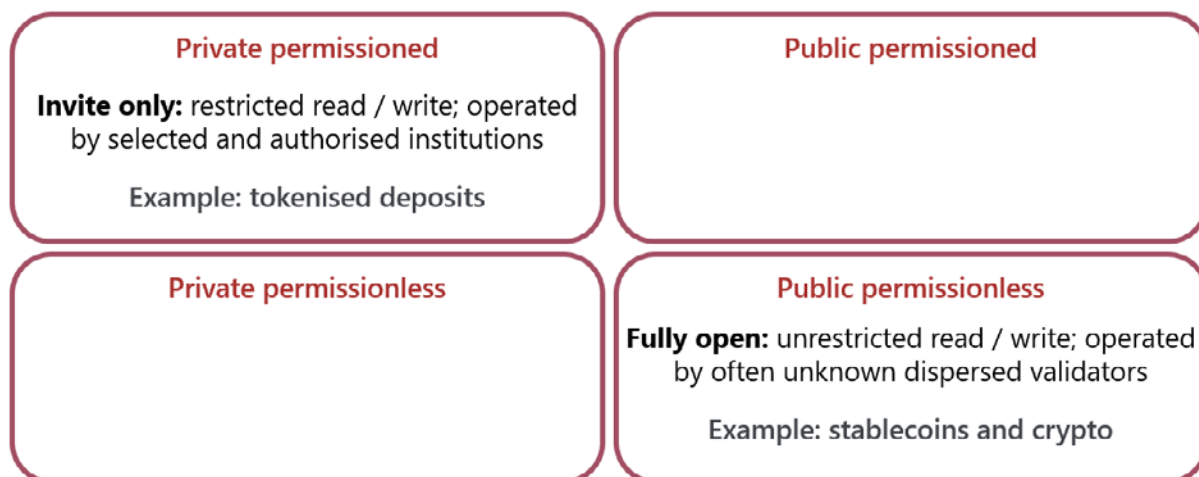
central bank money. [Project Mariana](#) tested the cross-border trading and settlement of wholesale central bank digital currencies between financial institutions on a public blockchain. [Project Helvetia](#) explored how central banks could offer settlement in central bank money in a future with more tokenised financial assets based on DLT. [Project Agorá](#) explores a common platform for tokenised reserves and deposits from both central banks and banks.

## One DLT technology, different worlds

The different worlds (or types of platform) that DLT technology can create differ along two key dimensions (Graph 6): the *public/private dimension*, which defines access to the platform (private being restricted and public being open to anyone); and the *permission/permissionless dimension*, which defines the degree of controls or permissions over the operations on the platform.

One DLT technology, different worlds

Graph 6



Source: BIS.

For the sake of simplification, I will focus on two of these quadrants – the *private permissioned world* in the upper left and the *public permissioned world* in the lower right.

Today, tokenised deposits are typically issued on “private permissioned” ledgers. This is a DLT ledger (or network of ledgers) that banks design, operate, own and manage. Access is restricted to invited participants only, and the DLT ledger is operated by a set of known and trusted operators with a clear accountability framework with safeguards and regulatory controls. In this sense, private permissioned networks operate conceptually in the middle layer of Graph 5.

By contrast, cryptoassets and the large majority of stablecoins operate on “public permissionless” ledgers. These DLT ledgers are open networks maintained and operated by an unknown group of participants who coordinate operations through consensus protocols. While this open and decentralised architecture enables novel innovation, it also reflects a very different world – one in which there are new risks, transactions are viewable by all, and there is no clear operator or central overseer.<sup>9</sup> Errors cannot easily be reversed (by design), code vulnerabilities can have systemic

<sup>9</sup> While decentralisation may have a role in low-trust environments, it comes at a price, often with limits to scale and high transaction costs. While newer blockchains aim to solve this, that can come with a cost of greater centralisation or weaker security guarantees. See R Auer, C Monnet and H S Shin, “Distributed ledgers and the governance of money”, *Journal of Financial Economics*, vol 167, 2025; and F Boissay, G Cornelli, S Doerr and J Frost, “Blockchain scalability and the fragmentation of crypto”, *BIS Bulletin*, no 56, June 2022. There are other challenges beyond technology which also require careful attention. See also BIS, *The crypto ecosystem: key elements and risks*, report to the G20, June 2023.

effects and accountability (and the allocation of responsibilities) in the case of a cyber attack may not be clear.

Those considering issuing on public permissionless platforms must address the risks to ensure safety, trust and resilience. In some cases, it may be possible to embed safeguards and technical workarounds such as compliance in smart contracts or in the technology stack itself. Ultimately, however, a well-functioning ecosystem is more than good technology. Its soundness depends on its governance. And how governance works in the context of public permissionless platforms is yet to be fully understood.<sup>10</sup> By comparison, financial market infrastructures and systems within the two-tier system are typically governed and operated by authorised and regulated entities, meaning they can be connected to the core (the first tier of Graph 7). Currently, unregulated stablecoins sit in the outer layer. It remains to be seen whether this will change in the jurisdictions with a robust regulatory framework for stablecoins over time.<sup>11</sup>

## The world in which a particular form of money is issued matters

This brings me back to one of the key features underlying trust in money, namely, singleness of money, or the ability to exchange private money on a no-questions-asked basis. Historically, singleness has been enabled through exchanges of deposits between banks to be settled in central bank reserves (ie linking the middle layer to the inner core in Graph 7).<sup>12</sup> In a world of tokenised deposits operating on private permissioned platforms, options for creating such links are being actively explored by central banks, including through on-platform settlement in tokenised reserves or off-platform settlement in reserves via the traditional RTGS system.

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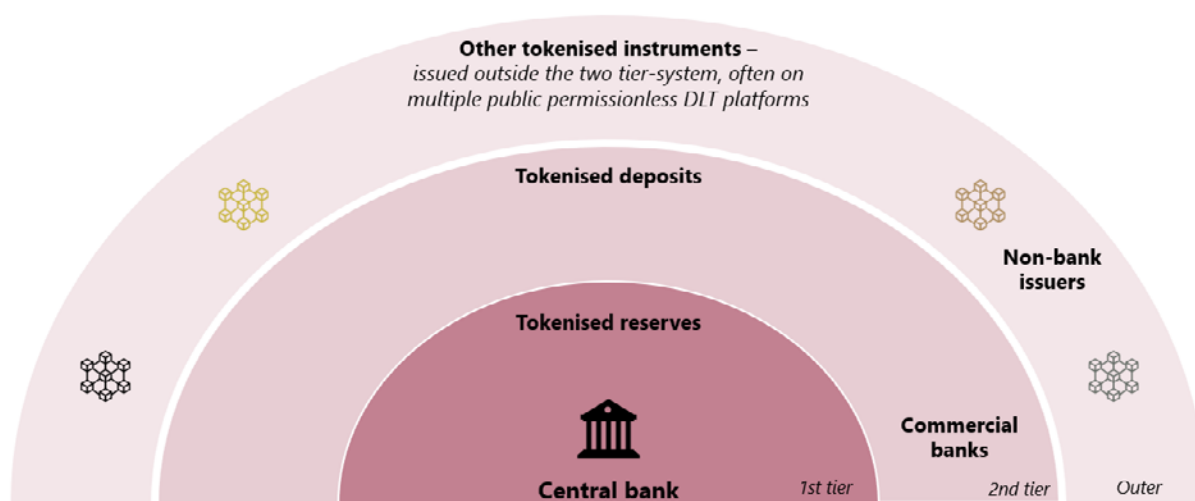
<sup>10</sup> For example, while DeFi is based on the concept of “trustless” finance, experience with DeFi shows that platforms and applications built on public permissionless chains often exhibit a “decentralisation illusion”, with governance and validation concentrated with governance token holders (often platform developers) or a small group of large token holders /validators who vote on platform proposals. In practice, many such protocols do have intermediaries behind them – whether they be developers, token holders or other parties – and as such, there is a decentralisation illusion. See S Aramonte, W Huang and A Schrimpf, “DeFi risks and the decentralisation illusion”, *BIS Quarterly Review*, December 2021.

<sup>11</sup> Stablecoin legislation and regulatory frameworks are still in their infancy, focusing predominately on requirements for issuers, the nature of reserve assets, and governance and redemption requirements (see the European Union’s Markets in Cryptoassets Regulation, the Monetary Authority of Singapore’s Stablecoin Regulatory Framework and the US Guiding and Establishing National Innovation for US Stablecoins Act).

<sup>12</sup> Principle 9 of CPMI states “An FMI should conduct its money settlements in central bank money where practical and available. If central bank money is not used, an FMI should minimise and strictly control the credit and liquidity risk arising from the use of commercial bank money” (*Principles for Financial Market Infrastructures*, April 2012). In a tokenised ecosystem, transactions between banks in DLT ledgers should be settled in central bank money (or at a minimum in a settlement asset with little or no credit or liquidity risk).

The world in which a particular form of money is issued matters – particularly when it comes to trust in money

Graph 7



Source: BIS.

What about achieving singleness across public permissionless DLT platforms (or the stablecoins issued on such platforms) that remain by design in the outer layer of the two-tier system in Graph 7?<sup>13</sup> This is yet largely uncharted territory and will require sound and comprehensive analysis to understand under what conditions platforms that operate in different worlds can be integrated in a vibrant and dynamic tokenised ecosystem.<sup>14</sup>

<sup>13</sup> Some central banks have indicated they are considering the possibility for systemically important and regulated stablecoin issuers to access a central bank account. Regulated stablecoin issuers would be closer to the middle layer of the two-tier financial system, whereas their stablecoins would remain on DLT platforms operating in the outer layer. See, for example, *Bank of England, Regulatory regime for systemic payment systems using stablecoins and related service providers*, November 2025. Refer also to S Breeden, “Not just token gestures”, October 2025; C Waller, “Opening remarks at the Payments Innovation Conference”, October 2025; A Bailey, remarks to the Financial Times and Monetary Authority of Singapore; and D J Chia, “Creating the future of finance: a journey of innovation and collaboration”, November 2025.

<sup>14</sup> Further work and international collaboration regarding this would be beneficial, building on, for example, BIS CPMI and the International Organization of Securities Commissions (IOSCO) guidance on the application of the PFMI to systemically important stablecoin arrangements “*Application of the Principles for Financial Market Infrastructures to stablecoin arrangements*”, July 2022.



## Conclusion

The future may not belong to one form of money, just like the past never did. It may belong to a spectrum from cash to digital money.

As we look to the next decade of finance, tokenisation represents a transformative innovation. We need to embrace the opportunities of tokenisation, while confronting the risks proactively, with robust technology and policy safeguards. As technology transforms the very fabric of our monetary and financial systems, we must uphold the importance of trust in money and reaffirm our commitment to inclusion, resilience and integrity of the financial system. Tokenisation is not about discarding what works. With tokenisation we can carry forward strengths of today's system into a tokenised programmable world for the benefit of society and the wider economy.

We call on central banks, regulators, financial institutions and the industry to work together to support the transition to a safe, efficient and inclusive financial system where tokenised and non-tokenised money and assets can interact safely and efficiently, confronting key challenges, and to deliver the promises of tokenisation. The BIS stands committed to contributing as a global convener and catalyst of innovation working together with central banks, regulators, standard setters, banks and the industry.