Tokenised Money

Use Cases, Interoperability and Regulation

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Contents

Foreword

Throughout history, technology has reshaped how money is recorded, transferred and settled. The transition from physical notes to book-entry money managed by banks and other intermediaries illustrates how innovation has altered the mechanics of money while leaving its economic role intact. Distributed, programmable ledgers should be understood as a recent development in this longer evolution.

Initially confined to stablecoins used in crypto trading and decentralised finance, tokenisation is now spreading across a wider range of money instruments, including bank deposits, and into more conventional use cases. As tokenised money interacts with existing payment arrangements and financial market infrastructures, it is reshaping market structures and the roles of market participants. As in earlier phases of financial innovation, regulatory responses have tended to lag market developments, and this gap is itself influencing how tokenised money markets evolve.

A broad perspective on tokenised money is essential to capture these dynamics in a systematic way. This report examines the range of privately issued tokenised money instruments, analysis how programmability and interoperability are shaping emerging institutional and other use cases, and maps the fragmented regulatory responses taking shape across jurisdictions and regions.

The implications of tokenised money are uneven across economies and increasingly shaped by geopolitical and macro-financial conditions. Policy challenges differ across jurisdictions, reflecting variations in market structure, macroeconomic context and regulatory capacity. In advanced economies, tokenised money raises questions around the evolution and integration of existing payment and financial market infrastructures. In emerging market economies, concerns around currency substitution and capital flows are prominent. These differences influence how policy responses are framed.

The analysis draws on engagement with both market participants and public authorities, reflecting the reality that tokenised money is evolving through the interaction of private innovation and regulatory reform. With this study, the Cambridge Centre for Alternative Finance and Financial Innovation for Impact aim to provide a basis for a forward-looking assessment of the role tokenisation may play in the ongoing evolution of monetary system.

Bryan Zhang
Co-Founder and Executive Director
Cambridge Centre for Alternative Finance

Hugo Coelho
Director of Policy and Advisory,
Financial Innovation for Impact

Cambridge Centre for Alternative Finance
UNIVERSITY OF CAMBRIDGE Judge Business School

Financial Innovation for Impact

Executive Summary

This study analyses the evolving landscape of privately issued tokenised money, the underlying infrastructures and the regulatory trends shaping its development.

Drawing on insights from 21 interviews with market participants, policymakers and regulators, complemented by extensive desk-based research, this report documents emerging use cases, examines the challenges of interoperability and programmability, and assesses the enabling and constraining influence of regulation across jurisdictions.

To compare tokenised money instruments, a classification framework is essential. Without such a framework, conceptual ambiguity hinders meaningful analysis, risk assessment, and policy development. Despite that, no widely-accepted taxonomy has emerged, and the terminology used by market participants and regulators remains inconsistent. This study introduces an exploratory two-layered approach to classify tokenised money. The proposed framework maps instruments across the core dimensions: nature of the claim, its backing, form, and access; alongside additional features relating to business models, technical architecture, and legal and governance properties. Four broad instrument categories are identified: central bank digital money, commercial bank claims or deposits, pre-paid fiat representations (commonly referred to as fiat-backed stablecoins), and fiat-anchored asset positions.

The research reveals a diverse ecosystem where tokenised money instruments play competing and complementary roles. Four main use cases have emerged in recent years, supporting the adoption of tokenised money beyond crypto-trading: (i) cross-border payments and settlement; (ii) treasury and liquidity management; (iii) trade finance digitisation; and (iv) capital markets infrastructure. Supported by their 24/7 availability, lower transaction costs and bearer-instrument characteristics, stablecoins are used in settling trades in decentralised finance, crypto exchanges and for crossborder payments. Tokenised deposits are emerging as a viable tool for institutional treasury management, offering familiar banking relationships and regulatory frameworks combined with digital efficiency. Meanwhile, tokenised money market funds are beginning to compete for some use cases, particularly where yield-bearing features are attractive.

Adoption tends to follow a gradual path: basic use cases, especially cross-border payments, are followed by treasury management and more complex applications. Regulatory and non-regulatory barriers remain – including privacy concerns and infrastructure limitations – but the pace of adoption is accelerating.

Interoperability is a critical barrier to scaling. While the basic functionality of tokenised money is well understood, seamless integration across networks remains challenging. Achieving interoperability requires addressing numerous systemic challenges: cross-border efficiency, cross-platform connectivity, cross-asset integration, regulatory harmonisation and governance coordination. The initiatives examined in this report – Partior, Project Guardian, RSN, and Project Agorá – provide evidence on different approaches to these challenges (e.g. from consortium-based private networks to public blockchain solutions with added privacy layers), with varying levels of maturity and success.

Programmability is best understood as an accelerator of adoption. Programmability is already enabling innovative pilot applications, including trade-finance automation, parametric insurance and AI-driven commerce and treasury optimisation, and its importance is expected to increase over time. Considerations around technical architecture decisions, implementation approaches and emerging standards will determine to a large extent whether tokenised money can achieve the scale and functionality necessary to transform global financial infrastructure.

Policy and regulatory choices both constrain and enable the development of tokenised money. The analysis highlights some of the most salient features, challenges and potential gaps that stem from the development and implementation of tokenised money regulation. AML/CFT and illicit finance risks, cybersecurity and operational resilience, and financial stability are identified as the top priorities by regulatory authorities. Risks to monetary sovereignty – particularly linked to the predominance of USD-denominated stablecoins – are gaining prominence in regulatory discussions, too, especially in Emerging Markets and Developing Economies (EMDEs).

The pace of regulatory action is accelerating, particularly following the policy shift in the United States toward a more industry-supportive approach, but fragmentation remains. Despite the rollout of international standards for stablecoins and efforts to oversee their implementation, views on the effectiveness of jurisdictional frameworks and the prospects for greater alignment and supervisory cooperation diverge. The comparative analysis of stablecoin regulations across five jurisdictions also highlights significant areas of divergence, including requirements for reserve assets and subsidiarisation of foreign issuers.

Regulatory attention is gradually shifting from the issuance of stablecoins to their use in payments, implications for monetary policy and the regulatory issues raised by other tokenised money instruments. Important uncertainties remain around the use of public permissionless blockchains as infrastructures for recording and transferring tokenised money. Issues such as interoperability, operational resilience and the role of smart contracts in embedding compliance and risk management are likely to become more relevant in the next phase of regulatory response.

As adoption continues to expand, the challenge for policymakers will be to create frameworks that enable innovation while safeguarding the safety, stability and integrity of the monetary and financial systems.

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Research Team and Acknowledgements

Research Team

Sami Alkhair, Keith Bear, Markus Bergvinson, Hugo Coelho, Hatim Hussain, Matthew Jones, Lindis Oma, Roman Proskalovich, Christopher Seta and Bryan Zhang.

Contributors and Reviewers

Douglas Arner, Denise Garcia Ocampo, Gina Pieters, Marcelo Prates and Daniel Trinder.

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Disclaimer

The views and perspectives shared by individuals interviewed for this research do not represent the formal positions of their respective organisations.

Introduction

Ten years on since the launch of the first stablecoin – conceived as a stable alternative to volatile cryptoassets – tokenised money is moving through a phase of innovation into a phase of diffusion.[1] Stablecoins, such as Tether's USDT and Circle's USDC, have grown and developed from niche assets used to support crypto trading into a US$250 billion-plus instrument with a wide range of use cases, from cross-border payments to a store of value in emerging economies. In response, financial incumbents and financial technology companies are piloting or introducing their own tokenised money instruments, and integrating them in new products and services.

The landscape of tokenised money is defined by a growing diversity of instruments – from stablecoins to tokenised deposits to tokenised money market funds (MMFs) – and increasingly blurred boundaries among them. Developed by a multiplicity of market participants competing across a widening range of use cases and payment innovations –including programmability – tokenised money instruments are increasingly integrating with the traditional global financial system.

Perhaps more than other phases of technological change, the phase of diffusion is set to be shaped by politics, policy and regulation. The shift in policy in the US towards a more pro-industry stance on cryptoassets and distributed ledger technology (DLT) and the passage of the 2025 Genius Act – which regulates payment stablecoins and has a stated objective of promoting the international use of the US Dollar[2] – provided an incentive to traditional market participants and crypto disruptors to accelerate the development and deployment of new instruments, and increased the sense of urgency for regulators in other jurisdictions. Against the backdrop of increasing geoeconomic competition, policy trade-offs between competitiveness and innovation and other policy objectives such as monetary sovereignty and financial stability are becoming increasingly salient, while differences in policy preferences are becoming exposed.

This report presents the findings of a nine-month study to describe and analyse the evolving landscape of privately issued tokenised money and the trends shaping its development. Prior analyses, including regulatory analyses, have generally considered single instruments in isolation – most commonly stablecoins – and sought to address discrete technical questions, such as interoperability of tokenised commercial-bank money. By contrast, this study adopts a holistic and forward-looking perspective, examining multiple instruments in parallel, and considering the market, technological innovation and regulatory factors impacting their development. The objective is to understand use cases of tokenised money, assess scaling and adoption factors, and compare regulatory approaches across jurisdictions.

Definitions and Scope

Tokenised money refers to fiat-denominated money instruments recorded and transferable on shared ledgers, including DLT. Tokenised money instruments are distinguished from other tokenised instruments by their features that enable them to perform the functions of money: unit of account, means of exchange and store of value. This study focuses on privately issued instruments.[3]

This broad definition is intended to capture a variety of instruments from tokenised claims on commercial banks or other financial institutions to asset-backed instruments such as stablecoins. The focus of the analysis is primarily on instruments that are within the scope of regulations. Tokenised MMFs – which are typically excluded from traditional, narrow definitions of money and regulated as securities – are included owing to their money-like use cases.

Methodology

This study employed primarily a qualitative research approach through semi-structured interviews, combined with quantitative analysis of survey responses. The interviews were conducted between July and September 2025. Two groups were targeted:

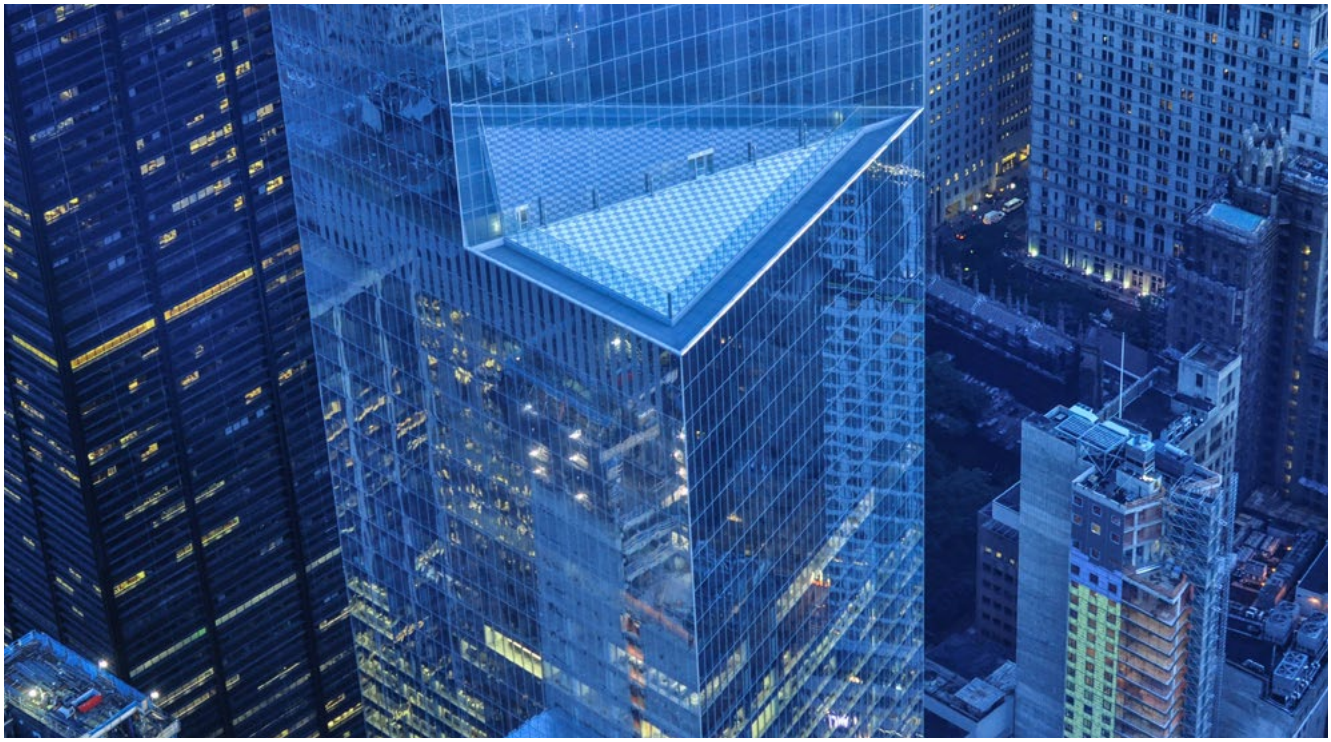
- Market participants
  - Traditional Banks (five interviews): including major global investment, commercial, and custodian banks;
  - Traditional Infrastructure Providers (three interviews): payment networks, and market infrastructure providers;
  - Fintech and Challengers (three interviews): including stablecoin issuers and digital payment providers, and blockchain infrastructure companies;
- International institutions and standard-setting bodies, and central banks and other financial regulators and authorities (10 interviews).

Interviews followed a semi-structured interview guide, tailored as appropriate to the participant's context (see Annex I and II). Each participant was interviewed once. Some questions were open-ended; in others, participants were asked to give a quantitative answer on 1-5 or 1-10 scale to facilitate the comparison of their opinions across the sample. To encourage candid discussion, interviews were conducted on a non-attribution basis, and the results were aggregated. While the sample size is limited, participants represent a diverse group of industry players actively developing and deploying tokenised money solutions and of public authorities shaping regulatory frameworks for the sector. Owing to the sample size, the study findings presented in this report can be deemed as only indicative of market and regulatory trends.

For the regulatory landscape analysis, five jurisdictions were the subject of detailed case studies: the European Union, Hong Kong, Japan, Singapore and the United States. These jurisdictions were selected based on their market relevance and/or the advanced stage of development of regulations. The analysis was based on an extensive review of primary sources (laws, regulations, directives, guidelines and other sources of regulatory information) and secondary sources (articles, books, and blog posts from authoritative sources) and background interviews.

External experts were consulted during both the preparation stage and review stage of this study.

For a glossary of key terms, please refer to the Cambridge Digital Money Dashboard[4] and the CCAF 2nd Global Cryptoasset Regulatory Landscape Study.[5] While the taxonomy chapter introduces new terminology for tokenised money instruments, the remainder of the report uses familiar terms – such as "stablecoins," "tokenised deposits," and "tokenised money market funds" – to ensure consistency with current market and regulatory language.



Report Structure

The results of the study are organised into four chapters:

Chapter 1 reviews the existing taxonomies of tokenised money, and proposes a revised framework for defining, distinguishing, and characterising privately issued tokenised money instruments. It provides an analytical foundation for understanding how tokenised deposits, stablecoins and other tokenised money instruments relate to and compete with each other.

Chapter 2 turns to the characterisation of the market, identifying four key use cases for tokenised money: (i) cross-border payments and settlement, (ii) treasury and liquidity management, (iii) trade finance digitisation, and (iv) capital markets. These use cases illustrate both the drivers of adoption and the constraints to wider application.

Chapter 3 focuses on interoperability and programmability issues. It describes how approaches to interoperability differ and can be assessed and provides an overview of the potential for programmability to accelerate adoption. It analyses key technical architecture decisions and emerging standards, along with the associated challenges and risks. Furthermore, it compares major interoperability and programmability initiatives, then concludes with design implications and outlook.

Chapter 4 provides a critical assessment of the regulatory landscape. It begins by setting out the criteria to assess tokenised money and mapping the risks associated with its issuance and use. It then reviews the global standards and recommendations. This is followed by a comparative analysis of five jurisdictions – highlighting their regulatory approach, institutional context and treatment of different instruments. The case studies also examine issuer requirements, rules on use in payments and transferability of stablecoins.

The Conclusion of this report summarises the main findings of the study, identifying trends in use cases, programmability, interoperability and regulation. A copy of the interview framework used in this study is provided in the Annexes.

Chapter 1

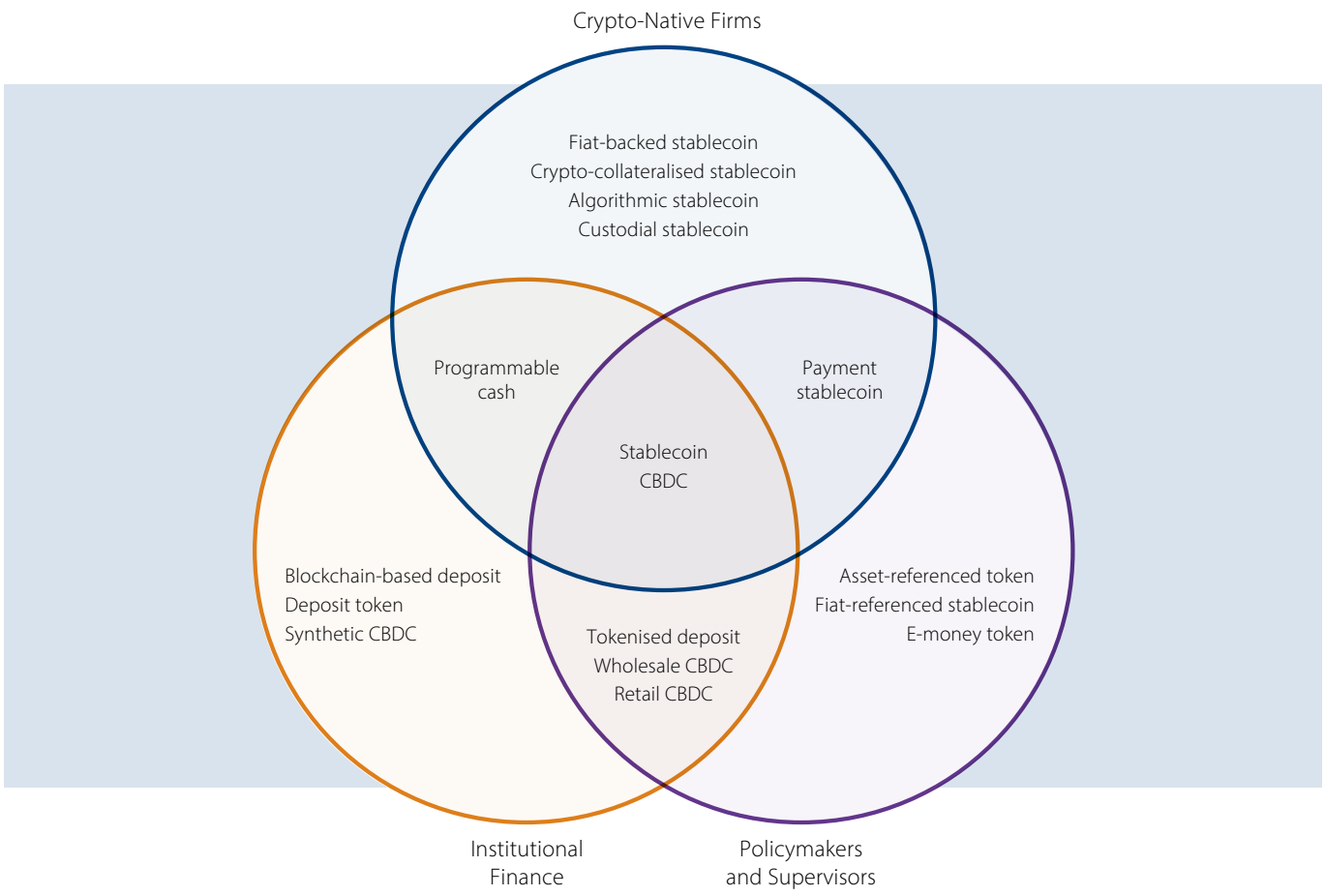
Taxonomy

In its essence, money is a transferable liability — a claim recognised and trusted by society. Bank deposits, fiat balances, cash, and central bank reserves function as money because they are claims recorded against credible balance sheets, transferable and used for settlement, and expected to hold value at par. Distributed ledgers change the way money is represented and its transfer mechanisms, but not its fundamental logic.

As monetary instruments migrate onto distributed ledgers, there have been numerous attempts to devise an encompassing classification system that categorises and describes them. However, no widely-accepted taxonomy has emerged so far. Policymakers, financial institutions, and crypto-native actors describe instruments differently, reflecting distinct perspectives:

- **Policymakers and financial authorities** anchor classifications in existing regulatory regimes, focusing on the legal character of claims and their eligibility for settlement.
- **Financial institutions** take a form-based or functional approach, distinguishing between deposit tokens and tokenised deposits and emphasising programmability features and settlement use cases.
- **Crypto-native sources** build typologies from market practice, often categorising instruments by reserve models and adoption patterns.

Figure 1: Indicative Split of the Current Use of Terminology



This fragmentation hinders comparability and frustrates attempts to assess the performance of different instruments against the three functions of money, i.e. as a unit of account, a medium of exchange and a store of value; and complicates discussions on how to regulate these instruments.

In this section, a two-layered taxonomy framework is proposed. This framework defines instruments at the level of the underlying claim and maps design features that determine functionality.

1.1. The Tokenised Money Framework

1.1.1. Instrument Defining Features

The term "tokenised money" refers to DLT-based claims referencing fiat money that are used as a means of payment and/or as a store of value. In this taxonomy, the term is broadly defined to also encompass quasi-monetary claims, which may perform monetary functions only under certain conditions. Furthermore, they may not promise redemption at par and instead represent proportional entitlements to underlying assets.

The first layer of the taxonomy distinguishes between tokenised money instruments, and classifies them according to four core dimensions:

- the nature of the claim;
- the backing;
- the form in which it is represented on a ledger;
- and the access conditions guiding who can hold and transfer it.

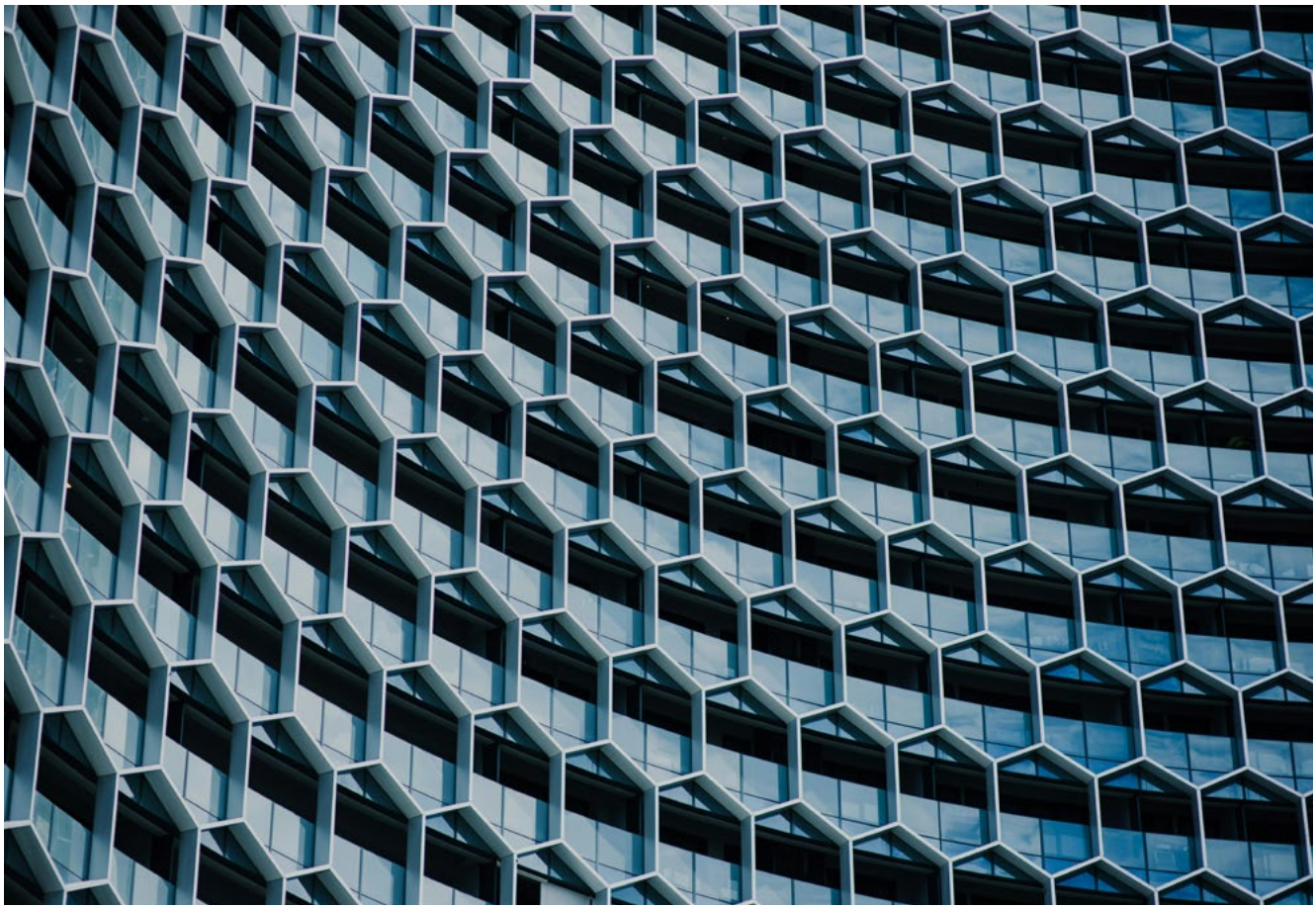


Table 1: Key Features of Tokenised Money Instruments

	Tokenised Money Taxonomy: Layer 1				
	Central bank money		Commercial bank deposits	Prepaid fiat representations	Fiat-anchored asset positions
	State-issued	Privately issued			
Claim	Against central bank (CB) for CB money (final settlement instrument)	Indirectly for CB reserves against a bank or other financial institution(s)	Against a bank for the credited amount in fiat money (contractual debt claim)	Against issuer for at-par redemption into fiat money (contractual redemption right)	Against fund/ issuer/protocol for a proportional ownership in a fund/ strategy or for locked assets (collateral)
Backing	Sovereign creditworthiness; government's taxing power and CB assets	CB reserves (omnibus account) (100%)	Fractional reserves + other bank assets LOLR, deposit insurance	HQLA (≥100%)	HQLA (≈100%), locked cryptoassets (>100%)
Form	• Tokenised CB money • CB money tokens	• Synthetic tokenised CB reserves • *Synthetic CB reserve tokens*	• Tokenised deposits • Deposit tokens	• *Tokenised fiat* • Fiat tokens	• Tokenised fund/ *collateral* • Fund/collateral tokens
Access	Mostly within a jurisdiction: • for whitelisted, KYC-verified financial institutions (wholesale CB money), or • generally available for individuals, firms, institutions after (tiered) KYC (retail CB money)	For whitelisted, KYC-verified financial institutions mostly within a jurisdiction	For whitelisted, KYC-verified institutional and individual clients of a bank or bank consortium, both within a jurisdiction and across borders	Generally available across borders for wholesale and retail transfers: • open on-chain access, subject to blacklisting, • eligibility criteria and KYC-verification for direct issuance/ redemption	• Both generally available and restricted versions exist • Restricted versions may be limited to a jurisdiction, accredited investors or qualified purchasers
	Monetary claims				Quasi-monetary claims
Examples	eCNY, eNaira, Sand Dollar	Fnality	JPMD, USDF, Citi TDs, CBIT	USDC, EURC, PYUSD	BUIDL, USDY, DAI/ USDS
Common labels	Wholesale, retail CBDC	Synthetic wholesale CBDC	Tokenised deposit, deposit token	Fiat-backed, fiat-referenced, regulated, payment stablecoin, settlement and e-money token	Tokenised MMF, crypto-collateralised stablecoin, fiat yield token

Notes: Text in *grey italic* indicates tokenised money forms that are either less common or exist only as a concept. LOLR refers to Lender of Last Resort, HQLA to High-Quality Liquid Assets, and KYC to Know Your Customer.

The four core dimensions shape the economic, legal, and operational properties of tokenised money.

Claim specifies the rights embodied in the token, i.e. whether the holder's entitlement is framed as a redemption right against an issuer, and which type of issuer. This dimension determines the nature of the holder's legal exposure, and the treatment of the instrument in insolvency or resolution.

This dimension is critical because it determines whether the instrument should be understood as a payment-oriented monetary claim, or as a financial instrument with money-like properties that primarily represents exposure and entitlement to underlying assets.

Backing describes the assets, guarantees and policies that stand behind the claim. It links the promise to balance sheets and/or asset pools, and thereby to loss-bearing capacity, liquidity under stress and potential run dynamics.

The backing descriptions are archetypal. Backing arrangements may vary across projects. For instance, some fiat or fund tokens deviate from using exclusively high-quality liquid assets as backing.

Form captures how the claim is represented on the ledger and whether the DLT record constitutes the authoritative register of rights, or is merely a representation of an off-chain status. For example, deposit tokens (where the deposit itself is issued solely on a distributed ledger) constitute a DLT-native form of the claim. By contrast, tokenised deposits typically represent an off-chain bank deposit recorded in traditional account systems, with the token serving only as a representation of that off-chain position.

Form is a crucial feature because it affects settlement speed and finality, as well as the feasibility of on-chain functionality such as atomic settlement, composability with smart contracts, and automated risk management. Where legal ownership is natively recorded on the ledger, transfers can settle directly on-chain, whereas off-chain representations typically require reconciliation with external systems.

Access summarises who can hold and transfer the instrument in practice, and under what conditions. It encompasses wholesale versus retail reach, jurisdictional restrictions, KYC and eligibility requirements, and other whitelisting and blacklisting mechanisms.

Whitelisting-based approaches restrict access to a predefined set of authorised participants (e.g. clients of the company who have been subject to a KYC process), while blacklisting-based approaches allow broader access but retain the ability to restrict or exclude specific addresses.

1.1.2. Secondary Design Features

Beyond the core dimensions, a second layer considers additional features that influence the usability and risk profile of tokenised money instruments. These features do not determine classification, are not mutually exclusive, and may evolve over time without changing an instrument's position in the first layer of the taxonomy.

Additional features can be bundled in three major groups:

- technical architecture;
- legal and governance;
- business and economics model.

Technical architecture features describe the design choices of a distributed ledger that determine how money instruments are recorded, transferred and observed. These features shape the "plumbing" of tokenised money by defining the type of ledger and its governance, the conditions under which transfers become final and irrevocable, and the extent to which transaction data are visible. Together, they influence performance, interoperability and risk characteristics:

- **Ledger type**: the nature of the underlying transaction ledger and its governance model. This determines who can participate in validation, how upgrades are decided and how easily the system can interoperate with other infrastructures.
- **Finality**: the conditions under which a transfer is considered irrevocable. This shapes settlement risk, determines when obligations can be treated as discharged and affects the suitability of a token for high-value payments or collateral use.
- **Privacy model**: the way in which transaction and position data are revealed or concealed, affecting user confidentiality.

Legal and governance features concern how rights in DLT-based money are defined, how backing assets are held and protected, and the degree of control exercisable by issuers and intermediaries:

- **Transparency and disclosure**: the scope, frequency and assurance level of information about backing assets, related-governance arrangements and third-party dependencies. This underpins market discipline, supervisory oversight and users' ability to assess risk.
- **Segregation and custody of backing assets**: how backing assets are booked and who holds them. This influences whether assets are insulated from issuer insolvency and how easily they can be liquidated in stress events.
- **Transfer controls**: the legal and technical powers for the issuer to allow, restrict or reverse transfers. These determine the balance between user autonomy, operational risk management and compliance with legal and regulatory obligations.

Business and economics model features define how returns from backing assets are distributed, shape incentives across issuers, intermediaries and users, and have important implications for behaviour under stress:

- **Yield distribution**: how returns on backing assets are allocated between issuers, holders and other stakeholders. This influences demand for holding the instrument.
- **Fees strategy**: the schedule of fees that the issuer (and, where relevant, intermediaries) charges for core functions such as issuance, redemption, safekeeping and transactions. This shapes the issuer's revenue model and incentives, and influences how the instrument is positioned relative to alternative forms of money.
- **Convertibility and stabilisation**: the mechanisms that govern redemption terms and value stability, including any conditions, limits or supporting tools. These mechanisms interact closely with the legal nature of the claim and the quality of backing, and are therefore central to assessing both perceived and actual 'moneyness'.

Table 2: Additional Features of Tokenised Money Instruments

Tokenised Money Taxonomy: Layer 2		
Technical architecture		
Ledger	**Finality**	**Privacy**
• public, private, or public permissioned • standalone or integrated (linked to other DLT-platform(s) or traditional infrastructures, including RTGS, SSS and payment gateways)	• probabilistic or deterministic • immediate/near-instant/delayed	• confidential • pseudonymous • selective disclosure
Fiat tokens mostly use public DLTs, claims on banks – private or public permissioned, asset claims vary by project	Probabilistic for PoW public ledgers, mostly deterministic for the rest; finality time depends on settlement ledger	Pseudonymous for fiat tokens and asset claims on public ledgers; confidential or higher privacy for bank claims
Legal and governance		
Transparency and disclosure	**Segregation and custody of backing assets**	**Transfer (TX) controls**
• proactive self-disclosure of backing assets, governance structure, third-party dependencies, technical architecture, etc. • independent audit, examination of management assertions, proof-of reserves or other assurance engagement	• segregated/non-segregated • self / smart-contract / third-party custody • single / multi-custodian	• free, conditional, or delayed TXs • ± (un)freeze/seize/pause hooks • ± TX-level KYC/AML/CFT screening • ± embedded travel-rule messaging • ± size/velocity/jurisdiction TX limits • ±programmable TXs (escrow, time locks, settlement-conditional logic)
Banking audits, disclosure levels vary for fiat token and asset claim projects	Self-custodied non-segregated for bank claims, mostly segregated third-party custody for fiat tokens and asset claims	Higher institutional control for bank claims, freeze hooks for fiat tokens, varying levels of TX controls for asset claims
Business and economics model		
Yield distribution	**Fees strategy**	**Convertibility and stabilisation**
• retain yield • pass to holders • share with partners • mixed strategy	• no fees • transaction, issuance/redemption, ongoing/management fees or a combination	• at-par, conditional, market-based, or off-par redemption • ± cut-offs, gates, or 'haircuts' • direct issuer and/or intermediated convertibility • ± liquidity buffers or backstops • ± (automated) market-maker support and supply-adjustment mechanisms
Deposit and asset claims are typically yield-bearing, yield passing is often forbidden for fiat tokens	Varies by project, DLT-specific fees may apply	Monetary claims are mostly redeemable at-par; liquidity support and mixed convertibility for fiat tokens; gates and extra stabilisation mechanisms for asset claims

Notes: The ± sign denotes "with or without" and indicates whether a property is present or absent. RTGS refers to Real-Time Gross Settlement, SSS to Securities Settlement System, PoW to Proof of Work, AML to Anti-Money Laundering, and CFT to Combating the Financing of Terrorism.

1.2. Market Landscape

The tokenised money landscape demonstrates distinct scale and adoption patterns across four basic categories of DLT-based claims, each at different stages of development and maturity:

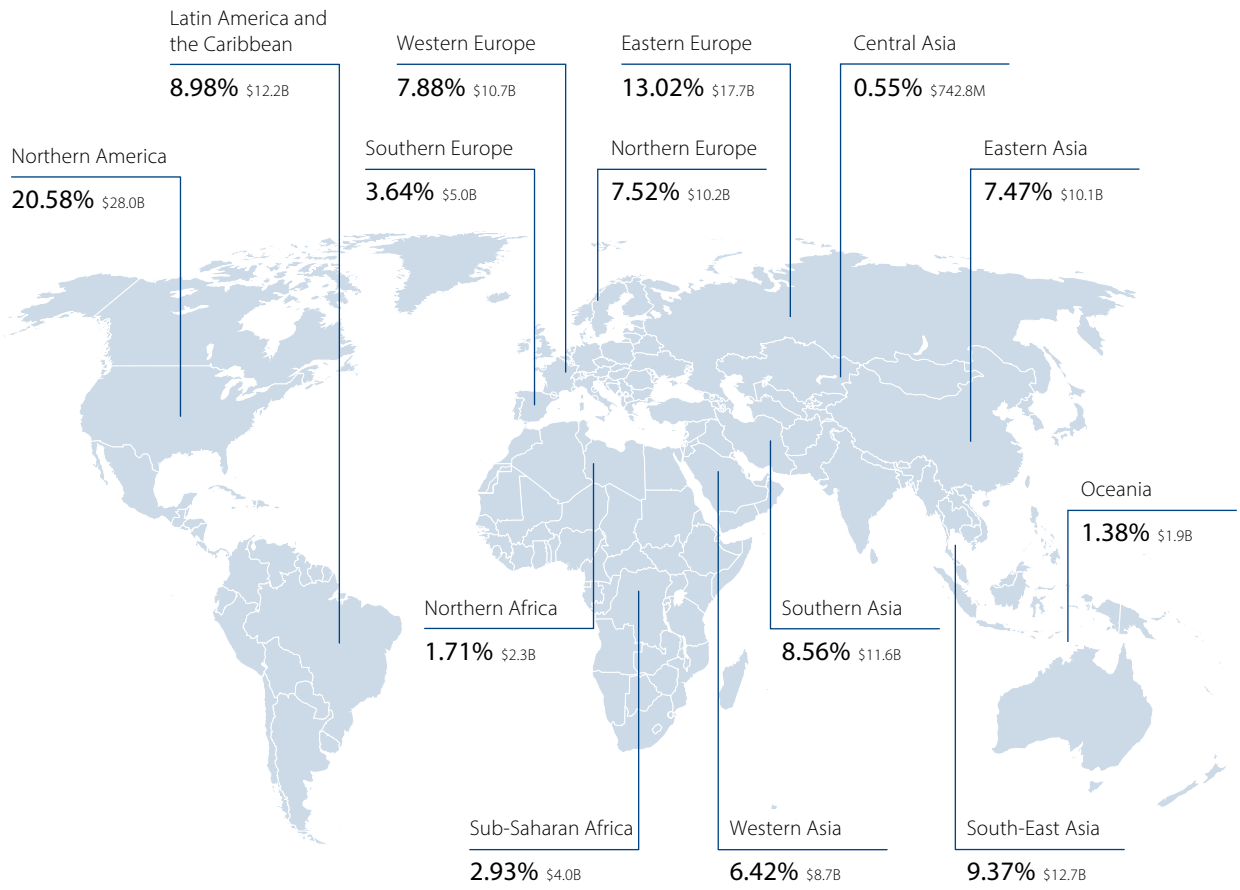
- **Claims on central bank money**, commonly referred to as "central bank digital currencies", are currently limited to specific jurisdictional deployments. Examples include China's e-CNY reaching 16.7 trillion yuan (US$2.38 trillion) in transaction volume by November 2025,[6] the ECB conducting exploratory DLT settlement work with over 60 industry participants and total value of €1.6 billion settled via trials over a six-month period in 2024,[7] and private-public bank initiatives such as Fnality launching the world's first regulated DLT-based wholesale payment system in December 2023.[8] Other deployments include the Bahamas' Sand Dollar, Jamaica's JAM-DEX, Nigeria's eNaira, the Eastern Caribbean's DCash, India's e₹, and various experimental projects such as Project mBridge, SNB Project Helvetia, and the Hong Kong Monetary Authority's e-HKD trials.
- **Commercial bank deposit claims**, including tokenised deposits, have progressed beyond early pilot phases, with notable institutional adoption. Whilst specific data on outstanding deposit volumes remains unavailable, reported transaction volumes are significant. One of the most prominent examples is J.P. Morgan's Kinexys platform that has processed over US$1.5 trillion in cumulative transaction volume since inception, averaging more than US$2 billion daily in tokenised deposit movements for institutional payments, and is now in production with the JPM Deposit Token.[9] Other significant initiatives include DBS Token Services (a commercially live product with multiple use cases across treasury liquidity management, conditional payment, and programmable rewards), Citi Token Services, Partior, the USDF Consortium, TassatPay, and projects from UOB and Standard Chartered.
- **Prepaid fiat claims**, primarily in form of fiat tokens, commonly referred to as "fiat-backed stablecoins", dominate the landscape with over US$250 billion in outstanding balances, led primarily by USDT and USDC.[10] This category has achieved global adoption with more than 200 million active wallet addresses worldwide,[11] operating 24/7 across multiple blockchain networks and serving as a US digital dollar infrastructure for both retail and institutional markets. Major issuers include Tether, Circle and Paxos.
- **Fiat-anchored asset positions** are mainly represented by collateral claims and fund claims. The former are commonly referred to as "crypto-collateralised stablecoins", with DAI/USDS, at about US$10 billion in outstanding value, serving as a representative example. The latter include tokenised treasury and money market funds that represent the fastest growing segment, with approximately US$9 billion in combined value,[12] reflecting demand for yield-bearing tokenised instruments from providers like BlackRock, Franklin Templeton, Ondo Finance, OpenEden, Circle and Superstate.

Market Size and Growth Trajectory

Combining tokenised money segments allows for a rough estimate of the total market of at least US$300 billion in 2025. Industry projections suggest significant expansion ahead, with Coinbase forecasting the fiat and collateral token segments alone could reach US$1.2 trillion by 2028,[13] while McKinsey estimates the broader tokenised market cap could approach US$2 trillion by 2030.[14] This growth trajectory aligns with broader tokenisation trends, as BCG and Ripple project the entire tokenised assets market, including fiat tokens, could reach US$18.9 trillion by 2033.[15]

The adoption of fiat tokens or fiat-backed stablecoins has accelerated dramatically in the past several years, with transaction volumes reaching up to US$30 trillion in 2024,[16] surpassing the combined activity of Visa and Mastercard, though approximately 80-85% of this volume may consist of trading, DeFi and bot activity.[17,18] The remaining 15-20% is concentrated among other use cases, including cross-border payments, settlement and remittances, accounting for up to 3% of the global cross-border payments market and up to 1% of global capital markets volume, according to some estimates.[19] Based on a recent EY-Parthenon survey of 350 corporate and financial services executives, corporate adoption of fiat tokens is accelerating, with 13% of firms currently using fiat tokens and 54% of non-users planning adoption within 6-12 months.[20] Geographically, fiat token use is broadly distributed, with Asia, Europe, and Northern America each accounting for roughly 20-30% of global transaction volume.[21]

Figure 2: Global Flows of Fiat and Collateral Tokens (Proxy Estimate)



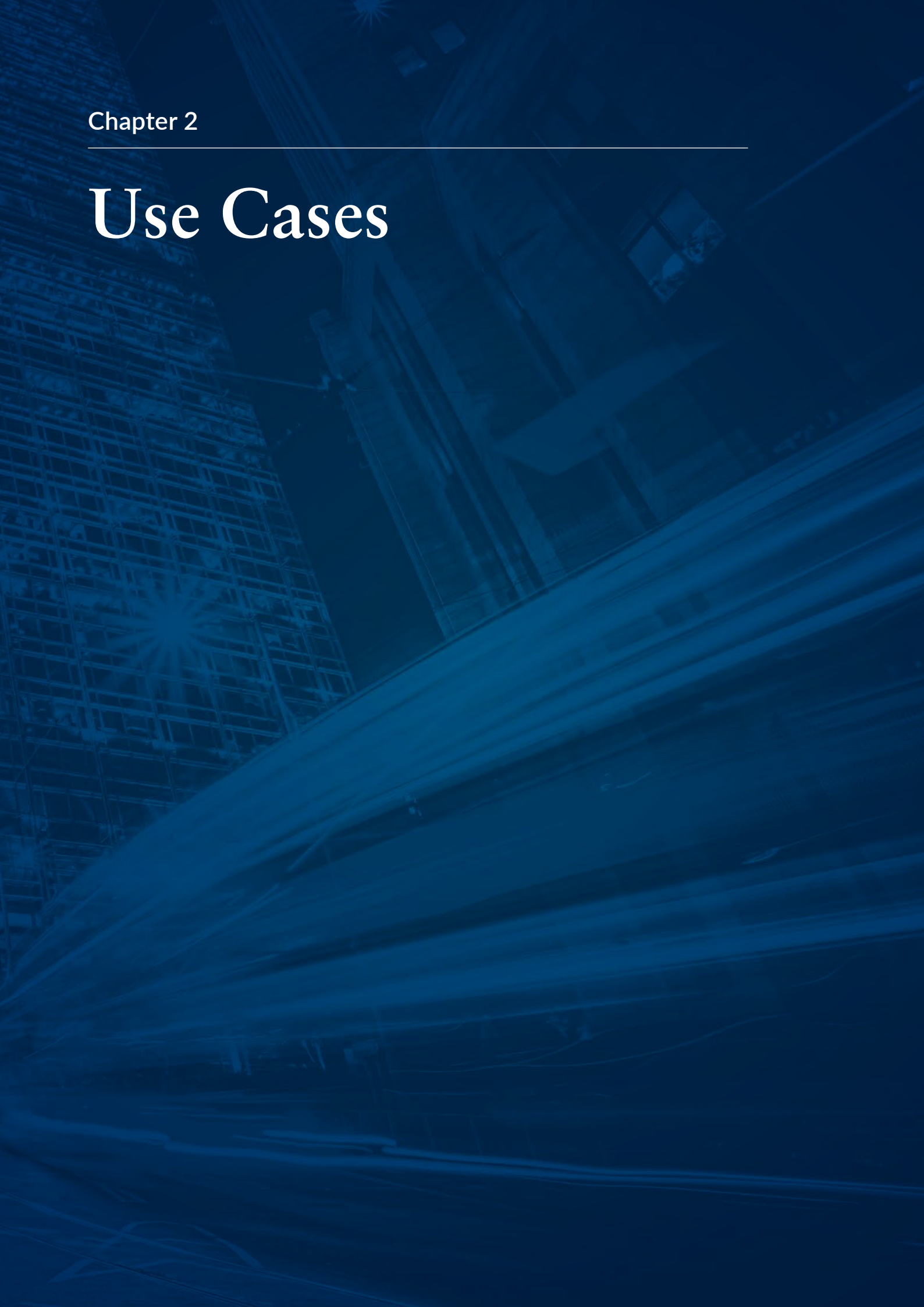
Notes: Proxy-based estimates of the global transaction volumes (inflows + outflows) in September 2024.
Source: Cambridge Digital Money Dashboard supported with data by Chainalysis.

Conclusion

The array of existing tokenised money instruments and the increasingly blurred definition of their features challenge classification frameworks that are closely tied to existing categories of money and differentiate primarily between issuers.

The proposed tokenised money framework offers an alternative analytical structure for comparison. By mapping instruments across the core dimensions, such as nature of the claim, its backing, form and access, alongside additional features relating to business models, technical architecture, and legal and governance properties, it enables systematic analysis that can evolve as the technology, market and the relevant regulations continue to mature.

The remainder of the report uses familiar terms – such as "stablecoins," "tokenised deposits" and "tokenised money market funds" – to ensure consistency with current market and regulatory language.



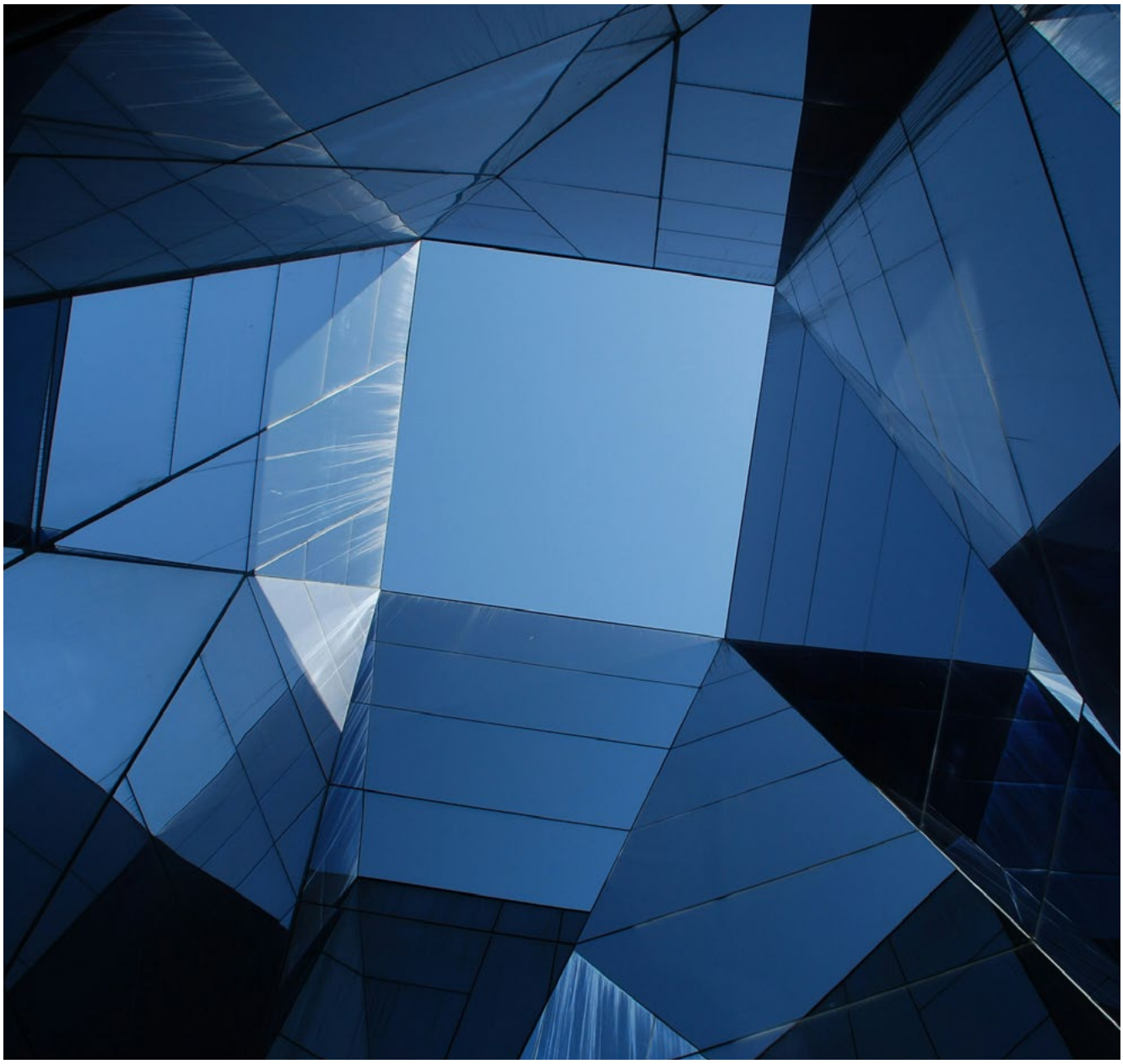
Chapter 2

Use Cases

The tokenised money landscape is rapidly evolving from experimental pilots to real-world implementation, driven by greater regulatory clarity, technology advancements, and compelling business use cases.

Based on interviews with traditional banks and infrastructure providers, as well as fintech and challenger companies across multiple jurisdictions, this chapter identifies four use cases that are driving the adoption of tokenised money: (i) cross-border payments and settlement, (ii) treasury and liquidity management, (iii) trade finance digitisation, and (iv) capital markets infrastructure.

The chapter presents findings on strategic priorities, implementation readiness, and specific use case applications, revealing a nuanced ecosystem where different forms of tokenised money serve distinct but complementary roles. Each use case is discussed in turn before cross-cutting themes and implementation patterns are examined.



2.1. Strategic Priority and Implementation Readiness Assessment

There is considerable variation in how different types of organisations prioritise tokenised money initiatives, interviews with market participants show. This reflects higher ratings from organisations where tokenised money is a core business, compared with those where it is only part of broader operations, although priority levels are high across all organisations.

Table 3: Strategic Priority Levels (1-10 Scale)

Organisation Type	Average Priority	Range	Key Characteristics
Banks	8.1	7-9	High strategic focus, CEO-level attention
Infrastructure Providers	8.5	6-10	Mission-critical for business models
Fintechs and Challengers	9.7	9-10	Core business dependency

Banks show the highest variation in priority levels, reflecting different stages of digital transformation and regulatory environments.

Infrastructure Providers demonstrate consistently high priority levels, viewing tokenised money as essential for maintaining competitive positioning in evolving payment ecosystems.

Fintech Companies and Challengers show the highest and most consistent priority ratings, with tokenised money representing core business functionality rather than an additional service layer.

Quote Box: Strategic Imperative

"From our work perspective, blockchain, digital money, tokenised forms of money – it's exactly what we do."

Bank Executive

Quote Box: Strategic Imperative

"We can't afford to miss the bus on this one... if we don't invest and this becomes a multi-billion-dollar business... that's a huge problem."

Infrastructure Provider Executive

Table 4: Organisational Readiness for Scale Adoption (1-10 Scale)

Organisation Type	Average Priority	Range	Implementation Status
Banks	7.4	3-10	Mixed: pilots to live deployment (primarily tokenised deposits and deposit tokens)
Infrastructure Providers	8.0	6-10	Advanced integration capabilities
Fintechs and Challengers	9.5	8.5-10	Operational or near-operational

The readiness assessment reveals that while strategic priority is high across all sectors, implementation readiness varies significantly.

Banks show the widest range, from early-stage exploration (3/10) to full operational deployment (10/10). This variation reflects different regulatory environments, risk appetites and client demands.

2.2. Primary Use Cases

2.2.1. Cross-Border Payments and Real-Time Settlement

The Universal Business Case

Cross-border payments emerged as the primary use case across all interviews, achieving unanimous recognition as the most compelling immediate application for tokenised money. This reflects the fundamental limitations in current correspondent banking infrastructure that create operational friction and cost for global businesses and the lack of alternative solutions (such as wholesale central bank digital currencies) providing safer means of settling transactions in tokenised assets.

Correspondent banking networks operate within the constraints of domestic Real-Time Gross Settlement (RTGS) systems. When these systems are offline, particularly during weekends and holidays, money becomes trapped in intermediary accounts, creating delays and uncertainty for businesses requiring immediate settlement. Additional challenges include complex compliance requirements across multiple jurisdictions, high transaction costs, and limited transparency in payment status.

Participants described a clear evolution in payment expectations, with tokenised money representing the next phase in this progression. This evolution is not merely about incremental improvement but represents a qualitative change in how businesses can operate globally. The ability to move money instantly across borders enables new business models and operational strategies that were previously impossible.

It should be noted that there is still a need for a foreign exchange (FX) transaction (possibly two in the case of a USD stablecoin being used as a bridge between two EMDE jurisdictions). This drives the requirement for an effective on-chain FX capability to make such transfers seamless.

Quote Box: Payment Evolution

"We had a saying when we started our business 13 years ago... to move cross-border payments from 5 days and $50 to 5 minutes and $5 and with tokenised money, we think we can get it down to 5 seconds and 5 cents."

Fintech Executive

24/7 Settlement: The Core Driver

The most frequently cited benefit across all interviews was 24/7 settlement capability. It addresses the fragmented structure of the current financial system leading to a "hurry up and wait" settlement processes, with interview participants describing the transformation from "just in case" to "just in time" money movement.

Quote Box: Always-Available Money

"The main use case is to have money that's available when clients are actually trying to do their business."

Bank Executive

The practical impact is especially significant for specific business needs that current infrastructure cannot serve effectively, for example:

- **Time-Critical Commercial Transactions**: Payments required outside banking hours for operational continuity;
- **Global Supply Chain Operations**: Just-in-time payments for international manufacturing and logistics;
- **Emergency Liquidity Needs**: Crisis situations requiring immediate fund transfers across borders;
- **Regulatory Compliance**: Payments required to meet regulatory deadlines regardless of banking hours.

However, the impact extends far beyond convenience, to fundamental operational transformation. For example, one participant described how constant availability of funds may eliminate or materially reduce the need for complex treasury forecasting and pre-positioning of liquidity.

Quote Box: Eliminating Treasury Forecasting

"If you have real-time availability to funds anywhere in the world, you don't need forecasting anymore. The idea behind forecasting is figuring out in advance when and where you'll need money, but if you can do it 24/7, that does away with forecasting."

Bank Executive

Geographic and Corridor Dynamics

Some participants highlighted important geographic nuances in cross-border tokenised money adoption.

The value proposition might differ across market corridors and depend on various factors, including underlying infrastructure gaps and demand for stable payment instruments.

Table 5: Cross-Border Use Case Priority by Corridor Type

Corridor Type	Adoption Potential	Key Drivers
Advanced > Emerging Markets	Medium/High	Correspondent banking gaps
Emerging > Advanced Markets	High	Access to stable currencies
Advanced > Advanced Markets	Low/Medium	Existing infrastructure already efficient
Emerging > Emerging	High	Limited infrastructure overlap, often requires USD intermediation

Quote Box: Corridor Specificity

"There's an opportunity to use these things for flows from Nigeria to the US. I don't think that stacks up from the US to Nigeria, and I don't think that stacks up from the UK to the US."

Infrastructure Provider Executive

Implementation Models and Strategic Approaches

When it comes to implementation strategies, participants described various strategies reflecting their risk tolerances and market positions. Some institutions pursue phased geographic rollouts, starting with specific corridors before expanding globally. Others focus on particular client segments or transaction types to build expertise and demonstrate value.

The infrastructure approaches vary significantly (explored further in the next chapter), broadly summarised as:

- **Closed Networks**: Initial deployment within existing customer bases (similar to the early J.P. Morgan Coin approach);
- **Consortium Models**: Collaboration with other financial institutions (such as Project Agorá involving multiple central banks and commercial banks);
- **Open Network Integration**: Building on public blockchain infrastructure (current stablecoin implementations such as Circle USDC);
- **Hybrid or Public Permissioned Approaches**: Combining private and public infrastructure elements (emerging tokenised deposit approaches requiring multi-bank connectivity, such as RSN, or controlled pilots, such as UBS tokenised MMF on Ethereum under Project Guardian).

Despite these variations, all participants emphasised the ultimate need for cross-system compatibility and collaboration.

Quote Box: Need for Collaboration and Compatibility

"Our clients are always multi-banked and they want to manage the flow of money across banks instantly and 24/7."

Bank Executive

Quote Box: Need for Collaboration and Compatibility

"Crypto needs banks more than banks need crypto... what is emerging is a convergence trend in innovation versus a disruptive one."

Fintech Executive

2.2.2. Treasury and Liquidity Management

The Institutional and Yield Imperative

Treasury and liquidity management emerged as the second most important use case, particularly for institutional clients requiring sophisticated cash management capabilities. This application addresses fundamental requirements for both immediate liquidity movement using stablecoins for just-in-time money transfer, and yield-bearing tokenised MMFs when money is at rest, integrating seamlessly with existing treasury systems while providing operational benefits of tokenised infrastructure.

An important finding across multiple interviews is that institutional clients may be reluctant to accept non-yielding tokenised money for treasury purposes. This yield requirement may fundamentally shape the tokenised money landscape for institutional applications.

Quote Box: Yield Requirements

"Our clients are not going to give up the yield on their extra balances... not going to be very happy [about] holding stocks of stablecoins."

Bank Executive

The yield requirement creates a natural progression from basic digital cash management to more sophisticated products. However, in most jurisdictions, yield-bearing stablecoins are prohibited by regulation. This points to the need for dynamic swapping between stablecoins and tokenised MMFs, while tokenised deposits can be yield-bearing but are currently only available within single bank or bank consortium networks, e.g. Partior.

Operational Integration and Automation

Treasury management applications benefit significantly from automated capabilities enabled by DLT. This is particularly valuable for complex treasury operations involving multiple counterparties and jurisdictions. Interview participants described implementations that incorporate sophisticated "if-then" logic beyond basic cash sweeping, automating complex processes while ensuring payment accuracy, controls and transparency and reducing manual reconciliation work:

- **Automated Cash Management**: Real-time movement of excess funds to yield-generating accounts with programmable logic;
- **On-Chain FX and Dynamic Hedging**: Automatic foreign exchange and hedging based on predetermined rules;
- **Liquidity Optimisation**: Intelligent allocation of funds across multiple accounts and currencies;
- **Compliance Automation**: Automated regulatory reporting, monitoring and supervision, audit trail maintenance.

Quote Box: Operational Transformation

"We use smart contracts to program the designated beneficiary of grant money... this actually helps to streamline a lot of their reporting and reconciliation work."

Bank Executive

Beyond basic cash management, tokenised money enables sophisticated treasury applications that were previously difficult or impossible to implement. Participants described capabilities including "straight through processing programmability" and "encumbrance of value" that can "reduce pre-funding on a wholesale basis."

These capabilities enable new forms of embedded finance where treasury functions become integrated into broader business processes:

- **Supply Chain Integration**: Automatic payments triggered by delivery confirmation;
- **Working Capital Optimisation**: Dynamic financing based on real-time cash flow analysis;
- **Multi-Party Coordination**: Complex transactions involving multiple counterparties;
- **Real-Time Risk Management**: Instant adjustment of exposures based on market conditions.

Multi-Bank Integration Requirements

A significant challenge in treasury management applications is the multi-bank reality of large corporates. Most institutional clients maintain relationships with multiple banks for risk diversification and service optimisation, requiring solutions that can work across different banking relationships. This challenge is specific to tokenised deposits and drives the need for platforms such as RLN, Partior, and Project Agorá described in detail in chapter 3 of this report.

In so doing, it increases technical complexity as treasury systems must integrate with multiple platforms while maintaining unified reporting and control capabilities. Participants noted that successful solutions must bridge traditional and tokenised systems rather than requiring complete replacement of existing infrastructure.

Risk Management and Operational Considerations

Treasury applications of tokenised money raise important risk management questions. The automated nature of these systems creates new categories of operational risks that must be carefully managed while maintaining the efficiency benefits that drive adoption.

Participants emphasised the importance of maintaining traditional risk management frameworks while adapting them to tokenised environments. This includes maintaining human oversight capabilities even in highly automated systems, reflecting the need to balance automation with control.

2.2.3. Trade Finance Digitisation

Historical Context and New Opportunities

Trade finance digitisation has long been a goal of the financial services industry, with previous initiatives achieving limited success due to coordination and business model challenges and lack of integrated payment infrastructure. Tokenised money creates new possibilities by providing the payment rails necessary to support digitised trade documents and processes.

One of the insights from the interviews is that trade finance digitisation is expected to be client-driven rather than institution-led, with businesses demanding more efficient processes driving bank participation.

Quote Box: Finance Digitisation Future

"I think it's going to come from the clients... the money is going to be digitalised, and the payment is going to be much more efficient on chain. So, the trade is going to come on-chain."

Bank Executive

Electronic Trade Documents and MLETR

The foundation for tokenised trade finance lies in the implementation of electronic trade documents, particularly complying with instruments such as the UNCITRAL MLETR (Model Law on Electronic Transferable Records). This enables bills of lading, invoices, and other trade documents to be represented digitally and transferred securely.

However, integration with payment systems is crucial. While some approaches use document scanning and storage systems, these create limitations because proper settlement linkage requires both documents and payment instruments to live on the same technical infrastructure.

Quote Box: Integration Requirements

"The invoices and the bill of lading... can be exchanged and managed more easily and now can be paid through those corridors without having the risk of... delivery versus payment."

Bank Executive

Delivery vs. Payment (DvP) Benefits

One of the most significant advantages of tokenised trade finance is the elimination of delivery versus payment risk. When both trade documents and payment instruments are tokenised on the same infrastructure, settlement can be atomic, ensuring that payment only occurs when documents are transferred.

This capability addresses a fundamental friction in international trade where the timing mismatch between delivery and payment creates risk for both buyers and sellers, while enabling faster integration of trade finance with cash flows and accelerating financing processes.

Implementation Challenges and Human Factors

Despite the potential benefits, trade finance digitisation faces significant challenges. The complexity stems from the need to integrate multiple jurisdictions while coordinating numerous stakeholders. Additionally, there are questions about the extent to which trade finance processes can be fully automated, given the importance of legal interpretation and human judgement in complex commercial transactions.

Quote Box: Automation Limits

"The friction is really the human interpretation of legal text... the legal interpretation and the voluntary subtlety of the wording sometimes is intended to be under interpretation."

Bank Executive

Standards-Based Evolution

Insights from the interviews suggest that successful trade finance digitisation may follow an open standards approach rather than proprietary platform models. This implies that industry-wide standards for tokenised trade documents and payments will be essential for scaling adoption, rather than closed consortium approaches that have characterised previous digitisation efforts.

Quote Box: Open-Source Solutions

"It's always the solution... based on standard open-source standard... that does win the game."

Bank Executive

2.2.4. Capital Markets Infrastructure

Tokenised Assets and Settlement Infrastructure

The tokenisation of capital markets represents a transformational long-term use case for tokenised money. While current activity is scaling up but still limited as a proportion of total volume and value, it has the potential to fundamentally reshape how securities, bonds and other financial instruments are issued, traded and settled.

Table 6: Capital Markets Tokenisation Progression

Asset Class	Current Status	Tokenised Money Integration
Money Market Funds	In production *Examples: BlackRock BUIDL, Franklin Templeton FOBXX*	Direct tokenisation
Government Bonds	Experimental *Examples: Hong Kong Government tokenised green bond issued on HSBC Orion network; European Investment Bank 2-year bond on Ethereum and Project Venus on Goldman Sachs digital asset platform*	Collateral applications
Corporate Bonds	Limited issuance *Examples: UBS bond on SIX Digital Exchange, Société Générale bond on Ethereum using CAST*	DvP settlement
Equities	Early stage *Examples: NASDAQ engagement with the SEC regarding blockchain-based listing and trading; Robinhood plans to offer tokenised or synthetic representations of US-listed equities in Europe*	Future integration

The vision involves an integrated ecosystem where tokenised money serves as the settlement asset for tokenised securities and other assets, enabling atomic settlement that eliminates counterparty risk and reduces settlement times from days to seconds.

A specific area of innovation is in repo markets where tokenised money and tokenised securities can interact seamlessly. Participants described scenarios where treasurers with tokenised cash purchase tokenised bonds and tokenised MMFs for yield optimisation, then use those securities as collateral for instant repo transactions when dynamic liquidity is needed for varying timescales.

This creates a virtuous cycle where tokenised money drives demand for tokenised securities and vice versa, potentially accelerating adoption across both asset classes.

Quote Box: Market Integration

"Those repo in order to be efficient... will have to have your stock of bonds... in tokenised form so that will create another layer of demand for tokenised bonds."

Bank Executive

Market Structure and Systemic Stability

The capital markets use case presents risks related to market structure and systemic stability. Participants noted that widespread adoption of stablecoins could impact government debt markets, by affecting short-term debt dynamics and market volatility. The concern is also that proliferation of different tokenised money forms could create fragmentation that undermines the fungibility essential for efficient capital markets operation. Some central banks in particular have expressed concerns that financial stability could be impacted if stablecoins grow to play a major role as a wholesale settlement asset (see chapter 4 of this report).

2.3. Cross-Cutting Themes and Patterns

Use Case Prioritisation across Sectors and Near-Term Value

Cross-border payments achieved unanimous recognition as the primary use case, while treasury management ranked consistently high across all organisation types. Trade finance showed lower immediate priority but high long-term potential, while views on the potential of capital markets applications varied significantly by organisation type.

Table 7: Expected Value Realisation Timeline (2-Year Horizon)

Organisation Type	Average Expected Value (1-10)	Range
Banks	6.3	3-8
Infrastructure Providers	6.5	5-8
Fintechs and Challengers	10	10

Fintech companies show the highest expectations of near-term value realisation, reflecting their focus on tokenised money as core business functionality. Banks and infrastructure providers show more conservative expectations, likely reflecting longer implementation cycles and regulatory considerations.

Regulatory Box: Major Use Cases and Expectations for Growth

To contrast with the views of the industry, we have gathered regulators' perspectives on current and future use cases for tokenised money (primarily stablecoins). The responses reflect individual views rather than institutional positions, and the limited sample size means these findings should be considered indicative of regulatory sentiment rather than definitive conclusions.

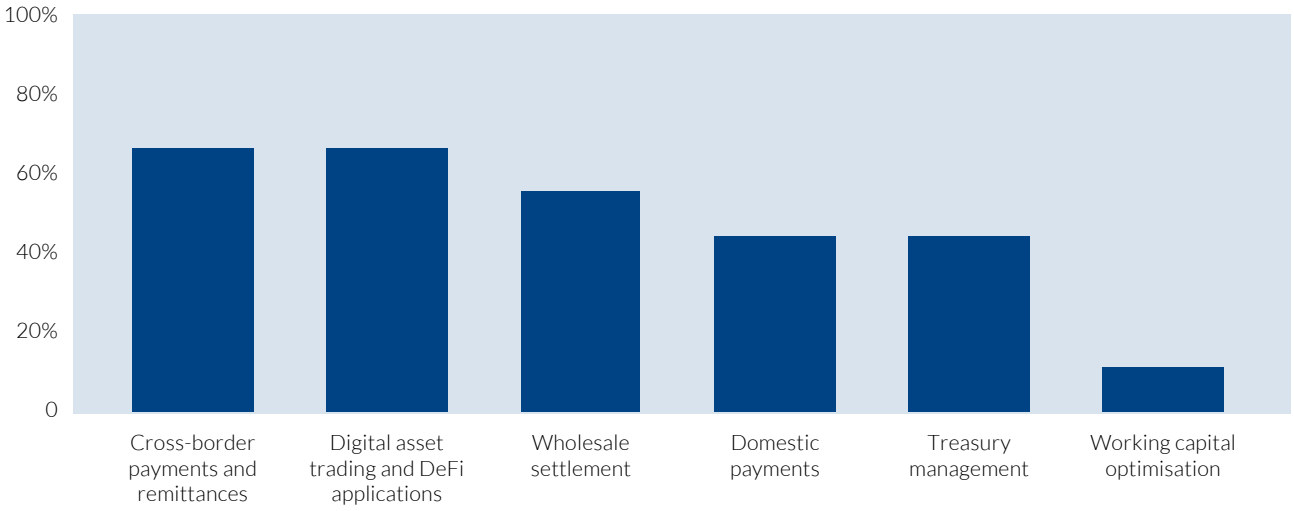
Current Use Case Recognition

Regulators (nine interview responses) identified the following primary use cases for stablecoins in their jurisdictions (respondents could choose more than one response):

- Cross-border payments and remittances
- Digital asset trading and DeFi applications
- Wholesale settlement

This aligns with the industry priorities identified in our interviews, particularly the emphasis on cross-border payments applications.

Figure 3: Primary Use Cases



The table below outlines respondents' expectations for the growth and expansion of stablecoin use cases over the next 2 to 5 years.

Table 8: Regulatory Expectations for Stablecoin Growth (2-5 Year Horizon)

Metric	Score	Range	Interpretation
Expected Growth	3.9/5	3-5	Widespread expectation of continued expansion

Scale: 1 (limited take-up) to 5 (significant growth, potentially surpassing other private digital money forms)

The consistently high growth expectations (average 3.9/5) suggest that regulators anticipate continued expansion of stablecoin use cases, which may influence future policy development and regulatory frameworks.

Common Implementation Barriers

There are four main barriers to the adoption and expansion of use cases of tokenised money, according to interviewees:

- **Regulatory Uncertainty**: Despite recent progress in a number of jurisdictions (see chapter 4), the uncertainty about the regulatory obligations that apply to different instruments and use cases present a significant challenge. Interview participants reported confusion about their responsibilities when operating with DLT, with unclear frameworks for risk allocation and compliance requirements. The complexity is compounded by the need to operate across multiple jurisdictions with different regulatory approaches to tokenised money, creating compliance challenges for global financial institutions.

- **Privacy Concerns**: Privacy has emerged as a critical barrier to mainstream tokenised money adoption across multiple use cases. Public ledger transparency creates concerns for institutional users who require confidentiality in their financial transactions. The challenge is particularly acute given the power of modern analytics to identify transaction patterns and participants, creating concerns about commercial confidentiality and competitive intelligence.

- **Challenges in Complying with AML/CTF Requirements:** For institutional adoption of public ledgers, there are specific challenges around implementing AML/CTF requirements efficiently, particularly the need to complete these processes only once across multiple institutions, while also strictly avoiding any interaction with sanctioned entities.

- **Interoperability and Integration Challenges:** A practical challenge across all use cases is the need to integrate tokenised money systems with existing financial infrastructure (potentially a transitional challenge) and create a standardised infrastructure across systems (a short and a long-term technical challenge). Interview participants noted that successful implementations must bridge traditional and tokenised systems rather than requiring complete replacement of existing processes. This integration challenge affects everything from accounting systems to regulatory reporting, requiring careful planning and significant technical investment. This also implies a lengthy period of coexistence between traditional and digital infrastructures which is a cost the industry will need to bear as part of its transition to tokenised markets.

Conclusion

The findings set out in this chapter suggest that successful tokenised money implementation is following a gradual evolution pattern, starting with basic payment applications and expanding to more complex use cases as infrastructure and regulatory frameworks mature.

The use case landscape is characterised by clear near-term applications in cross-border payments and treasury management, with significant long-term potential in trade finance and capital markets.

Success factors include regulatory clarity, client demand, and the ability to integrate with existing business processes while providing clear operational benefits. The variation in implementation approaches across different organisation types suggests that the tokenised money ecosystem will continue to evolve through multiple parallel paths, rather than converging on a single model.

Realising the full potential of tokenised money will require continued progress on infrastructure development, regulatory frameworks and industry standardisation efforts, as discussed in the next chapters of this report.

Chapter 3

Interoperability and Programmability

The successful scaling and adoption of tokenised money depends critically on technical considerations and infrastructure. While tokenised money functionality is increasingly well understood, the infrastructure requirements for seamless integration across different ledgers – namely the interoperability capabilities – remain less so and represent a persistent challenge.

Programmability, though not essential for scaling, plays an important catalytic and enabling role in developing advanced financial applications and unlocking additional value.

This chapter examines the technical architecture decisions, implementation approaches, and emerging standards that will determine whether tokenised money can achieve the scale and functionality necessary to transform global financial infrastructure.

3.1. Interoperability: The Foundation for Scale

Interoperability refers to the ability of different DLT networks, traditional financial systems, and regulatory frameworks to seamlessly exchange and recognise tokenised value without requiring complex conversion processes or manual intervention. This enables tokens issued on one platform to be transferred, accepted and utilised across multiple systems and jurisdictions, creating an ecosystem with minimal friction for tokenised money flow.

A standardised, interoperable infrastructure consistently ranked as a critical requirement for tokenised money adoption across all interviews, with participants rating its importance at an average of 8.9/10. Yet the approaches to achieving interoperability reveal fundamental differences in both technical design and implementation strategies.

Quote Box: Interoperability as Outcome

"Interoperability is an outcome—it doesn't mean the same tech stack, but outcome equivalence."

Bank Executive

Table 9: Interoperability Importance by Organisation Type

Organisation Type	Average Priority	Range	Key Characteristics
Banks	7.1	3-10	Multi-bank client requirements drive need for seamless cross-institution connectivity
Infrastructure Providers	9.7	9-10	Business models depend on achieving network effects across multiple participants
Fintechs and Challengers	10	10	Market access and scale require integration with existing financial infrastructure

The consistently high ratings reflect a shared understanding that fragmented, uninteroperable tokenised money will fail to achieve network effects.

Quote Box: Scale Requirements

"If you want scale, you have to have that. You're just not going to be able to do things at scale... If all you end up doing is building 100 new walled gardens, then you have the same kind of fragmentation."

Infrastructure Provider Executive

3.1.1. Five Key Challenges

Despite widespread agreement on the importance of interoperability, multiple challenges must be overcome to achieve it at systemic scale, including:

- **Cross-border efficiency**: While finance operates globally, payment infrastructures remain nationally anchored, leaving international transfers frequently slow, costly, and vulnerable to settlement risk. Correspondent banking creates delays and multiple points of failure that tokenised money could eliminate.
- **Cross-platform connectivity**: The proliferation of ledgers, protocols and closed networks risks reproducing old frictions on new technological foundations. Without standardised interfaces and protocols, each new platform becomes another silo requiring bespoke integration.
- **Cross-asset connectivity**: Tokenised money encompasses multiple forms, including CBDCs, tokenised deposits and regulated stablecoins, all of which must be interchangeable. Without this connectivity, value becomes trapped within technological or institutional boundaries, undermining fungibility.
- **Regulatory alignment**: Even robust technical solutions cannot graduate from pilots without clear legal frameworks. Cross-border interoperability requires coordination between different regulatory regimes and common standards for compliance, identity and dispute resolution.
- **Governance coordination**: Multi-actor infrastructures require credible arrangements for decision-making, liability allocation and risk-sharing. Whether through public sector coordination, private consortium agreements, or hybrid models, governance determines both functionality and accessibility.

Cross-asset connectivity has been identified as a critical concern by many interviewees, highlighting the importance of maintaining "singleness of money" or "monetary interchangeability" in a tokenised environment.

Quote Box: Asset Fragmentation Risk

"Could it be a case that eventually you and I will be holding on to $100 but it is made out of 10 different tokens, all at different values? So, I think that's certainly not the kind of payment experience that we all would like to have."

Bank Executive

Quote Box: Asset Fragmentation Risk

"We don't want a million flavours of tokenised money and branded money; the end user wants settlement to take place as fast and as safely as possible."

Fintech Executive

Cross-platform connectivity or network interoperability was another shared concern among interview participants. It encompasses connectivity across DLT networks and legacy systems, cross-border settlement capabilities that eliminate correspondent banking delays, and standardised interfaces and protocols that enable seamless integration. The severity of this challenge has intensified with the proliferation of Layer 1 and Layer 2 blockchain networks, as illustrated for example in recent announcements by market participants such as Swift, Stripe, Circle and Robinhood launching their own blockchain initiatives.

Interview participants highlighted problems of walled gardens and general fragmentation, resulting in limited genuine transformation of financial infrastructure. While most participants view interoperability challenges as problems requiring collaborative solutions, others see them as business opportunities, offering proprietary services that monetise the fragmentation, indicating divergent approaches to addressing the same underlying problem.

Quote Box: Current State of Network Interoperability

"We did a simple comparison – You don't actually reduce intermediaries when using stablecoins. There's actually no change in market structure."

Bank Executive

Quote Box: Current State of Network Interoperability

"I'm optimistic that we don't have interoperability, because that allows me to be between things that don't interoperate and charge a fee."

Bank Executive

3.1.2. Implementation Approaches

Market participants are developing diverse implementation strategies to address cross-platform connectivity issues. These approaches reflect fundamental differences in the way tokenised money networks should be structured, governed and scaled, with each model presenting distinct advantages and limitations.

One of the fundamental dividing lines is between consortium-based and open network models:

- **Consortium-Based Models** operate as controlled environments where a defined group of institutions jointly govern and participate in shared infrastructure. These models tend to prioritise regulatory compliance, risk management, and institutional control. Participation is typically limited to vetted financial institutions, with governance exercised through formal agreements and voting structures. Examples of such projects include Partior, RLN/RSN and Project Agorá.
- **Open Network Models** leverage public blockchain infrastructure to enable broader participation and maximum interoperability. These models prioritise network effects, global accessibility and programmable composability. While participation is theoretically open, practical barriers around compliance, technical integration and risk management often limit institutional adoption. Examples of such projects include public-blockchain-based stablecoins, cross-chain bridges and DeFi integrations.

Quote Box: Consortium Scepticism

"I don't believe in this infrastructure [consortium-led infrastructure project] because they are constructed as a consortium with a lot of people trying to align themselves... the coordination costs of those groups are killing the benefit."

Bank Executive

The trade-off between openness and privacy presents another challenge. Achieving maximum interoperability often requires transparency and standardisation that may conflict with institutional user privacy requirements and AML/CFT compliance that benefits from transparency but demands controlled access to transaction data:

- **Privacy** is necessary for safeguarding client information, maintaining competitive advantages, and complying with data protection regulations. Traditional financial systems achieve privacy through closed networks and bilateral relationships that limit information sharing.
- **Openness** is related to transparent standards, open protocols, and shared data formats that enable different systems to communicate effectively. Public blockchains offer maximum interoperability because they provide universal access, standardised interfaces, and transparent settlement mechanisms.
- **Regulatory compliance** requires controlled transparency, where AML/CFT obligations demand access to transaction data for authorised parties while maintaining restrictions on disclosure, creating complexity in system design.

The development of privacy-preserving technologies, including zero-knowledge proofs and trusted execution environments, represents a potential solution to overcome this trade-off. Zero-knowledge proofs enable verification of information without revealing the underlying data, while trusted execution environments create secure processing areas that protect sensitive data during computation. However, these technologies remain in relatively early stages of commercial deployment due to computational complexity, scalability challenges and the need for industry-wide standardisation across networks and jurisdictions.

Quote Box: Privacy Solutions

"Zero-knowledge proof is probably the most likely solution to the privacy problem... Trusted execution environments involve encrypted data processed only within secure environments."

Infrastructure Provider Executive

Beyond governance and openness models, four distinct technical implementation approaches are emerging, each with distinct trade-offs between functionality, complexity and risks:

- **Multi-Chain Deployment** involves deploying identical tokenised money across multiple blockchain networks, maintaining consistency while enabling access across different infrastructure platforms. This approach ensures compatibility but requires coordinated management across networks. Examples include Circle's USDC natively deployed across 30 blockchain networks.[22]
- **Bridge Technologies** employ cross-chain protocols that enable movement of tokenised money between different blockchain networks. While these expand connectivity, they introduce additional complexity, security risks and potential points of failure at bridge interfaces. Infrastructure providers such as Axelar, Wormhole, and LayerZero are developing the technology stack to enable this approach.
- **API Standardisation** focuses on creating common interfaces that allow different networks to interact, regardless of underlying technical implementation. This approach prioritises interoperability through messaging standards rather than technological convergence. Some examples include Visa,[23] Mastercard[24] and Finzly[25] projects.
- **Correspondent Banking Models** recreate traditional correspondent banking relationships in tokenised form, enabling interbank transfers while maintaining separate systems. This familiar model reduces adoption friction but may limit efficiency gains. The BIS-led Project Agorá exemplifies this approach.[26]

Quote Box: Technical Solutions

"Our open-source framework brings account representation and back-office interoperability on-chain to recreate correspondent banking.

Bank Executive

3.1.3. Overview of Major Initiatives

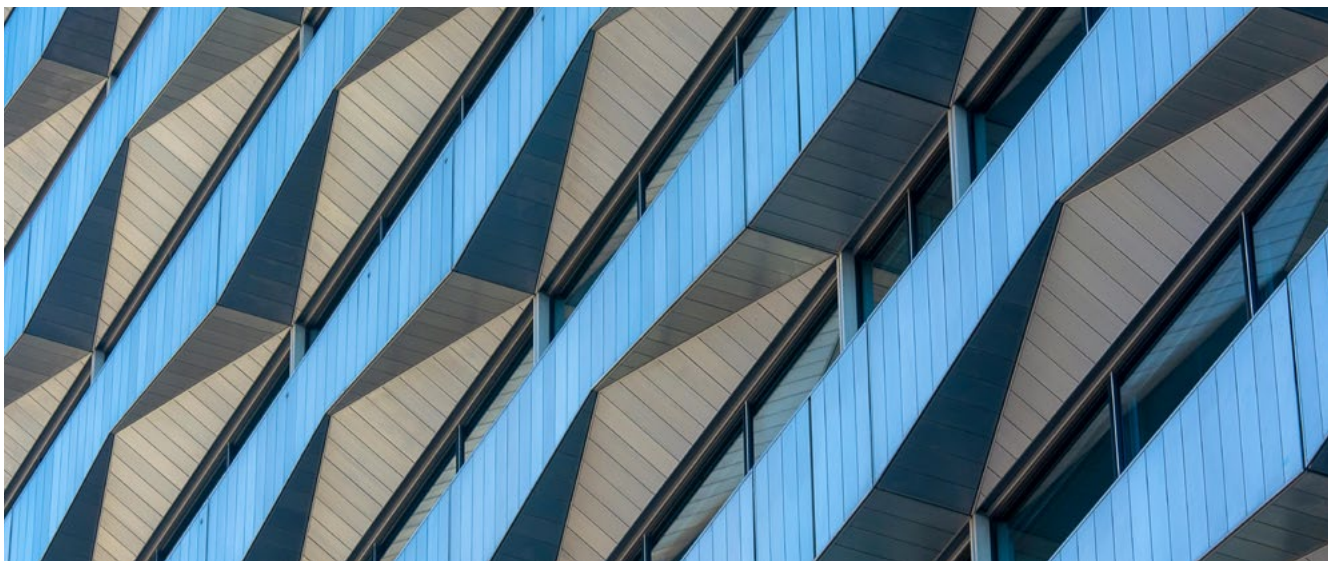
Major initiatives under development provide evidence for different approaches to interoperability in regulated environments.

Partior operates a live permissioned DLT platform for cross-border multi-currency clearing and settlement. Drawing on learnings from the Monetary Authority of Singapore (MAS)-led Project Ubin and founded by DBS, J.P. Morgan, Standard Chartered and Temasek, it enables FX Payment versus Payment (PvP) and Delivery versus Payment (DvP) settlement. The platform is operational with USD, EUR, and SGD, achieving atomic settlement and sharply reducing counterparty risk. However, coverage remains limited to consortium members and select currency pairs.

Project Guardian, led by the MAS, explores how tokenised real-world assets and traditional/DeFi infrastructures can be connected securely via open, interoperable networks. Across multiple proofs of concept and pilots, Guardian-related industry initiatives have trialled cross-network interoperability approaches using protocols such as Chainlink CCIP and bridge/messaging solutions including Axelar and LayerZero to demonstrate transfers and settlement across heterogeneous ledgers, with an emphasis on regulatory compliance and vendor neutrality.

The Regulated Settlement Network (RSN) builds on earlier Regulated Liability Network (RLN) initiatives and involves a consortium of institutions, including Citi, the NY Fed Innovation Center and Swift. It creates a shared ledger environment where regulated liabilities and tokenised assets can settle in real time across multiple entities. The December 2024 RSN proof-of-concept demonstrated 24/7 settlement capabilities in a controlled environment, though questions remain about broader ecosystem integration and cross-border scaling. In parallel, RLN in the UK, under the auspices of UK Finance, demonstrated a number of retail and wholesale use cases as part of its "Experimentation Phase" and has recently announced a next "Live Pilot" phase.

Project Agorá is a joint initiative led by the BIS Innovation Hub with seven central banks and over forty private financial institutions. It explores the feasibility of a unified programmable ledger combining wholesale CBDCs and tokenised commercial bank deposits with atomic settlement and integrated compliance. The project emphasises cross-border coordination and regulatory harmonisation while avoiding fragmentation as the platform scales.



The table below compares the four initiatives, providing insights into the different viable pathways toward systemic integration.

Table 10: Comparison of Major Interoperability Initiatives

	Partior	Project Guardian	RLN/RSN	Project Agorá
Problem(s) Addressed	Limited FX PvP coverage; High settlement risk for cross-currency trades.	Fragmentation between DeFi/CeFi/RWA platforms.	Siloed legacy systems; No unified settlement ledger.	Combining tokenised deposits and wholesale central bank money on a programmable platform.
Key participants	DBS, J.P. Morgan, Standard Chartered, and Temasek, later joined by other institutions, including Deutsche Bank.	MAS with more than 40 participants, including ADDX, Ant Group, Citi, DBS, Fidelity, J.P. Morgan, SBI Group, Standard Chartered, UBS.	NY Fed Innovation Center, Swift, UK Finance, major private sector banks and card networks.	BIS Innovation Hub with seven central banks and private sector banks.
Technical Solution	Permissioned DLT infrastructure enabling real-time PvP through coordinated settlement logic.	Cross-chain bridges and other implementations enabling interoperable asset transfers.	Shared permissioned ledger with institutional partitions.	Shared programmable platform unifying CB and commercial money; Atomic operations with compliance screening.
Current Status	Live production with USD/EUR/SGD	Active pilots transitioning to applications	Advanced experimentation phase	Development and experimentation stage
Challenges	Restricted to member banks; EMDE currency coverage; integration with legacy FX rails.	Security and trust in bridges, standardisation across chains, regulatory challenges for RWA movement.	Legal harmonisation required, governance complexity for large-scale rollout.	Governance and access design; avoiding fragmentation as system scales.

3.2. Programmability: Enabling Financial Innovation

Programmability denotes the ability to embed executable logic, for example, conditions, rules, rights, and constraints, directly into instruments, as well as the mechanisms governing them. Operationally, programmability shifts finance from ex-post record-keeping to ex-ante execution, where outcomes are determined and verifiable when an instruction is sent.

The concept extends beyond smart contracts to encompass money (CBDCs, tokenised deposits, stablecoins), financial instruments (bonds, equities, derivatives, etc.), market infrastructures (custody, clearing, settlement), compliance systems (AML/CFT, transaction monitoring, embedded supervision) and governance mechanisms (voting rights, access control).

3.2.1 Implementation Levels and Financial Applications

Programmability in tokenised money exists on a spectrum from basic automation to sophisticated smart contract applications with different levels of implementation maturity across organisations.

Table 11: Programmability Implementation Levels

Level	Description	Current Adoption	Examples
Basic	Simple conditional transfers	High	Scheduled payments, basic escrow, DvP
Intermediate	Multi-party automation	Medium	Trade finance, margin calls
Advanced	Complex financial products	Low	Parametric insurance, automated lifecycle
Autonomous	AI-driven transactions	Experimental	Agentic commerce, predictive treasury

Several participants interviewed agree on the uneven impact across financial industry segments. For instance, capital markets and complex B2B solutions benefit more than retail payments:

Quote Box: Domain-Specific Value

"The ability to bundle together a complex set of transactions... so it all either succeeds, or it all fails has a lot of appeal in the capital market space. It's less obvious to see how that would apply in the individual retail space."

Infrastructure Provider Executive

Programmability enables various ecosystem players to activate operational and control capabilities across different layers of financial infrastructure:

- **Settlement and Clearing Capabilities** include 24/7/365 settlement eliminating daily cut-offs that trap liquidity, atomic DvP/PvP finality where securities and cash move in indivisible transactions eliminating principal and Herstatt risk, real-time liquidity netting that frees collateral otherwise left idle in batch processes, and peer-to-peer cash settlement reducing correspondent banking delays and fees.
- **Risk Management Capabilities** encompass continuous margin management through smart contracts that recalculate exposure in real time, tokenised collateral mobility enabling instant re-pricing and movement on-chain, automated collateral substitution where smart contracts swap downgraded assets for eligible alternatives, and dynamic risk monitoring with real-time position tracking and automated limit enforcement.
- **Compliance and Regulatory Capabilities** involve automated sanctions enforcement through transfer logic that screens and blocks sanctioned parties instantly, real-time compliance checks where AML and regulatory tests execute at transaction time, continuous regulatory visibility providing supervisors with live permissioned ledger data, and protocol-level tax withholding with automated calculations and remittances integrated into payment flows.
- **Governance and Access Control** features include on-chain governance automation where proposals, voting and execution run on smart contracts with immutable records, dynamic access control enabling role grants or revocations within seconds, automated treasury disbursement releasing funds when milestones are met, and multi-party payment coordination splitting proceeds across beneficiaries instantly.

Interviews revealed several programmability application examples already in development or deployed. These include:

- **Government Grant Management**: Smart contracts that program designated beneficiaries for government subsidies, ensuring 100% payment accuracy and transparency while streamlining reporting and reconciliation.
- **Trade Finance Automation**: Multi-signature wallets where buyers and sellers each hold keys but cannot move funds until goods are delivered satisfactorily, potentially eliminating the need for traditional trade finance intermediaries.
- **Margin Call Automation**: Smart contracts that eliminate human intervention in margin calls, preventing the systemic risk that occurs when institutions delay liquidations during market stress.
- **Treasury and Cash Management**: Programmability enables automated sweeps, conditional payments, and just-in-time liquidity optimisation, shifting operations from probabilistic forecasting to deterministic execution.

Quote Box: Automation Benefits

"Because you trust the execution, it enables much easier multiparty automation. Previously automation was usually within an organisation because you need to trust the data and processing yourself. With smart contracts, you know it will always execute faithfully."

Infrastructure Provider Executive

3.2.2 Overview of Major Initiatives

Beyond the application examples mentioned above there are multiple programmability exploration projects:

Kinexys by J.P. Morgan (Programmable Payments Platform)

Kinexys demonstrates how programmability can be embedded directly into commercial banking infrastructure. Originally built as a blockchain-based deposit account system, it enables clients to define executable instructions (for instance, dynamic funding rules, conditional payment releases, and automated sweeps) processed within J.P. Morgan's regulated environment.

The platform enables "bank-side programmability" where treasury operations shift from probabilistic forecasting to just-in-time execution. For example, balances can be swept automatically at end-of-day, or margin calls can be met instantly through real-time transfers between accounts. This delivers continuous liquidity optimisation, reduced operational friction and enhanced resilience against payment failures.

In June 2025, J.P. Morgan announced a permissioned USD deposit token ("JPMD") proof-of-concept on Base, Coinbase's Ethereum Layer 2 network.[27] While this demonstrates progress toward broader interoperability, the utility of JPMD remains primarily limited to transactions between J.P. Morgan institutional clients, and Base's current centralised structure introduces standard Layer 2 trust and censorship concerns. Other remaining challenges regard client-deployed logic control, external system integrations and oracle-based data management requirements.

Broadridge DLR (Distributed Ledger Repo)

Broadridge's Distributed Ledger Repo platform demonstrates programmability in intraday repo operations. Through integration of lifecycle events, e.g. allocation, collateral replacement and repurchase, directly into smart contracts, repos execute simultaneously across distributed ledger infrastructure.

The platform processed an average of US$384 billion in daily volumes as of December 2025 (approximately US$9 trillion monthly),[28] demonstrating scalability while reducing settlement failures, enabling same-day funding, and providing enhanced transparency across participants. Programmability shortens margin cycles and reduces coordination costs among clearing members, custodians and dealers.

Key challenges reflect broader DLT-based repo market constraints, including customer hesitancy around integration with legacy systems, regulatory uncertainty, legal documentation and organisational alignment.

BlackRock BUIDL (via Securitize)

BlackRock's BUIDL represents a programmable tokenised money market fund launched on the Securitize platform. As an ERC-20 token with built-in transfer controls, BUIDL aims to enable real-time settlement among whitelisted participants and collateral use on select platforms, with transparent on-chain ownership tracking.

The fund operates through a hybrid on-chain/off-chain architecture. While token transfers and ownership tracking occur on-chain, many operational elements, including KYC/AML compliance verification, are managed off-chain. The programmable token structure creates opportunities for automated treasury solutions, such as using tokenised MMF shares as real-time lending collateral or settlement assets.

Current limitations include whitelisting requirements that restrict liquidity, high minimum investment thresholds and custodial integration complexity.

3.2.3 Risks and Challenges

Despite potential benefits of programmability, there are important risks and challenges that require attentive consideration, including:

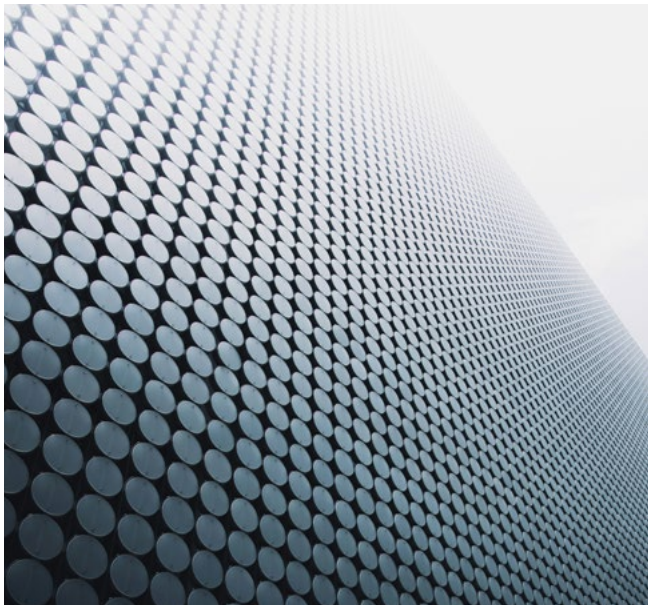
- **Code vulnerabilities**: bugs or flaws in smart contracts may freeze or compromise assets. Upgrades are complex in distributed settings, making operational risk higher as programmability grows more sophisticated.
- **Oracle and data dependency**: programmable systems rely on external data (prices, events, documents). Oracle integrity is a critical vulnerability, as corrupted or manipulated feeds can trigger incorrect execution.
- **Legal enforceability**: it is still unknown whether self-executing contracts are enforceable across jurisdictions, whether they are open to being renegotiated, and to what degree finality is decided and identified should a dispute materialise.
- **Operational resilience**: incident response, roll-back plans and version compatibility are crucial. Programmable infrastructures are prone to systemic fragility without proper governance of upgrade and contingency planning.
- **Systemic interdependencies**: interconnected smart contracts and cross-chain bridges may propagate local shocks across systems, growing failures or attacks into systemwide events.
- **Fragmenting standards**: proprietary proliferation of language, token models, and protocols for messaging decrease interoperability, create lock-in risks and undermine efficiency gains.

The above list is not exhaustive and a number of other significant barriers limit programmability adoption, particularly around dispute resolution and liability management. A tension between automation and human oversight creates design challenges for programmable systems. Users may expect automated efficiency but also demand recourse when systems fail or produce unexpected results. Resolving this challenge requires embedding governance mechanisms, appeal processes and liability frameworks into programmable architectures.

Quote Box: Code is Law Problems

"Nobody actually turns out to be happy with the code is law approach to the world. People want a right to appeal. They want to be able to talk to a human... The complicated part is dispute resolution and liability management."

Infrastructure Provider Executive



3.3. Design Implications and Outlook

3.3.1. Infrastructure Architecture Trade-offs

Interoperability and programmability capabilities are both constrained and enabled by the choice of infrastructure architecture. There are three different architecture types: public, private and hybrid (often called public permissioned). The table below presents their features and assesses them against seven key criteria.

Table 12: Infrastructure Architecture Comparison

	Public Permissionless Blockchain	Private Blockchain	Hybrid (Public Permissioned) Model	Key Considerations
Programmability	High – Full smart contract capabilities, composable ecosystem	Medium – Controlled programmability within consortium rules	High – Combines public flexibility with private compliance	Public chains offer maximum flexibility; hybrid enables selective exposure
Interoperability	High – Universal standards, maximum network effects	Medium – Limited to consortium members, bilateral agreements required	Medium-High – Strategic connectivity between layers	Public maximises connections; hybrid optimises trade-offs
Regulatory Compliance	Challenging – Uncertain liability, complex KYC/AML requirements[29]	Easier – Clear governance frameworks, regulatory oversight	Balanced – Compliance by design with selective exposure	Private provides certainty; hybrid manages risk exposure
Network Effects	High – Global participation, viral adoption potential	Limited – Restricted membership, slower growth	Medium-High – Private efficiency with public benefits	Network value increases exponentially with participants
Institutional Control	Low – Permissionless access, protocol governance	High – Full member control, governance by agreement	Shared – Hybrid governance with control where needed	Control vs. efficiency fundamental trade-off
Privacy Protection	Low by default – Transactions are visible and pseudonymous[30]	High – Full confidentiality, permissioned access	Configurable – Privacy by design with selective transparency	Privacy essential for institutional adoption
Institutional Adoption	Medium – Privacy and compliance concerns Examples: Circle, PayPal	High – Meets institutional needs Examples: J.P. Morgan's Kinexys blockchain, central and commercial bank projects on Corda	Developing – Promising but complex Examples: Canton Network, JPMD	Balanced approach with implementation complexity

Public permissioned or hybrid models are emerging to combine public blockchain benefits with private institutional control requirements. These architectures use public chains for functions benefiting from maximum interoperability, such as settlement finality, audit trails, cross-institutional messaging, while maintaining private elements for sensitive operations requiring confidentiality.

Hybrid architecture features may include:

- **Settlement/Execution Separation**: Private networks handle business logic execution, while public chains provide final settlement and immutable audit trails.
- **Privacy Layers**: Public blockchain infrastructure enhanced with zero-knowledge proofs or confidential computing for private institutional transactions.
- **Bridged Networks**: Private institutional networks with standardised bridges to public chains for specific interoperability use cases.

Quote Box: Hybrid Implementation

"You don't want money being created out in the world of the public blockchain. The money gets created on the bank balance sheet... what's on the chain is just the marker of a transaction."

Infrastructure Provider Executive

This approach allows institutions to comply with regulations and business confidentiality while benefiting from network effects and interoperability that public infrastructure provides.

3.3.2. Compliance Issues

A significant barrier to both interoperability and programmability is regulatory uncertainty about technical implementation details, particularly regarding institutional accountability when operating on public blockchains.

Market participants report confusion about liability boundaries when transactions occur on shared infrastructure, compliance responsibilities for institutions operating nodes and dispute resolution mechanisms for automated smart contract execution. Additional uncertainties include cross-jurisdictional enforcement of programmable contract terms and data protection requirements for transparent blockchain systems.

Quote Box: Regulatory Clarity Needs

"If a bank is participating on a public blockchain, what are they responsible for and what are they not responsible for? And that dividing line is just not clear."

Fintech Executive

One way to reduce this uncertainty is to embed standardised compliance capabilities into the tokenised money systems. This includes built-in AML/KYC capabilities with identity verification and customer screening, real-time sanctions screening integrated into transfer logic, automated regulatory reporting based on on-chain transaction data, and immutable audit trails with timestamped records supporting regulatory examination.

3.3.3. Emerging Technical Developments

Programmability as the API of Money

Some of those interviewed for this study pointed to programmability evolving beyond unlimited customisation toward standardised, secure interfaces enabling controlled third-party integration. This "API of money" approach prioritises reusable primitives over bespoke applications.

Rather than embedding arbitrary business logic into money itself, this model exposes standardised functions (escrow, conditional release, automated margining) that can be composed into more complex applications while maintaining security and compliance boundaries.

Key design principles include:

- **Encumbrance and Sequencing First**: Near-term value lies in fundamental primitives such as escrow, time-based releases, conditional splits and balance encumbrance that apply across tokenised deposits and stablecoins.
- **Standards-Based Interoperability**: Programmability requires common interfaces that work across different tokenised money implementations, avoiding proprietary lock-in while enabling ecosystem-wide innovation.
- **Controlled Third-Party Access**: API-style access allows external service integration while maintaining institutional control over core money functions and compliance requirements.

Quote Box: API Integration

"The very important point of programmability is the capacity for third parties to use your technical component... like exposing an API... it's like the defined world where you build up on top of blocks."

Bank Executive

AI Integration

An emerging but largely underdeveloped area is the intersection of tokenised money with artificial intelligence and autonomous systems. Early indicators of this direction include Google's announcement of Agent to Payment (A2P) capabilities supporting stablecoins for autonomous agent transactions.[31] Potential AI integration applications may include:

- **Autonomous agent commerce**: AI entities conducting transactions independently.
- **AI-driven treasury optimisation**: Predictive liquidity management based on market conditions.
- **Automated compliance monitoring**: AI systems continuously monitoring for regulatory violations.
- **Dynamic Risk Management**: Real-time portfolio adjustments based on AI risk assessment.

Quote Box: AI-Money Gap

"I like programmability a lot. I do notice that there's very limited conversations on linking AI... to programmable money... Nobody's talking about AI or bots or agents or anything else. So, I'm not quite sure why that is and why somebody hasn't created that intersection, but I find that interesting."

Infrastructure Provider Executive

Convergence Trends and Development Priorities

Market interviewee responses and research suggest different infrastructure evolution pathways:

- **Standards Consolidation**: Movement toward common technical standards enabling interoperability and programmability without requiring identical implementations across all systems.
- **Privacy Integration**: Development of mature privacy-preserving technologies resolving the openness/confidentiality trade-off through zero-knowledge proofs and confidential computing.
- **Regulatory Alignment**: Gradual alignment of regulatory frameworks across jurisdictions to enable cross-border programmable finance applications.

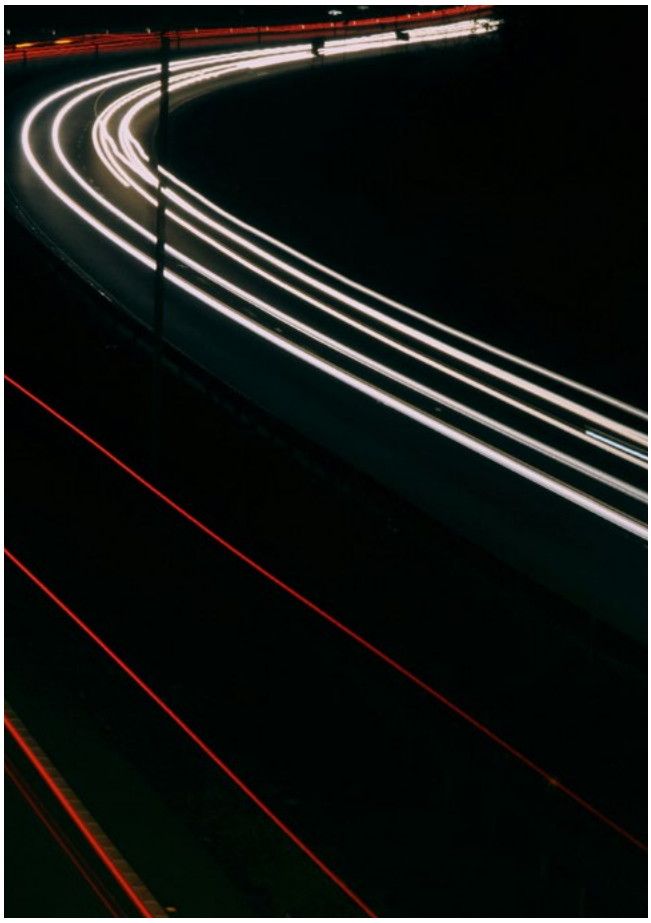
In this context, development priorities across organisations may include:

- **Interoperability Solutions**: Cross-chain protocols, API standardisation, bridge technologies enabling seamless connectivity;
- **Privacy Technologies**: Zero-knowledge proofs, secure multi-party computation, confidential computing for institutional privacy;
- **Programmability Platforms**: Smart contract development environments, testing frameworks, governance tools for reliable automation;
- **Compliance Infrastructure**: Automated monitoring and supervision systems, regulatory reporting capabilities, audit trail technologies.

Quote Box: Standards Requirements

"Programmability depends on standards, leaving third parties the capacity to use it. This doesn't mean that you allow third parties to do whatever they want... obviously there is the security aspect and there is the compliance aspect, there are many rules that need to be put in place."

Bank Executive



Conclusion

The infrastructure and technical considerations for tokenised money represent both the greatest opportunity and the most significant challenge to scaling and achieving mainstream adoption. Interoperability and programmability are not merely technical features, but fundamental enablers of the network effects and innovation potential.

Interoperability has emerged as the foundational requirement, with the highest priority ratings across all organisation types. However, achieving interoperability requires addressing numerous systemic challenges: cross-border efficiency, cross-platform connectivity, cross-asset integration, regulatory harmonisation and governance coordination. The initiatives examined in this study (Partior, Project Guardian, RSN and Project Agorá) demonstrate different approaches to these challenges, with varying levels of maturity and success.

Programmability represents a fundamental shift in financial infrastructure logic, moving from ex-post reconciliation to ex-ante execution where outcomes are determined and verifiable at instruction transmission. The capability spectrum ranges from basic conditional transfers to sophisticated AI-driven autonomous systems, though current adoption is highest in capital markets and lowest in retail applications.

The research reveals the trade-offs involved in different architectural approaches, with public permissioned or hybrid models emerging to balance openness with control, and programmability with security. However, significant challenges remain in regulatory clarity, technical standardisation, and the development of privacy-preserving technologies.

Chapter 4

Policy and Regulatory Landscape

The development of tokenised money is shaped and constrained by policy and regulatory choices. Regulators articulate criteria for assessing the risks posed by different instruments and their underlying infrastructure and determine which rules to apply to each of them, impacting the playing field. This assessment of risks does not only consider the technical features of these instruments but also the activities they are used for, the type of entity involved(i.e. banks or non-bank financial institutions) and even broader macroeconomic factors that could pose risks at systemic level. Conversely, emerging risks and evolving technological capabilities feed back into regulators' choices, by reshaping what rules are needed and feasible.

This chapter provides a comparative analysis of policy and regulatory frameworks concerned with tokenised money, its issuance and use. It first introduces four criteria commonly used by central banks and regulators to assess the properties of money, before mapping out the risks associated with tokenised money instruments. It then reviews the global standards and recommendations and compares regulations in the selected jurisdictions. This chapter concludes by setting out how regulators delineate between tokenised money instruments and highlighting the differences in the rationale, objectives and key elements of the regulatory frameworks for each of them.

4.1. The Criteria of Money

Even as public authorities diverge on the detailed rules that apply to tokenised money instruments, they share core objectives such as financial stability, safe and efficient operation of payment systems and monetary sovereignty. Additional policy objectives include lawful, fair and efficient use of these instruments, which range from effective AML/CFT and market-conduct compliance, to robust operational resilience and data safeguards, consumer protection, financial inclusion and competition.

Some of these objectives are reinforcing, while others create trade-offs, which may be exacerbated by form and features of tokenised money and the underlying infrastructure. These objectives can be distilled into four core criteria of money.[32,33]

Singleness and Finality

The principle of singleness of money stipulates that all money instruments within a given monetary system carry the same value and are interchangeable at par.

Singleness is observed when we withdraw funds from a bank account and receive the same amount (net of fees) in cash, or when we transfer funds denominated in the same currency between bank accounts without facing exchange-rate-like spreads. For singleness to hold, monetary instruments must be "information insensitive". This means that economic agents must be able to use them "without questions asked" (i.e. without conducting the due diligence they would apply to other assets).

Finality of settlement concerns irrevocability.[34] It is achieved when a payment is made definitively and cannot be reversed or legally unwound, even if one of the parties subsequently becomes insolvent.

Without singleness and finality, we would not know how much value a payment would deliver, nor whether a transfer would be valid. These interlinked properties are therefore necessary to create trust for money to function as a reliable means of exchange.

In a two-tier monetary system, central banks play a critical role in ensuring singleness and finality. Public money – such as bank reserves and cash – acts as an "anchor" that prevents regulated private money from drifting in value, while settlement infrastructures and the rules around them ensure that transactions become irrevocable and unconditional at a legally defined point. Other mechanisms such as Lender of Last Resort (LOLR) and deposit insurance, as well as the broader prudential, governance and resolution frameworks complement these.

As DLT develops and becomes more widely used as infrastructure for recording and transferring money and assets, some experts and market participants have argued that the two principles need not be applied in absolute terms.[35] A very high level of singleness and high probability of operational finality are attainable and should be sufficient, at least, for some use cases.

Elasticity

Elasticity refers to money being supplied flexibly so that payment obligations – especially large-value or time-critical ones – can be discharged without delay or gridlock. Effectively, this means the money must expand and contract to meet the changing needs of the economy. Gridlock happens when participants wait for others to pay first before they make their own payment. In concrete terms, elasticity allows corporates to settle large-value payments without waiting for prior receipts.

In a two-tier monetary system, the ability of commercial banks to create deposits through lending (i.e. without full backing by reserves, but subject to prudential rules), combined with central bank support (i.e. via supply of reserves, e.g. through intraday overdrafts, in real-time gross settlement systems), underpins elasticity and smooths payment flows.

Integrity against Illicit Activities

Integrity covers compliance with financial crime rules, adherence to market-conduct standards, and protection against illicit activity and fraud. In a traditional system, obligations on intermediaries that facilitate transactions (e.g. KYC, customer due diligence, ongoing monitoring, suspicious transaction reporting, travel rule, etc.) are the main tools through which integrity is pursued.

Efficiency and Inclusion

Efficiency and inclusion refers to the cost, speed and access to payments, together with the ability for networks to interoperate. Instruments that are expensive, slow, or confined to narrow systems would typically struggle to fulfil the functions of money.

Traditional monetary instruments and payment systems perform differently in efficiency and inclusion metrics. The spread of fast payment systems over recent years has improved performance in domestic payments in several jurisdictions.[36] Efficiency and inclusion are also factors behind a push from some central banks to develop a retail Central Bank Digital Currency.[37] On the other hand, cross-border payments, which remain costly, slow and unevenly accessible, are explicitly targeted by the G20 cross-border payments roadmap.[38]

4.2. Risks and Challenges

Tokenised money and the underlying infrastructure may change the form, scale, and speed with which risks manifest. Old risks, from stability to integrity, can re-emerge in new forms, while challenges such as interoperability, market concentration and contestability may gain new salience.

Below is a non-exhaustive list[39] of risks and challenges associated with tokenised money. The risks are organised by category and linked back to the four criteria presented above. Risks and challenges are often instrument-specific, heavily dependent on their features and the underlying infrastructure. Unless stated otherwise, the risks described in this section relate to stablecoins, as instruments transferable on a peer-to-peer basis over public, permissionless ledgers. This is arguably the instrument that presents the highest set of risks, and is the current focus of regulators.

Financial Stability

Financial stability risks, in particular credit and liquidity risks, arise when redemption of instruments is dependent on the sale of volatile, illiquid or maturity-mismatched backing assets. Stress with one issuer may propagate across the financial system through deposit outflows or asset fire sales, disrupting sovereign bond or other markets. The impact can be greater when the market is dominated by a few issuers and instruments and backing assets are concentrated, as it is arguably the case with stablecoins backed by US treasuries.

These risks may be exacerbated in cross-border contexts, as the backing assets and entities controlling them may be located outside of the jurisdiction where they are used. Finally, when instruments are issued by non-banks, the ability of central banks to act as liquidity backstops to the system is limited.

Safe and Efficient Operation of Payment Systems

Tokenised money can affect the safe and efficient operation of payment systems in two major ways: possible deviations from singleness and challenges to establishing finality. For example, stablecoins may deviate from par value, as they are transferable without intermediaries and self-settling. Furthermore, when validation of a stablecoin transaction is distributed and subject to probabilistic consensus, it may be hard to identify the point of irrevocability.

These risks are intrinsically linked to the underlying tokenised money infrastructure. However, as discussed in chapter 3 of this report, public permissioned ledgers or build-in capabilities in tokens may go some way to address risks.

Monetary Policy Transmission and Sovereignty

Through their role in credit creation, banks are critical to the transmission of monetary policy. If there were a significant shift towards narrow banking or equivalent arrangements, this role could be hampered, reducing money elasticity.

Cross-border use of tokenised money instruments also raises concerns about the effectiveness of domestic monetary policy, which is of a different order than other risks. US dollar-denominated stablecoins account for 99% of stablecoins in circulation.[40] They have the potential to strengthen the international role of the dollar, particularly as a means of exchange and store of value.[41] Dollarisation could undermine the effectiveness of domestic monetary policy transmission and weaken capital-flow management, especially in small, internationally-connected economies.

Unlike prudential or consumer protection risks, sovereignty concerns cannot be fully mitigated by issuer regulations; they are structural, linked to network effects and global demand for currency. DLT infrastructure further complicates the enforcement of capital-flow measures, as transactions may bypass intermediaries and domestic oversight.[42]

Interoperability

Fragmentation risks arise from the use of multiple non-interoperable platforms. If money becomes trapped in "walled gardens", its fungibility is reduced, and transfer costs may rise.[43] The IMF has found that brokers' unequal market power have the potential to cause further fragmentation – either by forming exclusive coalitions that create isolated systems, or by limiting investment and slowing adoption of tokenised markets.[44] Public, permissionless ledgers are generally more supportive of interoperability compared with privately controlled platforms.

A related set of risks concerns the possible lock-in of some technologies and standards that may have sub-optimal or outdated designs.

Market Concentration

Linked to interoperability is the risk of market concentration and monopolistic dynamics. Tokenised money often integrates the functions of issuance, transfer, custody and settlement within one broad "arrangement". This can give rise to conflicts of interest and increase market concentration, exacerbating the risks of monopolistic behaviour.

Cybersecurity, Operational Resilience, Smart Contract Risks

DLT prevents single points of failure, increasing resilience, but is exposed to new operational and cyber risks. Coding errors or flaws in consensus mechanisms can have system-wide negative effects. Forks complicate continuity in the absence of an accountable entity. Finally, the reliance on bridges, oracles and wallets creates additional points of vulnerability, often concentrated in a small number of providers.

AML/CFT and Illicit Financing

Instruments that are peer-to-peer transferable and pseudonymous may complicate the enforcement of AML/CFT and sanctions rules. These risks may be mitigated by the transparency of public ledgers, analytics tools, the imposition of extended requirements on gateways and intermediaries and the programming of the tokens (see chapter 3 of this report). Inconsistent regulation across jurisdictions may create weak links in the global system and complicate cross-border supervision.

Consumer and Investor Protection

Given that tokenised instruments may reach individuals directly, consumer and investor protection risks are abundant. Users may lack information about the risks associated with the instruments they hold. Redemption rights may be undermined by inappropriate backing and segregation of reserves. Furthermore, consumers may lack effective recourse when instruments lose value or access is disrupted, either because the issuer or intermediary is out of reach of domestic authorities, or there is no intermediary.

Other Risks and Challenges

Beyond these categories, other risks are often discussed by regulatory authorities. Legal certainty of claims against issuer remains a foundational issue: who owns a token, when title transfers, and how assets are treated in insolvency. Data governance and privacy risks emerge as platforms generate large amounts of sensitive information, which may be public (see chapter 3 of this report). At the same time, there are large data gaps and information asymmetries from the perspective of supervisors.

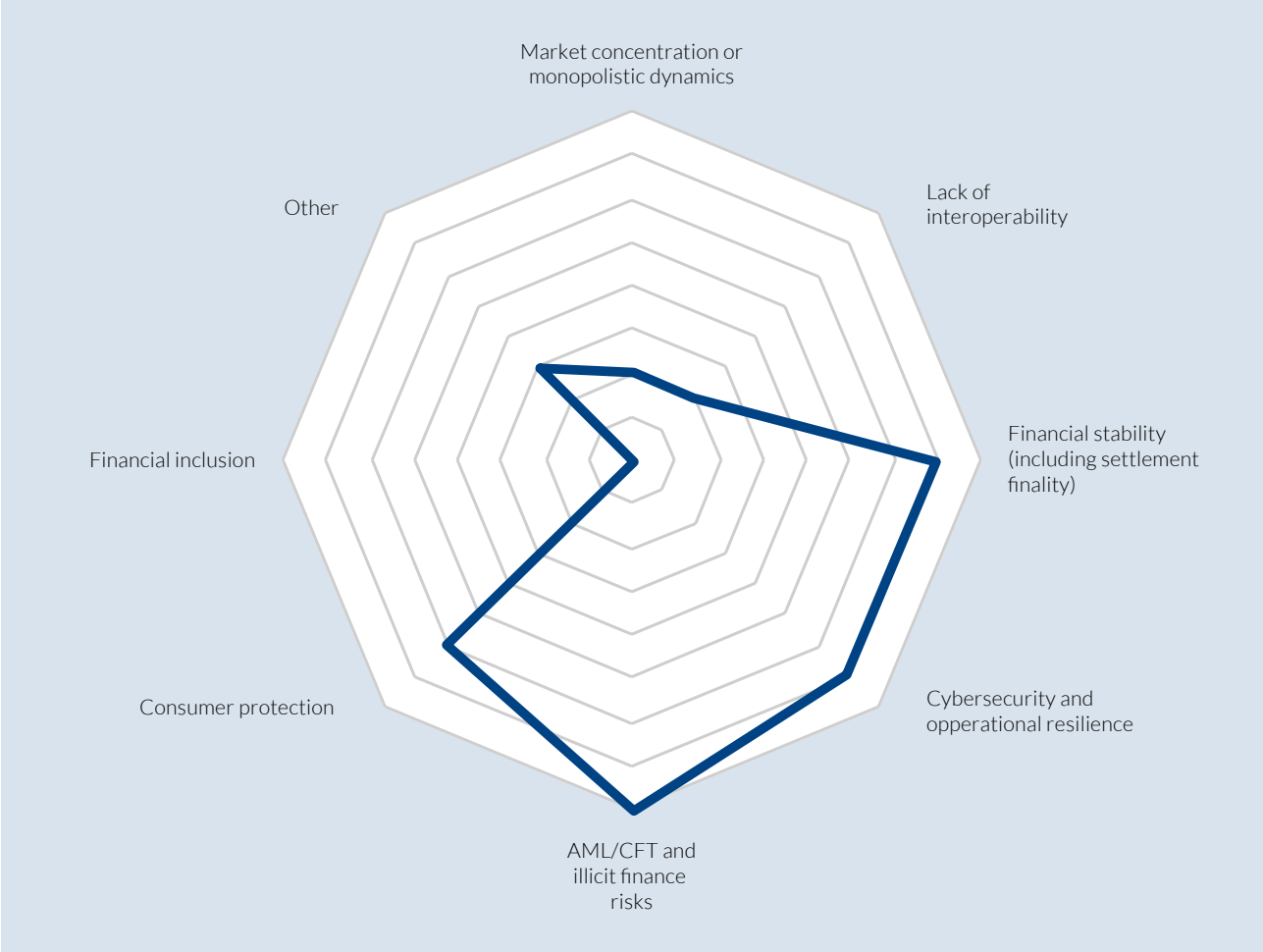
Tokenised money instruments have the potential to increase and improve levels of financial inclusion by lowering barriers to access to services (i.e. wallet-based access) and costs, but these gains are not automatic. Digital illiteracy and lack of internet access, for example, can exclude some users and limit access.

The categories listed above are distinct, but they interact in practice. Regulators increasingly view them as interconnected rather than siloed. This is the backdrop against which international institutions have issued standards and recommendations on the regulation of tokenised money instruments.

Regulators' View on Risks

Regulators interviewed for this report were asked about their perspective on the key risks associated with tokenised money. Figure 6 highlights the risks that respondents are monitoring closely. The top three risks identified are those related to AML/CFT and illicit finance, cybersecurity and operational resilience, and financial stability.

Figure 4: Key Risks Related to Tokenised Money



Notes: Based on survey responses from 10 interviews.

Quote Box: Data and Supervisory Risk

"There is an issue with data and cross-border cooperation between regulators. There are frameworks for cooperation on enforcement, but very little on the supervision side."

Regulator

4.3. International Standards and Recommendations

4.3.1. Overview of Global Initiatives

Global standards provide a baseline for policies and regulations concerned with tokenised money arrangements. This section synthesises published standards, recommendations and analysis by international institutions and provides insights drawn from their assessment.

Standard-setting bodies (SSBs) and other international institutions approach tokenised money from different perspectives, consistent with their mandates. Examples include:

- the Financial Stability Board (FSB), an international body that issues high-level recommendations concerned with financial stability;[45]
- the Bank for International Settlements' Committee on Payments and Market Infrastructures (CPMI) an international standard setter that promotes, monitors and makes recommendations about the safety and efficiency of payment, clearing, settlement and related arrangements;
- the International Organization of Securities Commissions (IOSCO), which focuses on market integrity, investor protection and disclosure standards;
- the Financial Action Taskforce (FATF), an international body that issues global standards on market integrity regulation, implementation and enforcment;
- the Basel Committee on Banking Supervision (BCBS), which addresses prudential requirements for banks engaging with tokenised assets;
- the BIS and the International Monetary Fund (IMF), which are not standard setters but provide analytical framing and assess implementation of financial regulations;
- the World Bank and the Organisation for Economic Co-operation and Development (OECD), which while not standard setters, provide a macro-view on dollarisation, cross-border spillovers, consumer protection, etc.

Their remits complement each other and overlap in some areas. Their deliverables also differ in nature: some SSBs develop international standards (e.g. CPMI, BCBS, FATF, IOSCO), others set recommendations (e.g. FSB), and others contribute primarily through conceptual analysis.

In recent years, SSBs have issued a series of standards and recommendations, and analytical papers, relevant to tokenised money. A non-exhaustive list is provided in table 13, below.

Table 13: Standard-Setting Bodies' Recommendations on Tokenised Money

Institution	Standard / Publication	Applicability	Key Focus Areas
Financial Stability Board (FSB)	Recommendations on the Regulation, Supervision and Oversight of Global Stablecoin Arrangements[46] Cross-border Regulatory and Supervisory Issues of Global Stablecoin Arrangements in EMDEs[47]	Updated most recently in 2023. Not legally binding, aim is to guide national implementation.	Focus areas include clear governance frameworks (including decision-making and risk management), robust measures for operational resilience, cybersecurity and AML/CFT, cross border coordination and legally enforceable redemption rights.
NB: FSB published their report on implementation of standards in October 2025.			
BIS' Committee on Payments and Market Infrastructures (CPMI) and International Organization of Securities Commissions (IOSCO)	Guidance on the application of the Principles for Financial Market Infrastructures (PFMI) (published by CPMI-IOSCO in 2012) to systemically important stablecoin arrangements[48]	Applies the PFMI (used for systemically important infrastructures such as payment systems, among others) to stablecoin arrangements.	Focus areas include accountable governance, settlement finality, risk management (especially around liquidity and credit risk) and interoperability of payment systems.
IOSCO	Policy recommendations for Crypto and Digital Assets Markets, including stablecoins[49]	Where further risks are presented by stablecoins, supplementary guidance is issued, including on custody of reserves.	For stablecoins functioning as securities or enabling access to them (e.g. through yield or investment features), IOSCO applies securities market regulation.
NB: IOSCO published report on implementation of standard in October 2025			
Basel Committee on Banking Supervision (BCBS)	Prudential treatment of cryptoasset exposures[50]	Focused on banks' treatment of stablecoins as assets. Banks can hold stablecoins but face strict conditions and capital charges.	Key features include the requirement to have (i) fully reserved and redeemable stablecoins, (ii) risk-based capital treatment similar to traditional assets and (iii) stricter capital requirements on non-compliance (e.g. 1250% risk weight).
Financial Action Task Force (FATF)	Updated Guidance 2021[51]	AML/CFT compliance of digital assets	Key focus areas include application of travel rule to all digital asset transactions involving Virtual Asset Service Providers (VASPs).

The recent IOSCO[52] and FSB[53] thematic reports on the implementation of standards provide insights into how regulatory reform is taking shape across different jurisdictions, highlighting key areas that require further regulatory development and convergence, particularly to improve cross-border coperation.

They show meaningful progress toward more comprehensive frameworks for cryptoasset markets, but underline implementration remains uneven, in timing and scope. The risk of regulatory arbitrage, therefore, persists. The reports also highlight structural challenges that continue to impede effective oversight, such as overlapping or fragmented regulatory responsibilities, varying interpretations of key concepts, and continued inconsistencies in the treatment of cryptoassets and stablecoins across legal and regulatory regimes.

To support supervision of tokenised money instruments, the BIS Innovation Hub (in collaboration with central banks) has explored using technology tools to enable their monitoring. For example, Project Pyxtrial (a joint project between BIS and Bank of England) has developed a prototype data analytics pipeline which provides near real-time data about stablecoins' liabilities and their backing assets.[54] Project Atlas (a collaboration between BIS, Deutsche Bundesbank and De Nederlandsche Bank), which provides tailored data gathered from intermediaries to shed light on macroeconomic relevance of cryptoassets markets and decentralised finance, is another example of technology-enabled supervision for tokenised money instruments.[55]

4.3.2. Comparative Analysis: Convergence, Overlaps and Gaps

Analysis of standards, recommendations and other texts produced by the organisations summarised in 4.3.1 reveals their different areas of focus, areas of convergence and overlap, as well as some potential gaps.

Instruments in Focus

At an instrument level, the focus is on stablecoins to a significant extent, leaving gaps for other tokenised instruments and infrastructures that are rapidly emerging. This is justified in part by their potential to be used outside the crypto sphere, their interactions with traditional finance and the risks they pose.

Terms and Definitions

The term 'tokenised money' is often defined narrowly as the tokenisation of existing financial instruments or claims – such as commercial bank deposits or central bank reserves – rather than as a distinct new category of money. For example, the FSB's definition of tokenisation refers to the use of DLT to issue or represent assets in token form, applying 'tokenised money' primarily to settlement assets such as tokenised deposits and wholesale central bank money and exclude retail CBDC from its remit.[56] The BIS and CPMI in their report to the G20 in 2024 similarly describes tokenisation as the digital recording of claims on programmable platforms.[57] Conversely, tokenised money is considered to encompass both tokenised central bank reserves and commercial bank deposits coexisting on a unified ledger.[58] IOSCO and BCBS, though less specific, align with this framing: IOSCO situates tokenisation within securities markets, focusing on native vs. non-native tokens,[59] while BCBS frames tokenised money in prudential terms, emphasising tokenised deposits within existing regulatory structures.[60]

In contrast, stablecoins are seen as new instruments with money-like functions and a promise of stability but weaker institutional anchors. The FSB's high-level recommendations explicitly tie the definition of global stablecoin arrangements to governance and redemption rights designed to ensure stability of value.

Recommendations by the FSB emphasise that tokenised deposits and reserves represent settlement assets within the two-tier monetary system, while stablecoins are structurally different instruments, potentially subject to the PFMI Principles when systemically important.[61] The BCBS has formalised this distinction in its prudential framework, classifying tokenised deposits as Group 1 assets, while qualifying stablecoins fall into Group 1b and other stablecoins into Group 2.

Issuers vs Arrangements

Standards and recommendations generally apply to stablecoin arrangements, as opposed to stablecoins as instruments separate from the underlying infrastructure in which they are recorded and transferred. This challenges their bearer nature. The recommendations are also broadly aligned on the topic of risk management – in which strong oversight over governance and risk controls, settlement finality, operational resilience and cyber security is consistently prioritised.

Design Features

The comparison of the recommended design features of various forms of tokenised money highlight further the differences in focus and objectives of the SSBs. The FSB, CPMI and IOSCO highlight a range of considerations related to liquidity, quality and disclosure among others,[62] rather than mandating a specific reserve asset.

Interest-bearing features is another area of attention. The FSB cautions that yield-bearing designs could heighten run risks and blur lines with deposits and securities. Interest-bearing fiat-referencing instruments may be required to comply with the PFMI and/or securities laws.

Systemic Relevance

While global recommendations highlight systemic importance as a trigger for more stringent oversight, there is limited progress in setting out quantitative thresholds, criteria, or supervisory methodologies. This leaves national authorities with broad discretion but little technical guidance on how to assess systemic relevance in practice.[63] Macro-economic risks, including the risks of capital outflows and monetary substitution (including through dollarisation), are identified in analytical papers as source of concern, but addressed only indirectly in the recommendations.[64]

Cross-Border Cooperation

Standards and recommendations set out the tools for supervisory coordination – from home-host arrangements, information sharing and Memorandums of Understanding (MoUs), to supervisory colleges and crisis management groups. But there are no binding supervisory mechanisms or operational follow-through. Thus far, no functioning supervisory colleges exist for tokenised money issuers – despite the global footprint of stablecoins.

Likewise, on interoperability, SSBs regularly call for inter-agency and cross-border coordination, data sharing and alignment of approaches across tokenised arrangements, but there is limited evidence of concrete follow-up or implementation. Existing references to interoperability remain high-level and do not address questions of technical and legal alignment (see chapter 3 of this report).

There are also unresolved issues around settlement finality and legal underpinnings for tokenised instruments across jurisdictions. Whether permissionless systems can deliver the level of settlement finality required for systemic use remains an open question. The FSB, meanwhile, is monitoring whether stablecoin redemption standards are being implemented consistently and effectively across jurisdictions.

4.3.3. Next Steps

Looking ahead, global standards and recommendations are expected to increasingly feature in the debates on the appropriate regulatory frameworks for tokenised money.

The FSB has recently signalled a sharper focus on stablecoins as payment and settlement instruments, acknowledging that risks remain underexplored relative to the pace of market development.[65] As the next section highlights, for regulators, this underscores the need not only to implement agreed standards, but also to monitor emerging practices and coordinate across borders before vulnerabilities become systemic – as the next section highlights.

4.4. Jurisdiction-Level Regulatory Frameworks

In response to recommendations and standards from international institutions and given the risks above, central banks and regulators across leading jurisdictions have either adapted existing legal regimes or begun developing bespoke legal and regulatory frameworks for tokenised money.

Stablecoins have been the primary focus of these efforts. A survey by the Bank for International Settlements found that around 70% of jurisdictions had introduced, or were in the process of introducing, rules for stablecoins, particularly around issuance, reserve management and redemption. Other instruments, such as tokenised deposits and tokenised MMFs, are beginning to attract attention, featuring in consultations and reports.

Regulators' Views on the Effectiveness of Regulatory Frameworks and Global Policy Developments

We have gathered regulators' views on the effectiveness of regulatory frameworks for stablecoins and the global direction of tokenised private money policy and regulation (please note these include only responses from regulators and policymakers, not market participants).

Table 14 shows the extent to which the regulatory framework for stablecoins in respondents' jurisdictions is deemed to effectively address risks, including those arising from cross-border payments. The average score was 3.6, with responses ranging from 1 (not addressed) to 5 (fully addressed). The significant variation in respondents' views can probably be put down to different assessments of the effectiveness of rules in addressing risks as well as the different stages of development and implementation of the regulations.

Table 14: The Effectiveness of Stablecoin Regulatory Frameworks (Scale 1-5)

Average Value	Range
3.6	1-5

Notes: Based on survey responses from 9 interviews.

Table 15 assesses whether the global direction of tokenised private money policy and regulation is perceived as one of divergence or convergence. The findings indicate an average score of 3.1, with responses ranging from 1 (maximum divergence) to 4. This reflects a general perception of fragmentation in global policy approaches, despite the significant variation in responses.

Table 15: The Global Direction of Tokenised Private Money Policy and Regulation (Scale 1-5)

Average Value	Range
3.1	1-4

Notes: Based on survey responses from 10 interviews.

Quote Box: The Appropriateness of Global Standards and Recommendations

"The cross-border challenges should be addressed via more consistent implementation of the FSB Crypto Framework (rather than its amendment) and other related standards by the standards-setting bodies, as well as better cross-border collaboration on the supervision and regulation of crypto-asset market and activities."

Regulator

4.4.1. Case Studies

This section presents case studies on the regulatory approaches to tokenised money instruments in five jurisdictions: the European Union, Hong Kong, Japan, Singapore and the United States. Each case study follows the same analytical framework and is organised into three parts:

- **Context and institutional setup**: The first part provides a description of the broader policy trajectory and the evolution in policy priorities. It sets out the institutional framework and outlines the regulatory perimeter by showing how tokenised deposits, stablecoins and tokenised MMFs are categorised and which laws apply to each of them.
- **Stablecoin-specific rules**: The second part describes the stablecoin dedicated regulations, along critical dimensions (with a focus on payment stablecoins).
- **Outlook**: The third part highlights reforms in progress and the strategic direction of policy. It covers upcoming legislation plans, consultations and studies.

Case Study 1: European Union

Part I – Context and Institutional Setup

The European Union (EU) has moved faster than many comparable jurisdictions in establishing frameworks for the use of distributed ledger technology (DLT) in finance, particularly with regard to monetary instruments.

A cornerstone of this effort is the Markets in Crypto-Assets Regulation[66] (MiCA), adopted in 2023, which sets out comprehensive rules for the issuance of "E-Money Tokens (EMTs)", defined as cryptoassets referencing a single official currency. Furthermore, the European Banking Authority (EBA) has identified tokenisation of financial products, including deposits, as a priority area for monitoring, including through surveys, assessment and publications in its work programme.[67] In parallel, the European Central Bank (ECB) has led the push and preparation for a digital euro – a CBDC for the Euro Area – for retail use,[68] and is exploring wholesale options.[69]

The policy stance of the EU toward financial technology reflects well-known policy trade-offs. Regulation is viewed as an enabler of innovation – particularly for harmonising national rules and facilitating cross-border financial services. On the other hand, traditional regulatory priorities, such as consumer protection, financial stability – and importantly, monetary sovereignty,[70] remain central. As a result, while the EU's framework is widely seen as comprehensive and coherent, it has also been criticised by parts of the industry as being overly restrictive or protectionist.

The institutional framework reflects the EU's layered model. Rules are increasingly set at EU level, but national competent authorities (NCAs) retain the power to supervise most regulated entities. The EBA ensures convergence across banking and payments supervision and shares supervision of significant EMTs with NCAs. The ECB, through the Single Supervisory Mechanism (SSM), directly supervises large euro area banks and holds a veto right over systemic EMT issuance in the Euro Area.

Tokenised money instruments are classified on a case-by-case basis according to existing legal definitions across sectoral regulations and guidelines:[71]

- **Tokenised deposits**, which are broadly defined as digital representations of credit balances issued by banks – are subject to regulation[72] and directives for credit institutions and deposit guarantee schemes.[73]
- **Stablecoins** fall under the category for EMTs, which are broadly defined as cryptoassets pegged to a single currency, and are covered by MiCA, linked to E-Money rules.[74]
- **Tokenised MMFs** are governed by the sectoral regulation.[75]

MiCA follows a residual approach to classification of assets, meaning that cryptoassets already classified as deposits or other financial instruments are excluded from its scope.

The inherent features underlying distributed infrastructure – public or private, permissioned or permissionless – do not determine the legal classification of the instrument. Issuers and service providers are expected to demonstrate compliance with the requirements and supervisory expectations that apply to the different instruments (e.g. settlement finality). Lack of express clarity about acceptability of uses of permissionless technology in the EU financial sector may be slowing down experimentation in use cases involving this form of DLT.

Part II – Deep Dive: Stablecoin-Specific Regulations

The MiCA Regulation sets out a bespoke regime for EMTs. As at the end of 2025, 25 EMTs had been approved in the EU.

Only authorised credit institutions or electronic money institutions (EMIs) may issue EMTs. Issuers must notify the relevant authorities and submit a white paper well in advance. EMTs must be fully backed by reserves. For EMIs, these reserves must be segregated and invested in high-quality liquid assets, including a minimum share of deposits of 30% or 60%, diversified between different banks. Banks may issue EMTs as liabilities without reserve segregation, but such activity will be factored in liquidity coverage ratio requirements. EMTs must be redeemable at par, at any time. Issuers are prohibited from offering interest on EMT holdings, a factor that distinguishes them from tokenised deposits and tokenised MMFs.

EMTs may be used for retail payments, including cross-border transfers, and may be employed as a settlement asset under the DLT Pilot Regime,[76] which sets out exemptions for market infrastructures using DLT. The application of EU payment rules to payment services with EMTs is currently under review. The EBA issued a no-action letter (i.e. forbearance) in July 2024 to temporarily suspend enforcement of specific obligations while new legislation is finalised.[77]

Issuers and service providers involved in EMT transactions are subject to AML/CFT obligations, similar to other requirements of financial institutions, including travel rule-related requirements.[78] Issuers are not explicitly required to monitor secondary market transactions, but must conduct due diligence.

MiCA requires issuers to subsidiarise and prohibits stablecoins issued solely outside of the block. This requirement has justified the high-profile delisting of USDT (the largest stablecoin in the world) by regulated exchanges.

However, it does not specify how to treat global stablecoins issued by both an EU entity and a foreign entity. The Commission is expected to issue interpretative guidance on so-called dual-issuer models. This guidance should clarify which holders have the right to redeem from which entity, where reserves and localised and how they can be rebalanced over time, and how fungibility is ensured, in particular in stress scenarios.[79] Industry participants have warned that a stringent application of the rules will lead to fragmentation. Furthermore, MiCA imposes strict usage thresholds on non-euro denominated EMTs, including USD denominated, and the ECB may limit their use in payments or settlement if systemic risks are identified.

MiCA includes a mechanism to classify certain EMTs as significant based on specified quantitative and qualitative indicators (e.g. transaction volume, user base, market share). As at the end of 2025, no EMTs had been designated as significant. Once classified, these tokens are subject to enhanced prudential and governance standards, including increased capital and liquidity requirements and shared supervision between the relevant NCA and the EBA. The classification is reassessed annually, and may disincentivise large-scale issuance.

Part III – Outlook

The EU's approach to tokenised money will evolve with ongoing and planned regulatory reforms. These include the ongoing revision of EU payments rules and a full review of MiCA scheduled for 2027. Targeted revisions of the regulation are possible in the meantime, for instance in the context of the Savings and Investments Union package. The EBA will continue its work on tokenised instruments.

International developments will also shape the EU's future posture. The stance may be influenced by global competition, particularly the dominance of USD-denominated stablecoins, and the US approach. Overall, the EU is expected to continue to balance monetary sovereignty and financial stability[80] and innovation objectives.

Case Study 2: Hong Kong

Part I – Context and Institutional Setup

1. Policy and Regulatory Context

The Hong Kong Monetary Authority (HKMA) first published a discussion paper on cryptoassets and stablecoins in January 2022, and jointly issued with the Financial Services and the Treasury Bureau the consultation conclusions on the legislative proposal for implementing the regulatory regime for stablecoin issuers in July 2024.[81] The same year, the HKMA further launched the "Stablecoin Issuer Sandbox" to understand business models of prospective stablecoin issuers and communicate regulatory expectations.[82] The Stablecoins Ordinance (SO) came into effect on 1 August 2025, establishing Hong Kong's regulatory regime for issuance, offering and marketing of stablecoins.[83]

2. Institutional Framework

HKMA is responsible for the regulation and supervision of banks and stablecoin issuers. The HKMA and Securities and Futures Commission (SFC) are jointly responsible for the regulation and supervision of financial intermediaries (including banks) that engage in activities, such as dealing, advisory and asset management services related to digital assets.[84] The Stablecoin Review Tribunal, established under the SO serves as an independent appeal body with jurisdiction over licensing decisions, sanctions imposed under the SO and enforcement actions, and compliance matters.[85]

3. Instrument Delineation and Broad Regulatory Perimeter

Hong Kong's regulatory framework establishes a comprehensive categorisation for tokenised money instruments:

- **Fiat-referenced stablecoins**: Digital tokens designed to maintain stable value relative to fiat currencies. Subject to the dedicated licensing regime, with comprehensive supervision guidelines[86] and AML/CFT requirements specifically developed for stablecoin issuers.[87]
- **Tokenised deposits**: Bank-issued digital representations of traditional deposits, regulated under existing banking supervision frameworks.[88]
- **Tokenised securities**: Digital representations of securities.[89] Subject to existing legal and regulatory requirements governing the traditional securities market, as well as any additional requirements that may be imposed by the regulators.[90]

The stablecoin regulatory framework does not prescribe the use of any specific underlying technology (e.g. public, private or public permissioned) but rather establishes technological and operational requirements covering areas such as token management, wallet and private key management, and account management.[91]

Part II – Deep Dive: Stablecoin-Specific Regulations

As at the end of 2025,[92] there is no HKMA-licensed stablecoin issuer. The HKMA expects the first batch of licenses to be granted in early 2026.[93] Any stablecoin issuers that have been operating in Hong Kong prior to the new regulatory regime coming into effect would be subject to certain transitional provisions.[94]

An HKMA license is required for entities that issue fiat-referenced stablecoins in Hong Kong, HKD-referenced stablecoins, and actively marketing their issuance of fiat-referenced stablecoins to the Hong Kong public.[95] Licensees are required to be incorporated in Hong Kong or be authorised institutions maintaining minimum paid-up capital of HK$25 million.[96] Regulated issuers must obtain consent from HKMA for any non-stablecoin activities, including unregulated activities, while also managing risks and conflicts of interest.[97]

Issuers are required to publish comprehensive whitepapers.[98] Ongoing transparency obligations include daily preparation of statements on outstanding stablecoins and reserve composition, with weekly HKMA reporting and public website disclosure of these statements, complemented by mandatory regular independent attestation.[99]

Stablecoins must be fully backed at all times.[100] HMKA may approve currency flexibility arrangements for reserve assets, allowing for currency mismatches where legitimate reasons exist and appropriate risk mitigation measures, such as over-collateralisation, are implemented.[101] Reserves must be held in high quality, liquid assets, encompassing cash, short-term bank deposits, qualifying debt securities, and dedicated investment funds.[102] These assets must be held under effective trust arrangements to ensure proper segregation.[103]

Redemption rights are protected through requirements for par value redemption without unreasonable fees, with valid requests processed within one business day.[104] Finally, the framework prohibits the offering of any interest-bearing features.[105]

The framework adopts a technology-neutral approach without restricting use cases or mandating specific transferability restrictions.[106] Stablecoin issuers should identify all operations in relation to the management of the full lifecycle of each type stablecoins it issues through token management systems, including whitelisting, transaction limits, and blacklisting capabilities, with restrictions dependent on individual risk assessments and AML/CFT obligations.[107] Licensees conducting business activities beyond stablecoin issuance must assess whether these constitute other regulated activities requiring additional licensing.

Licensed stablecoin issuers are financial institutions under Hong Kong's AML/CFT laws, subject to comprehensive requirements including "travel rule" obligations detailed in the HKMA's dedicated AML/CFT guideline.[108]

Entities issuing HKD-referenced stablecoins must be authorised by HKMA whether they are based in or outside Hong Kong. Retail distribution in Hong Kong is restricted to the permitted offerors as defined in the SO. HKMA is open to multi-jurisdictional issuance arrangements, provided these have been discussed with HKMA and relevant regulatory requirements are fulfilled.[109] Reserve assets are not required to be held exclusively in Hong Kong, with portions permitted outside Hong Kong subject to demonstration of adequate rationale and adequate safeguards.[110]

Part III – Outlook

Hong Kong regulators are developing comprehensive regulatory regimes for broader digital asset activities. In parallel, the HKMA is developing a new taxonomy and financial market infrastructure that facilitates the adoption of wholesale CBDCs and tokenised deposits, such as through Project Ensemble. [111]

As HKMA progress and promote the responsible and sustainable development of a digital asset sector in Hong Kong, they are an active participant and contributor to international discussions on digital finance to ensure domestic development aligns with global standards and best practices.[112]

Case Study 3: Japan

Part I – Context and Institutional Setup

1. Policy and Regulatory Context

Japan emerged as one of the first major jurisdictions to establish a regulatory framework for cryptoassets and related activities. The framework was integrated in its Payment Services Act (PSA) in 2017.

In response to market developments,[113] Japan introduced in 2022 a bespoke framework,[114],[115] for stablecoin issuers. This bespoke framework was amended in March 2025.

Japan's Financial Services Agency (JFSA) is the primary regulatory authority responsible for implementing and enforcing of regulation governing tokenised money, including stablecoins, tokenised deposits and other money-like instruments, such as tokenised MMFs, in Japan.

The remit of the Bank of Japan (BoJ) is closely tied to its broader mandate to ensure the stability and efficiency of Japan's payment and settlement systems.[116] This role is carried out through research; publications such as technical reviews and discussion papers; and initiatives aimed at raising awareness of emerging infrastructure technologies and associated risks.

The JFSA and BoJ are active parfticipants in international forums such as FSB, IOSCO, BCBS and CPMI, contributing to international discussions on tokenised money and the relevant standard-setting work.

No formal or dedicated forum currently exists at the national level for joint discussion on tokenised money instruments, though coordination occurs through established inter-agency consultation mechanisms and shared participation in international regulatory initiatives

Japan generally defines tokenised money instruments as "Electronic Payment Instruments (EPI)"[117] under the PSA, however the instrument category and legal treatment will depend on the type of issuer and underlying characteristics:

- **Stablecoins** are EPIs which are issued at a price linked to the value of fiat, are redeemable at par value and fully backed by fiat currency.
- **Tokenised deposits** share the same category as stablecoins but are issued by banks and therefore strictly treated as traditional bank deposits in digital form under the Banking Act, thereby restricted to specific users and by consent mechanism for transfers.
- Unlike stablecoins and tokenised deposits, **tokenised MMFs** are interpreted as an "electronically recorded transferrable right" under the Financial Instruments and Exchange Act (FIEA) and are categorised as security tokens.

There are no explicit requirements regarding the use of permissioned or permissionless DLTs for tokenised money instruments. However, for tokenised deposits that are issued on permissionless blockchains, they will likely be regarded as an EPI. This is because permissionless DLTs are unlikely to satisfy necessary regulatory requirements for deposits.

Part II – Deep Dive: Stablecoin-Specific Regulations

The JFSA regulatory framework sets out bespoke rules for fiat backed stablecoins (which are classified as EPIs). As at the end of 2025, there is one issuer of yen-denominated stablecoins.[118]

Only Japanese licensed banks, registered fund transfer service providers, trust banks or trust companies are permitted to issue stablecoins. Unless stated otherwise, in this section, we focus on Trust Beneficiary Interest stablecoins, which are issued by trust banks and trust companies, because they capture stablecoin arrangements that are widely adopted internationally.

The 2025 amendments to the PSA relaxed the reserve requirements for stablecoins, expanding the type of assets that can be held in reserve. Reserve composition now must be fully backed and held in highly liquid assets, such as bank deposits, government bonds, or guarantees. Up to 50% of reserves may be held in short-term government bonds or fixed-term deposits. All reserve assets must continue to be segregated and audited.

Redemption must be prompt and unconditional. While no specific timeline is codified, the JFSA guidelines imply that redemption must occur without undue delay, ensuring liquidity and user confidence.

The PSA amendments also introduce a new intermediary category 'electronic payment instrument service intermediary'. This is a distinction made for intermediaries that do not hold custody of customer assets and only support the dissemination of stablecoins by brokering transactions, exempting them from prudential requirements and direct AML/CFT obligations.

The use of stablecoin in payments under Japan's existing payments framework is governed by existing transfer rules.

Japan's dual issuer model for stablecoins requires a foreign entity to partner with a licensed Japanese financial institution (e.g. a trust bank or a trust company) to issue stablecoins domestically. The JFSA does not directly regulate foreign issued stablecoins but oversees them indirectly through the partner institution. When foreign currency denominated stablecoins are issued by fund transfer providers, reserve assets must be denominated in the same foreign currency.

Japan does not have a formal framework for designating stablecoins as 'systemic', but instead manages varying risk levels through differentiated licensing requirements for their issuance and distribution.

Part III – Outlook

The latest PSA amendments, including the relaxation of requirements on reserve assets, are set to take effect in June 2026. Japan has a track record of responding to market shifts and aligning with international regulatory developments. This is expected to continue as approved stablecoins emerge and with ongoing assessment of cross-border payment frameworks in coordination with the Bank of Japan's digital currency research.

Case Study 4: Singapore

Part I – Context and Institutional Setup

The Monetary Authority of Singapore (MAS) has been at the forefront of efforts by comparable jurisdictions in establishing regulatory frameworks and initiatives for the digitalisation of financial services, including cryptoassets as a means of payment.

In 2020, the Payment Service Act (PSA) entered into effect, which included regulation of Digital Payment Token (DPT)[119] services. The scope of regulated DPT services was further expanded in 2024.[120] MAS has also finalised a bespoke framework for single currency stablecoin (SCS) issuance, for SCS pegged to the Singapore Dollar or G10 currencies.

In parallel to regulatory reform, MAS has taken steps to support the adoption of DLT in financial markets, consistent with its pro-innovation approach. In 2022, MAS launched a collaborative cross-border sandbox initiative named "Project Guardian". The objective is to facilitate industry trials involving multiple currencies and across various financial products, including tokenised funds, bonds, stablecoins and tokenised bank liabilities.[121] Other notable initiatives include Global Layer 1, a shared-ledger blueprint to foster interoperable public-permissioned infrastructure.

Singapore operates under a unified institutional structure with the MAS serving as the country's central bank and integrated financial services regulator. The MAS holds comprehensive policy, regulatory and supervisory powers over tokenised money instruments and related services. The MAS plays an important role in discussions in global standard-setting bodies. It currently chairs the IOSCO Fintech Taskforce and leads one of its workstreams on Financial Asset Tokenisation.

Consistent with a technology-neutral approach, tokenised instruments that can be used for settlement purposes are subject to respective sectoral regulations, depending on their features, and irrespective of the underlying technology. Tokenised money instruments fall into one or more of the following categories under the MAS regulatory framework:

- **DPTs** are digital representation of value that can be used as a means of payment and publicly transferred. Non-MAS regulated stablecoins are captured under this definition.
- **Stablecoins** regulated under the SCS framework are a subset of DPTs that maintain a constant value to a single fiat currency, and are able to meet the requirements under the MAS SCS framework.
- Tokenised bank liabilities, including **tokenised deposits**, are digital representations of bank liabilities issued by banks on DLT. Banks issuing tokenised bank liabilities continue to be subject to existing banking regulations. MAS retains flexibility to impose additional requirements to address risks specific to tokenised bank liabilities as use cases develop.
- **Tokenised MMFs** are considered a digital form of MMF, which is a capital market product, regulated under the Securities and Futures Act.

Part II – Deep Dive: Stablecoin-Specific Regulations

MAS takes a distinct approach to stablecoin regulation compared to jurisdictions such as the EU, offering an opt-in regime for issuers seeking a regulated SCS label, while all other stablecoins are treated as DPTs. Unless stated otherwise, this section will focus on stablecoins regulated as SCSs.

Regulated stablecoins must be issued in Singapore, pegged to the Singapore Dollar or G10 currencies and exceed a circulation of SG$5 million. Stablecoins not eligible under the SCS framework include those not issued in Singapore, are denominated in other currencies, are pegged to more than one currency or other assets (e.g. commodities), or where the reserve assets are algorithmically backed or include non-eligible assets, e.g. cryptoassets.[122]

Stablecoins issuers are subject to licensing and capital requirements.[123] Stablecoins must be fully backed and the permissible reserve asset include holdings of cash, cash equivalents, and short-term debt securities.[124] Assets must be denominated in the same currency as the stablecoin peg, held in segregated trust accounts with qualified custodians,[125] and disclosed through monthly attestations. They are also required to fulfil redemption requests within five working days, and are not allowed to pass interest to holders.

Stablecoins, in the broader sense, fall under existing payments regulations, which have been adapted to accommodate new characteristics and risks, distinguishing them from existing forms of money (e.g. e-money).[126]

There are no regulatory restrictions that prohibit the use of foreign-issued stablecoins, but these do not qualify for the MAS regulated label. Only regulated SCS can be labelled and advertised as "MAS-regulated stablecoins", to communicate credibility and trust and differentiate from non-regulated stablecoins (e.g. foreign-issued stablecoins). Intermediaries that handle stablecoins are subjected to similar requirements as those offering DPTs, including AML/CFT.

A stablecoin arrangement in Singapore could be designated as "systemic" under certain conditions that demonstrates a sufficient interconnectedness with the broader financial system.[127] Systemic stablecoin arrangements would be subject to enhanced requirements and compliance with applicable international standards.[128]

Part III – Outlook

MAS is in the process of proposing legislative amendments to formally implement the SCS framework and plans to undertake a revision of its guidance on digital token offerings, as part of its broader efforts to strengthen regulatory policies and enhance financial sector competitiveness.

In March 2025, MAS consulted on implementing Basel Committee standards for the prudential treatment of cryptoasset exposures by banks, aligning Singapore with international banking supervision standards.[129] These standards have a global implementation date of 1 January 2026.

Case Study 5: United States

Part I – Context and Institutional Setup

The US adopted a regulatory framework for stablecoins in July 2025, the first legislative reform in the area of digital assets. The 'Guiding and Establishing National Innovation for U.S. Stablecoins' (GENIUS) Act of 2025, is a federal, bespoke framework for issuing and regulating payment stablecoins.

Prior to the GENIUS Act, there was no federal regulatory regime for stablecoins. At the state-level, some states applied state money transmitters laws to stablecoin issuers and intermediaries, while others also had state-level digital asset regulations for stablecoin issuance and custody.[130]

The regulatory landscape relevant to stablecoins in the US involves several agencies. The Office of the Comptroller of the Currency (OCC) is the primary regulator for uninsured national banks, federal branches of foreign banks, and nonbanks should the latter choose the federal path to become an authorised issuer. The federal banking agencies[131] will regulate subsidiaries of insured deposit institutions that issue payment stablecoins. Relevant state regulators are the primary regulators to state-chartered, uninsured depository institutions and nonbanks (should they choose the state-regulated path) located in the state. The Stablecoin Certification Review Committee (SCRC) is an inter-agency body with a panel comprised of the Treasury Secretary and chairs of the Federal Reserve Board[132] and Federal Deposit Insurance Corporation. The SCRC is responsible for certifying state regulatory regimes[133] and approving non-financial public companies seeking to issue stablecoins.

The GENIUS Act precludes payment stablecoins from securities' classification that would place it under the jurisdiction of the Securities and Exchange Commission (SEC). The SEC retains authority over tokenised securities, which includes tokenised MMFs under existing US securities laws.[134]

The US does not have clearly defined categories for tokenised money instruments, instead the definition for payment stablecoins offered by the GENIUS Act allows for some delineation between the different types of money instruments:

- **Payment Stablecoins** are defined in the GENIUS Act to include any digital asset issued on a public blockchain that is or is designed to be used as a means of payment or settlement where the issuer (i) is obligated to redeem the instrument for a fixed amount of money, and (ii) has created the reasonable expectation of stable value relative to a fixed amount of money.
- **Tokenised deposits** are explicitly excluded from the GENIUS Act and fall under existing banking regulations.
- **Tokenised MMFs** are also out of scope of the GENIUS Act. They represent shares in a MMF issued and transferred over a DLT network, where the fund transfer agent retains responsibility legal ownerships, custody, among other regulatory obligations. Tokenised securities will be captured under existing securities laws.

The GENIUS act applies to issuers of payment stablecoins and not the underlying infrastructure supporting their use.

Part II – Deep Dive: Stablecoin-Specific Regulations

The GENIUS Act sets out a bespoke regulatory framework for fiat backed payment stablecoins. The vast majority of stablecoins in circulation is USD-denominated, meaning the regulatory reforms in the US may affect adoption and market growth for stablecoins. As a result, there could be a knock-on effect on across different jurisdictions who may react to US reform.

Only a permitted payment stablecoin issuer (PPSI) can issue stablecoins in the US, which include federal qualified payment stablecoin issuers,[135] subsidiaries of insured depository institutions, and state qualified payment stablecoin issuers. The GENIUS Act specifically prohibits public companies not predominately engaged in financial activities from issuing payment stablecoins unless they obtain unanimous approval from the SCRC.

PSSI's are subjected to reserve requirements to ensure the stability of the stablecoin peg. Reserves must have at least 100% asset backing, which are comprised of high-quality liquid assets such as cash, US government bonds, short-dated debt instruments and MMFs. These reserves are subject to monthly audits and public reporting. Reserves are subject to non-rehypothecation restrictions and conditions.

Redemption must be on-demand and redeemed at par to the equivalent fiat value. PSSIs must establish procedure for timely redemption' and publicly disclose redemption rights to consumers, including fee structures.

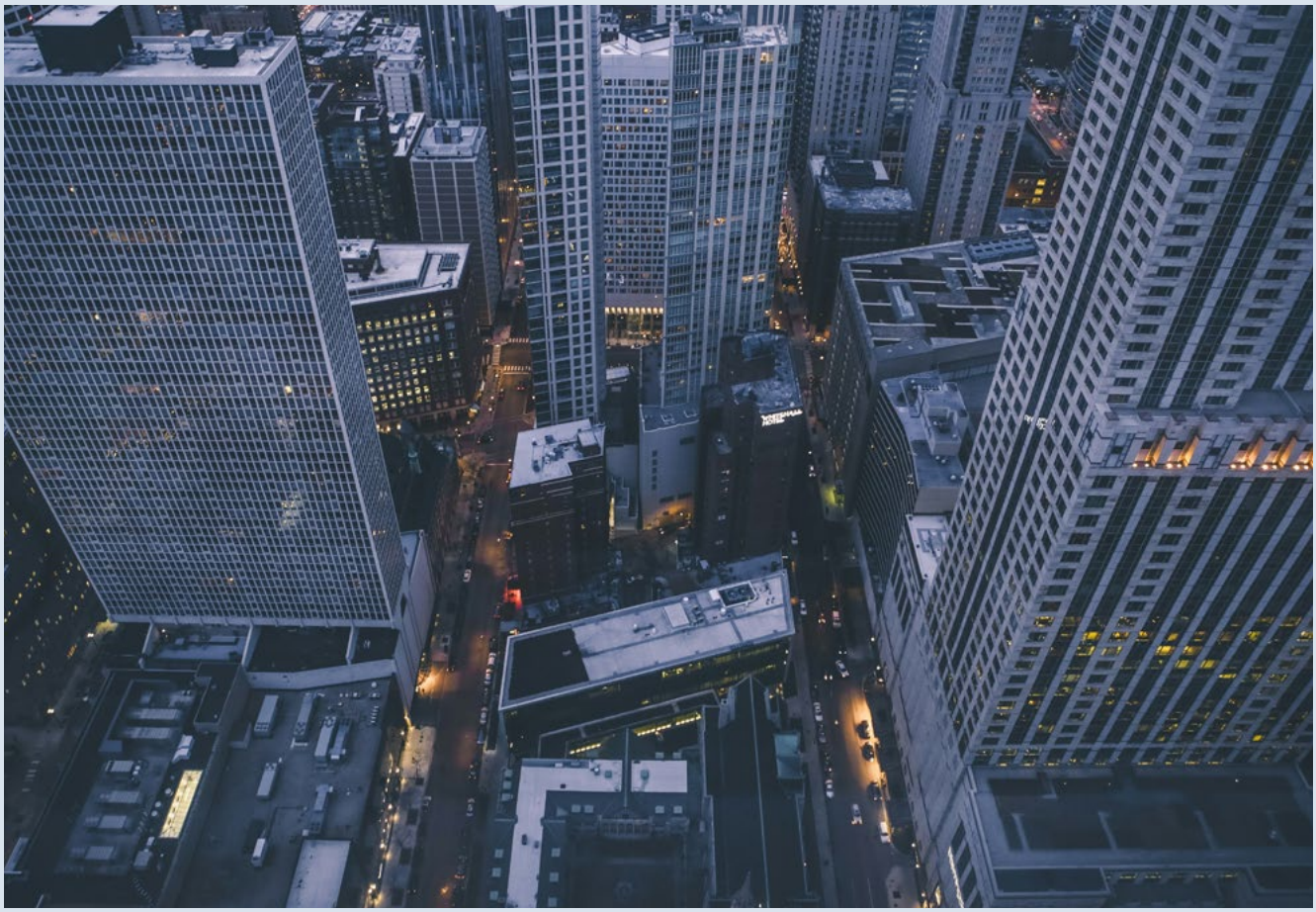
The GENIUS Act prohibits the passing of interest to holders of payment stablecoins and specifies that payment stablecoins are distinct from existing payments regulations, but are recognised as a complementary payment apparatus to the US financial system. PSSIs will be treated as financial institutions under the US 1970 Bank Secrecy Act, which will subject them to AML/CFT requirements.

Foreign stablecoin must meet a range of conditions to be offered and sold in the US. [136]Issuers must be regulated in a jurisdiction with a regulatory regime deemed equivalent (or comparable) by the US Treasury Secretary,[137] gain OCC registration and hold reserve assets in US-located financial institutions.

The US does not have a framework specific to 'systemic' stablecoins, instead the GENIUS Act intends to establish a strong regulatory floor for stablecoins, addressing the most fundamental risks. If stablecoins become systematically important for US financial markets and stability, then the Financial Stability Oversight Council (FSOC) are likely to become more involved with its oversight and assess any necessary regulatory response appropriate under its remit.

Part III – Outlook

The GENIUS Act sets a precedent for digital asset regulatory reform in the US and is set to take effect in January 2027. At the time of writing, the US Congress is discussing the Digital Asset Market CLARITY Act which defines the regulatory scope of the SEC and CFTC with regards to cryptoassets, which may also modify provisions of the GENIUS Act as discussed above. In parallel, there are discussion on the Anti-CBDC Surveillance State Act, signalling a negative regulatory outlook for US developments in CBDCs, which is out of line with broader global CBDC trends. In March 2025, MAS consulted on implementing Basel Committee standards for the prudential treatment of cryptoasset exposures by banks, aligning Singapore with international banking supervision standards. These standards have a global implementation date of 1 January 2026.



4.4.2. Comparative Analysis of Case Studies

The five case studies document an accelerating global effort among comparable jurisdictions to develop frameworks for tokenised money. There is a growing understanding of the evolving market landscape and the risks posed by different instruments. Despite this, jurisdictions have moved at different speeds and have followed different policy objectives.

Rulemaking activity has concentrated mostly on stablecoins, while initiatives for tokenisation of deposits and MMFs have been less frequent and have taken the form of studies, reports and analysis. Singapore stands out for taking a proactive approach[138] in enabling a testing environment for tokenising financial instruments by engaging a wide range of stakeholders,[139] including international regulatory collaboration.

Despite the existence of global standards in stablecoin regulation, some areas of divergence are evident. A case in point are location requirements for reserve assets, access to domestic market, and subsidiarisation of foreign issuers. Some jurisdictions seem to have factored competitiveness considerations in the decision to allow greater access for foreign issued stablecoins and expanding the type of assets used in reserve. In others, such as the EU, monetary sovereignty and financial stability have taken prominence.

There are areas that remain to be addressed and are cross-cutting for all tokenised money instruments. These include interoperability mechanisms between blockchains and different types of tokenised money, integrity of oracles in communicating market data and peg-stability, and standards for smart contracts and implications to operational resilience. These policy topics become more prominent as the use of tokenised money matures and adoption grows.

Table 16: Stablecoin Regulation in Key Jurisdictions

	Europe	Hong Kong	Japan	Singapore	US
Location requirement of reserve assets	EU-entity must have access to reserves; backing assets can be held outside the EU for EMTs that are non-Euro denominated.	Allows for some portion of backing assets to be held outside HK.	Statutory trust, segregated and localised.	Held locally or with overseas custodians (with a local branch). No requirement for foreign/non-regulated issuers.	Held in US financial institutions for local and foreign issuers.
Composition of reserve assets	Limited to cash, government bonds and short-dated repos.	Limited to cash, short-term debt securities, and dedicated investment funds.	Limited to cash, government bonds, or guarantees. Up to 50% of reserves may be held in short-term government bonds or fixed-term deposits.[140]	Limited to cash, cash equivalents, and short-term debt securities.	Limited to cash, short-term treasuries, repos, reverse repos, registered MMFs (or tokenised equivalents of these assets).
Overseas stablecoins	Must have a local subsidiary.	Must have a local subsidiary.[141] Unlicensed stablecoins can only be offered to non-retail investors.	Must partner with local institution.	Permitted	Must have a have a local subsidiary and from a country with a comparable regime.
Regulatory framework: bespoke or adapted	Bespoke	Bespoke	Adapted existing payment rules	Adapted payment rules	Bespoke
Treatment as a wholesale stablecoin	Only supported under specific exemptions	Supported with wholesale CBDCs	Supported	Supported	Not supported

Conclusion

The development of tokenised money has been accompanied by a gradual but uneven regulatory response across jurisdictions. Stablecoins remain the primary focus of regulatory initiatives, reflecting their rapid growth and systemic potential, while tokenised deposits, tokenised MMFs and other arrangements are only beginning to attract close scrutiny. This divergence in attention underscores the need for regulators to keep pace with innovation, as the spectrum of tokenised instruments expands and their integration into financial markets deepens.

Global standard setters have provided an important reference point by articulating shared policy objectives and principles, standards and recommendations. Their standards converge on core issues such as governance, reserve quality, redemption rights and systemic oversight. Nevertheless, national implementation is not consistent, with significant variation in areas such as reserve composition, localisation requirements and treatment of foreign issuers. These differences reflect different policy preferences and objectives, and market structures. For example, in the case of the EU, the protection of monetary sovereignty and its reliance on bank credit; in the case of the US a strong commitment to preserve and advance the international role of the US dollar; in the case of Singapore or Hong Kong their competitivness objectives. Supervisory cooperation also lags, limiting the effectiveness of frameworks in addressing the cross-border use of tokenised money. Mutual recognition or equivalence regimes have yet to be developed in most cases.

In an environment of heightened geopolitical competition, it is unlikely that regulations will converge significantly in the near-term, as illustrated in interview participants' responses. However, the pace of regulatory action is likely to accelerate and broaden beyond advanced economies. The passage of the 2025 GENIUS Act in the US is emerging as a pivotal moment, triggering reactions from other jurisdictions concerned about the risks of dollarisation and declining competitiveness.[142] Finally, regulatory debates, including at international level, are expected to broaden beyond the treatment of stablecoins to encompass wider questions of infrastructure and design. Interoperability, operational resilience, and the role of smart contracts in embedding compliance and risk management are among the issues that are likely to become central in the next phase of regulatory development.

Chapter 5

Summary of Insights and Future Outlook

Tokenisation challenges long-standing categories of money and highlights the need for a novel approach to classification. This task is not straightforward – instruments such as stablecoins, tokenised deposits, tokenised MMFs and others are increasingly blurring traditional classification boundaries. This report proposed at the outset a novel classification framework for tokenised money. It aims to enable a systematic analysis that can remain appropriate as the technology, market and the relevant regulations continue to mature.

The proposed framework maps instruments across the core dimensions: nature of the claim, its backing, form, and access; alongside additional features relating to business models, technical architecture, and legal and governance properties. Four broad instrument categories are identified: central bank digital money, commercial bank claims or deposits, pre-paid fiat representations (commonly referred to as fiat-backed stablecoins), and fiat-anchored asset positions.

The findings suggest that successful tokenised money implementation is following a gradual evolution pattern, starting with basic payment applications and expanding to more complex use cases as infrastructure and regulatory frameworks mature. The use case landscape is characterised by clear near-term applications in cross-border payments and treasury management, with significant long-term potential in trade finance and capital markets. The variation in implementation approaches across different organisations suggests that the tokenised money ecosystem will continue to evolve through parallel paths, rather than converging on a single model. Realising the full potential of tokenised money will require continued progress on infrastructure development, regulatory frameworks, and industry standardisation efforts.

The infrastructure and technical considerations for tokenised money represent both the greatest opportunity and the most significant challenge to scaling and achieving mainstream adoption. Interoperability and programmability are not merely technical features, but fundamental enablers of the network effects and innovation potential. Interoperability has emerged as the foundational requirement, with the highest priority ratings across all organisation types. However, achieving interoperability requires addressing numerous systemic challenges: cross-border efficiency, cross-platform connectivity, cross-asset integration, regulatory harmonisation, and governance coordination. The initiatives examined – Partior, Project Guardian, RSN and Project Agorá – demonstrate four different approaches to these challenges, with varying levels of maturity and success. Programmability represents a fundamental shift in financial infrastructure logic, moving from ex-post reconciliation to ex-ante execution where outcomes are determined and verifiable at instruction transmission. The capability spectrum ranges from basic conditional transfers to sophisticated AI-driven autonomous systems – though current adoption is highest in capital markets and lowest in retail applications.

The development of tokenised money has been accompanied by a gradual but uneven regulatory response across jurisdictions. Stablecoins remain the primary focus of regulatory initiatives, reflecting their rapid growth and systemic potential, while tokenised deposits, tokenised MMFs and others are subject to existing rules, are only beginning to attract close scrutiny. This divergence in attention underscores the need for regulators to keep pace with innovation, as the spectrum of tokenised instruments expands and their integration into financial markets deepens.

Global standard setters and international institutions have provided an important reference point by articulating shared policy objectives and principles, standards and recommendations. Their standards converge on core issues such as governance, reserve quality, redemption rights and systemic oversight. Nevertheless, jurisidiction-level implementations are not consistent, with significant variation in areas such as reserve composition, localisation requirements and treatment of foreign issuers, as the five case studies demonstrate. These differences reflect different policy preferences and objectives, and market structures. For example, in the case of the EU, the protection of monetary sovereignty and its reliance on bank credit; in the case of the US a strong commitment to preserve and advance the international role of the US dollar; in Singapore and Hong Kong, their competitivness objectives. Supervisory cooperation also lags, limiting the effectiveness of frameworks in addressing the cross-border use of tokenised money. Mutual recognition or equivalence regimes have yet to be developed in most cases.

Since commencing the research for this report, a series of major developments have reshaped the landscape for tokenised money. In the US, Congress passed the 2025 GENIUS Act, prompting reactions from other jurisdictions wary of deepening dollarisation and competitive disadvantage.[143] Swift announced the integration of a blockchain-based ledger into its core infrastructure, enabling instant, interoperable settlements across digital and traditional rails.[144] Meanwhile, Circle revealed that it is exploring mechanisms to make transactions involving its tokens reversible, signalling its ambition to align more closely with the financial mainstream.[145] Circle also signed a MoU with Deutsche Börse to integrate USDC and EURC into Deutsche Börse's financial market infrastructure. In Europe, a consortium of nine European banks announced a joint initiative to issue a euro-denominated stablecoin,[146] while the European Central Bank stated that a digital euro could be launched by 2029. These are just a few examples.

Collectively, these developments illustrate the accelerating pace of innovation and diffusion. They highlight the ways traditional and tokenised infrastructures are converging, and intensifying competition between strictly private and public and public-private initiatives. Above all, they reinforce a central insight of this report: that the evolution of tokenised money is not a linear progression toward a single model, but a dynamic and contested process – shaped by market forces, technological design, policy choices, and, ultimately, competing visions of what money should be in the digital age.

Annexes

Annex I

Tokenised Private Money Instruments: Indicative Interview Guide – Industry Participants

Overview: This interview is part of a research project led by the Cambridge Centre for Alternative Finance, focused on exploring tokenised private money instruments (TM), their regulation and role in financial infrastructure. The study aims to better understand the key motivations, implementation and regulation challenges, strategic outlook, and ecosystem implications of TM adoption across different sectors and use cases.

The purpose of this guide is to provide a broad overview of potential topics and areas that may be explored during the interview. The list is non-exhaustive and should be treated as indicative only: we would like the conversation to be flowing naturally. Please feel free to raise any additional points or areas you believe are relevant.

Duration: ~30 minutes

Flow:

1. Background (3–5 mins)
2. Use Case Exploration (20–25 mins – tailored to one selected use case)
3. Optional Quantitative Questions (2–5 mins)

1. Background (3–5 mins)

Theme	Questions
Background	• On a scale of 1 to 10, how relevant is tokenised money to your organisation's current priorities? • How do you expect this to change over the next two years? • Which TM use case is most relevant to your institution?

2. Use Case Exploration (20–25 mins)

Theme	Questions
Problem and Solution	• What **frictions or inefficiencies** are you trying to solve with TM? • Which of them imposes the most cost, delay, or complexity? • How do you see **TM helping resolve** these frictions or inefficiencies? • Is there a **form of TM best suited** to your use case—and why? • Which specific **features of TM** are most (or least) desirable for your use case?
Adoption Enablers and Challenges	• What are the key **barriers** to adopting TM (technical, regulatory, internal, external)? • Which risks are **hardest to quantify or mitigate**? • What **ecosystem dependencies or integration blockers** affect progress? • How might these challenges be addressed? Who should lead the development of the TM ecosystem? • How important is **programmability** in your chosen use case? • In which **domain** do you perceive the greatest promise? • What **benefits and risks** have you encountered—or do you anticipate—from programmability?

2. Use Case Exploration (20–25 mins) – continued

Theme	Questions
Experience and Impact	• What **lessons or best practices** have emerged from your TM experimentation or deployments • What **metrics** are you using to assess the success of TM? • What **early indicators** would signal readiness for scale TM adoption? • If possible, would you be open to sharing any **data** or results from your TM projects to support our research efforts?
Opportunities and Outlook	• Beyond solving today's frictions, what **broader value** could TM unlock? • What's your 2–5-year **outlook** for TM? • What could **accelerate/delay** progress? • Which **use cases or geographies** are likely to scale first – and why?

3. Optional Quantitative Questions (2–5 mins)

Theme	Questions (Scale 1 = Low / 10 = High)
Adoption Readiness	How ready is your organisation to adopt TM at scale?
Use Case Impact	How much value do you see TM bringing to your selected use case in the next two years?
Interoperability Need	How important is a standardised, interoperable infrastructure for TM adoption?

Annex II

Tokenised Private Money Instruments: Indicative Interview Guide – Financial Authorities

Overview: This interview is part of a research project led by the Cambridge Centre for Alternative Finance (CCAF), focused on exploring tokenised private money instruments, their use cases and regulatory treatment. The study aims to better understand the ecosystem implications of tokenised money (TM) adoption across different sectors and use cases and key motivations, implementation and regulatory challenges and strategic outlook.

In the context of this research project, tokenised private money instruments are defined broadly as digitally native or tokenised claims on fiat currency issued by private institutions, such as commercial banks, and recorded and transferred using blockchain or other distributed ledger technology. This definition would capture a range of instruments from deposits, to "stablecoins" and MMFs.

The interview will be conducted on a background basis. No statement or opinion will be attributed to the interviewee or their institution without prior approval. The only exception applies to the survey questions. While individual responses will not be attributed to specific participants, subject to your agreement, we would like to present the aggregated results from regulators in our reporting.

Duration: ~45 minutes

Flow:

1. Background (5 mins)
2. In-depth on regulatory frameworks and stance (35 mins)
3. Survey and Optional questions (5 mins)

1. Background

Theme	Questions
Remit and cooperation arrangements	• Please describe the remit and core responsibilities of your organisation with regards to tokenised money instruments and set out the coordination mechanisms with other relevant financial authorities.
Key regulatory initiatives	• Please outline the key regulatory or supervisory initiatives that your organisation has adopted or implemented over the past three years and describe any plans for the immediate future.

2. In-depth – Regulatory Framework and Stance

Theme	Core Questions
Classification	• Please set out how you define and delineate between different tokenised private money instruments (e.g. tokenised deposits, "stablecoins" and, possibly, tokenised MMFs).
Infrastructure	• What is your view about the risks posed by the underlying infrastructure (e.g. permissioned vs permissionless)? • How do the requirements on different tokenised money instruments differ according to the infrastructure used, particularly in relation to settlement finality and operational resilience?

2. In-depth – Regulatory Framework and Stance – continued

Theme	Core Questions
Cross-border payments	• How do you see tokenised money instruments contributing to the G20 cross-border payments roadmap? • Which infrastructure, regulatory, or interoperability conditions would need to be in place for stablecoins or similar instruments to support faster, cheaper, and more inclusive cross-border payments?

Stablecoin regulation	• Please can you clarify your stance on stablecoin issuers being prohibited to passing on interest or yield on reserve assets?
	• Please provide details on the criteria/indicators used to assess whether a stablecoin is systemic. Which features could be focused on (examples below); which should have a threshold or fixed criteria?
	  • Scale of usage (cross-border and domestic)
	  • Role in the payment system or broader financial markets
	  • Links to financial institutions or critical infrastructure
	  • Whether part of closed or restricted ecosystems that may enable scaling at pace
	• Please detail the implications for systemic stablecoins, i.e. stricter requirements, enhanced oversight, etc.
	• Do you believe this is an area that should be covered in further detail in the global standards or recommendations?

Cross-border issues	• Can you please describe the measures in place to regulate and supervise stablecoins issued abroad? (i.e. clarify your approach to multi-issuance; describe the key features of any models that you have seen as meeting your expectations) • How are you coordinating with foreign regulators on the oversight of cross-border stablecoin issuance and use? What factors or developments could justify the introduction of an equivalence regime? • How do you assess the risks of stablecoins denominated in foreign currency for financial stability and monetary sovereignty? • Are the cross-border challenges of stablecoins (i.e. multi-issuance and denomination) appropriately recognised in global standards and recommendations? In your view, should these standards be amended to enable jurisdictions to better address them?

3. Survey Questions

Theme	Questions
Use cases	What are the main use cases for stablecoins in your jurisdiction today? (Please select all that apply.) 1. Domestic payments 2. Cross-border payments and remittances 3. Wholesale settlement 4. Treasury management 5. Working capital optimisation 6. Digital asset trading and DeFi applications 7. Other (please specify)

3. Survey Questions – continued

Theme	Questions
Risks	Which risks related to tokenised money (broadly defined) are you monitoring most closely? 1. Market concentration or monopolistic dynamics 2. Lack of interoperability 3. Financial stability (including settlement finality) 4. Cybersecurity and operational resilience 5. AML/CFT and illicit finance risks 6. Consumer protection 7. Financial inclusion 8. Other (please specify)
Optional questions	• On a scale of 1 to 5, to what extent does the regulatory framework for stablecoins in your jurisdiction address these risks, particularly those arising from cross-border payments? (1 = not addressed, 5 = fully addressed) • On a scale of 1 to 5, would you describe the current global direction of tokenised private money policy and regulation as one of divergence or convergence? (1 = maximum divergence, 5 = maximum convergence) • On a scale of 1 to 5, do you expect an increase in the use and expansion of stablecoin use cases over the next 2 to 5 years? (1 = limited take-up; 5 = significant growth, with stablecoins potentially surpassing other forms of private digital money)

Endnotes

1. Joseph Schumpeter described the process of technological change in a free market in three phases: (1) invention (conceiving a new idea or process); (2) innovation (arranging the economic requirements for implementing an invention); and (3) diffusion (people observing the new discovery, adopting or imitating it). Schumpeter, J. A. (1934). The Theory of Economic Development. Cambridge: Harvard University Press.
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29. Public blockchains may offer KYC/AML controls to asset issuers, either through protocol-level features or smart contracts. In such cases, despite the decentralised infrastructure, asset issuers may have control over their tokenised assets.
30. Privacy-enhancing solutions, ranging from zero-knowledge proofs to confidential tokens, are available on public blockchains; however, this is not the default state.
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63. There is however, some progress on this front, for example, *Guidance on the Application of the PFMI* to systemically important stablecoin arrangements provides specific considerations to help jurisdictions determine systemic importance
64. Global availability of USD-denominated stablecoins or tokenised deposits could enable households and firms in emerging markets to bypass local currencies altogether, opening wallets that directly hold dollar-based tokens. This could accelerate de facto dollarisation, undermining the effectiveness of domestic monetary policy and weakening the transmission of central bank tools and echoes IMF and World Bank analyses that identify dollarisation as a structural risk for financial stability in weaker-currency jurisdictions.
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124. Debt securities must have a residual maturity of no more than three months, and be issued by the Singapore government, its central bank or supranational entities rated AA- or higher.
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132. The chair of the Federal Reserve Board may delegate this role to the Vice Chair for Supervision.
133. State regulators may supervise state-qualified stablecoins with less than $10 billion in outstanding stablecoins in circulation, conditional to their state-level regime being deemed equivalent to the federal framework under the GENIUS Act.
134. Rule 2a-7 of the US Investment Company Act 1940, as amended.
135. Non-bank entities, uninsured national banks and federal branches of foreign banks approved by the OCC.
136. The offer and sale prohibitions do not apply to: (i) the direct transfer of digital assets between two individuals acting on their own behalf and for their own lawful purposes, without the involvement of an intermediary; (ii) any transaction involving the receipt of digital assets by an individual between an account owned by the individual in the United States and an account owned by the individual abroad that are offered by the same parent company; or (iii) any transaction by means of a software or hardware wallet that facilitates an individual's own custody of digital assets.
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141. Retail distribution in Hong Kong is restricted to authorised institutions, regardless of the stablecoin's place of issuance.
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