SCALING UP TOKENIZATION AND DLT

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Europe's path to tokenised finance: Scaling, stability and market confidence

Improving financial infrastructures with distributed ledger technology

Distributed Ledger Technology (DLT) is fundamentally improving payment infrastructures by enabling the tokenisation of financial assets. Tokenisation consists in issuing, recording and exchanging financial assets or real assets, in the form of digital tokens on DLTs such as blockchains. Significant progress has been made on the exploration of the advantages and consequences of this innovation, and how we could adapt our tools as central bankers on the wholesale front.

Eurosystem exploratory work in 2024 have shown how important the momentum is, as over 200 tokenised transactions totalling €1.59 billion have been processed, using real central bank money. These experiments, involving more than 60 market participants, have focused on key use cases including the security lifecycle, payments, and cross-currency settlements.

Tokenisation presents efficiency gains driven by enhanced traceability, automation throughout the security lifecycle and shorter settlement towards To. It could also streamline cross-border transactions, thereby lowering costs and increasing market liquidity. Additionally, tokenisation could provide greater flexibility with programmability, expanding the range of investment opportunities.

The settlement asset conundrum: Maintaining central bank money as a safety pivot in a tokenised world

Financial crises have underscored the critical importance of secure settlement assets. Banque de France, alongside other central banks, has long promoted the use of central bank money in wholesale transactions – a principle enshrined in the CPMI-IOSCO Principles for Financial Market Infrastructures (PFMIs), as it is the safest settlement asset, with no liquidity nor credit risk. However, as tokenisation accelerates, there could be an increasing reliance on private settlement assets, particularly stablecoins, while other forms may emerge, such as tokenised commercial bank money. Although stablecoins aim to maintain a stable value relative to one or several assets, and to offer operational advantages in terms of speed and adaptability, they can pose acute risks if they are not supported by a solid regulatory framework (e.g. opacity of their reserves, limited stabilisation mechanisms and redemption rights, liquidity fragmentation and counterparty risks)

The emergence of a wholesale Central Bank Digital Currency (wCBDC) offers a strategic counterbalance to the rising prominence of stablecoins. By ensuring that central bank money remains accessible on DLT platforms, a wCBDC could erase liquidity and credit risk, mitigate liquidity fragmentation, reduce regulatory arbitrage, and uphold the role of central bank money – thereby reinforcing financial stability and preserving confidence among market participants. This is particularly relevant in a global landscape shaped by deregulatory trends.

Balancing innovation with financial stability and EU sovereignty

On the regulatory front, initiatives adopted in 2023 like the European Markets in Crypto-Assets (MiCA) regulation have created a harmonised environment for crypto-asset providers and stablecoin issuers, guaranteeing legal certainty in Europe. The DLT Pilot Regime, with its derogatory framework, has enabled controlled experimentation in trading and post-trading of tokenised securities under real-life and safe condition. A coordinated EU policy framework promoting dialogue among financial actors, technology providers, and supervisory authorities is vital. By pre-empting risks and enhancing interoperability, it fosters innovation while preserving financial integrity and boosting market confidence.

On the innovative side, the Governing Council's decision in February 2025 marks a significant milestone. Building on the success of the exploratory work in 2024, where three solutions where tested to settle tokenised transactions in central bank money – provided by Banque de France, Deutsche Bundesbank, and Banca d'Italia – the Eurosystem has endorsed a dual-track strategy for a euro wholesale CBDC.

In the short term, the Eurosystem will develop a solution based on these three approaches tested in 2024, enabling the settlement of tokenised transactions using euro central bank money. This wholesale CBDC is key to market confidence, scaling tokenisation, and financial stability.

> Wholesale CBDC is key to market confidence, scaling tokenisation, and financial stability.

In the long term, this initial solution will pave the way for a more integrated solution. As other currency areas leverage on tokenisation to gain market traction, developing a shared public-private infrastructure in Europe – such as a European shared ledger – has become crucial, and aligns with the yet-to-be-achieved Savings and Investments Union. This must foster market integration, streamline cross-border transactions, and preserve the anchoring role of euro central bank money in our two-tier monetary system, supporting a resilient and sovereign European financial ecosystem in the digital age.

SASHA MILLS
Executive Director for Financial Market Infrastructure – Bank of England

Scaling up tokenisation and digitalisation in the UK

In recent years, the financial landscape has been undergoing a significant transformation, driven by the advent of digital technologies and innovative financial instruments. Innovation occurring in wholesale financial markets today could have a truly transformative impact. Tokenisation - the process of issuing or representing assets in the form of digital tokens, often using distributed ledger technologies - and the wider adoption of new technologies have the potential to make post-trade processes faster, cheaper and more efficient, restructuring our financial system and the way we engage with it.

Public authorities have an active role to play in the reinvention of wholesale financial markets. This is both as enablers of innovation and providers of public infrastructure, and as regulators to ensure adoption happens in a way that preserves financial stability and is safe for participants in these financial markets. As it stands today, the implementation of programmable ledgers and tokenisation initiatives in traditional financial markets, for both securities and money, is at the experimental or early adoption stage in the UK. The Bank of England (the Bank) has been active in facilitating innovation in wholesale markets, in relation to both assets and money.

The Digital Securities Sandbox (DSS), a joint initiative between the Bank and the Financial Conduct Authority (FCA), is a significant milestone for the UK. It gives the Bank the power to 'turn off' rules to enable industry experimentation with tokenisation in a safe and secure environment which protects financial stability while supporting innovation. It supports the issuance, trading, and settlement of both digitally native securities and 'digital twin' tokenised securities, and will play a key role in the UK Government's issuance of a digital gilt (DIGIT) that was announced by the UK Chancellor at Mansion House in November 2024. By applying this proportionate approach to regulation, the DSS is supporting new firms that are driving the adoption of digitalisation and tokenisation and will allow this activity to scale up in the UK.

Tokenisation can improve investor access and introduce more liquidity into the market. By enabling fractional ownership, it unlocks access to previously illiquid assets or those with high barriers to investment. The perimeter of assets used in activities such as repo, lending and collateralisation could also be widened through tokenisation, and the tokenisation of new types of assets could open up and develop new markets where infrastructure was previously cumbersome. These larger and more diverse markets are how this innovation can drive growth.

> **Tokenisation has the potential to make post-trade processes faster, cheaper and more efficient.**

Digitalisation more broadly also has the potential to revolutionise post-trade processes by making them faster, cheaper, and more efficient. Programmable ledgers and smart contracts could consolidate and collapse trade and post-trade functions, resulting in reduced settlement risk, streamlining operations and cutting costs significantly. However, to unlock more of the benefits, including the programmability of securities, money needs to keep up with developments in tokenised assets. The Bank is considering ways to preserve and enhance the usefulness of central-bank money as a settlement asset for digital asset transactions, for example through the work taking place on the Bank's Real-Time Gross Settlement system and through a programme of experiments to test use cases and functionalities around new forms of central bank money.

Tokenisation and digitalisation should preserve the global nature of financial markets, but these changes risk market fragmentation. A key part of preventing this will be the adoption of consistent standards internationally, and we are working with other international regulators and standard setting bodies to develop a common understanding of the benefits and risks of tokenisation. For example, the Bank is participating in the Bank for International Settlements' Project Agorá, which explores how tokenised commercial bank deposits and central bank money may be exchanged on a public-private programmable platform, initially focused on cross-border payments. To the extent tokenised assets bring similar risks to financial stability as other assets, they should be subject to equivalent regulatory standards.

In conclusion, across wholesale financial markets the Bank of England is committed to exploring opportunities for innovation and working alongside innovators to ensure this digital transformation benefits everyone. The continued experimentation and development of these technologies can ultimately redefine the frontiers of market connectivity, financial system efficiency and sustainability. However, wholesale financial markets do involve a lot of risk, and it is important that innovation happens in a way that is safe for participants and does not propagate risk in the financial system.

MATHEW OSBORNE
Policy Director Europe – Ripple

Tokenising real-world assets: The next leap in financial innovation

The tokenisation of traditional financial instruments such as treasuries, bonds and exchange-traded funds (ETFs) is thrusting capital markets into the digital world of 'real-time' and 'always-on' trading and driving efficiencies for firms.

We've seen a groundswell of institutions leaning into the tokenisation of real-world assets such as securities, funds and FX. New and emerging use cases in tokenisation are streamlining processes that have traditionally been complex, inefficient and costly.

Ripple has deep experience in this. In 2016, we led the way in the tokenisation of fiat currencies using the XRP Ledger (XRPL), piloting a programme with banks to provide faster, transparent and more cost-efficient settlement of cross-border payments.

The momentum has continued in recent months, with partnerships with leading issuers of tokenised real-world assets (RWAs). Earlier this year, Ondo Finance, announced that it would bring tokenised US treasuries onto the XRPL, giving institutional investors access to Ondo's Short-Term US Government Treasuries (OUSG) which can be instantaneously minted and redeemed 24/7 using Ripple's USD stablecoin (RLUSD). In 2024, Ripple partnered with Archax, the UK's first FCA-regulated digital assets exchange, to facilitate tokenising money-market funds on the XRPL, as well as with the Singapore-based OpenEden to offer tokenised US Treasury Bills for institutional DeFi access.

New features and tools on public blockchain are supporting regulatory compliance and enhancing security, such as clawback and freezing features. On-chain identity solutions allow firms to enhance their KYC processes and mitigate compliance risk.

Medium to long-term opportunities in tokenisation

The opportunities in tokenisation extend beyond efficiency gains and are not limited to institutional adoption. By enabling fractional ownership, tokenisation significantly lowers barriers to entry to investment, especially for retail investors. These tools also help SMEs and scale ups by significantly reducing the cost of raising capital.

We anticipate that the tokenisation of real-world assets will continue to deepen and broaden new opportunities across traditional financial services. Going forward, there is huge potential for tokenisation to bring liquidity and access to historically illiquid markets such as bonds and even specialised assets like carbon credits.

A good example is collateralisation for DeFi lending. Stablecoins or tokenised US treasuries can support lending on DeFi platforms where collateral is locked into smart-contracts and released when the debt has been paid. These sorts of lending arrangements – like other transactions being transformed by tokenisation and DLT – benefit from being automated, decentralised and disintermediated.

> **Tokenisation has huge potential to bring liquidity and access to historically illiquid markets.**

There is certainly more work to be done to co-design a robust yet accommodating legal framework around tokenised assets to ensure wider adoption. For example, the UK's Property (Digital Assets etc) Bill seeks to ensure that tokenised assets are legally recognised as objects of personal property, providing clarity on their status and enforceability. This could create further opportunities for sectors such as real estate.

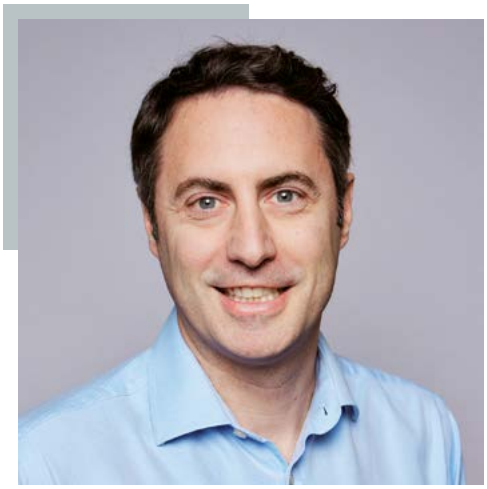
What next for the EU regulatory framework

The European Union has been proactive in getting ahead of other jurisdictions, with regulatory initiatives like its DLT Pilot a welcome step in the right direction. Tokenisation presents a huge opportunity to enhance growth and competitiveness across the European bloc, particularly by providing access to finance and capital markets through the EU's Savings and Investments Union.

A key challenge for the uptake of tokenisation in European financial markets is the viability of the cash leg for transactions. While alternatives exist, including CBDCs and tokenised commercial bank money, stablecoins present the fastest, most efficient and widely adopted offer.

The Markets in Crypto-Assets Regulation (MiCA) has provided regulatory clarity for stablecoins, although its lack of openness to overseas-issued and non-Euro stablecoins creates barriers. The increased requirements for systemic stablecoins could also impede the EU's emergence as a tokenisation hub, although the European Central Bank's recent announcement to support central bank money is welcome.

To foster further tokenisation, the EU's review of the DLT pilot should be expedited to allow for increased flexibility and higher limits for commercialisation. A centralised approach to supervision could ensure consistent and adaptive regulation.



TOM DUFF GORDON

Vice President of International Policy – Coinbase

The future of finance calls for a permissionless architecture

Despite years of digital advancements, many financial systems remain outdated, with slow and complex settlement processes that can take days. The deficiencies of the current financial system are sometimes masked by consumer-friendly innovations, such as the introduction of mobile payments apps. But while they are digital, and may feel instant, they still rely on traditional banks and settlement rails to actually move money. And because they are closed systems, they limit users to sending money within their own networks.

Tokenization of assets on permissionless blockchain networks can change this. Rather than just adding new interfaces to old systems, permissionless networks rebuild financial services from the ground up with open, programmable rails—bringing everyone and everything onchain. This enables true peer-to-peer transactions and direct connectivity between all participants—regardless of which provider they use.

Permissionless base layer financial market infrastructure is crucial for the future of finance due to its unique advantages over permissioned systems. These networks enhance resilience through decentralization, ensuring no single point of failure. They offer superior security with immutable, cryptographically secured transactions and enable seamless interoperability between blockchain applications, DeFi platforms, and traditional systems. Additionally, permissionless systems drive cost efficiency by eliminating the need for separate infrastructures for different applications. Together, these features provide a more secure, resilient, and cost-effective foundation for the financial markets of tomorrow.

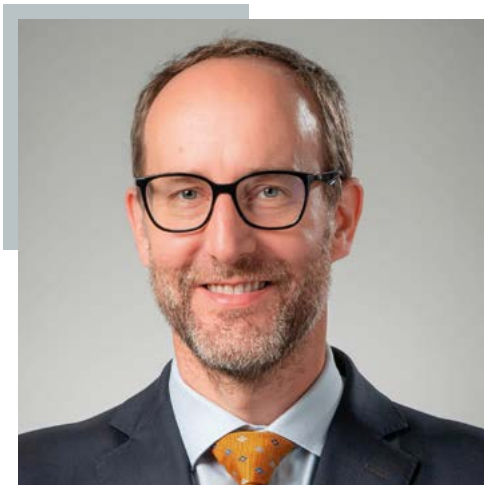
The future lies in permissioned systems built on a permissionless base layer. These systems can meet critical regulatory requirements while maintaining the benefits of decentralization. This allows financial institutions to maintain control over participants, ensuring that only pre-approved entities can interact with the platform, all the while benefiting from the transparency and auditability of permissionless networks. Privacy concerns are managed through the permissioned layer, restricting access to sensitive data to authorized parties only. Furthermore, data reporting becomes more efficient as permissioned systems can leverage the trustless nature of public blockchains to verify transactions without relying on centralized authorities. This combination of control and openness ensures regulatory compliance while harnessing the full potential of blockchain technology.

The Basel Committee on Banking Supervision (BCBS) should reevaluate its approach to the prudential treatment of digital assets, especially those transacted on permissionless blockchains. Instead of applying blanket punitive capital requirements, the BCBS should focus on developing principles that enable banks and financial institutions to engage with digital assets, such as DLT-based securities, on permissionless systems in a responsible manner. Banks should be allowed to assess their exposure to these digital assets just as they would with traditional assets, considering key factors like governance, controls, and risk mitigation. This approach would encourage innovation in the sector while maintaining financial stability.

The future lies in permissioned systems built on a permissionless base layer.

Collaboration between the EU and the US is essential as both regions progress in digital asset regulation. The US President's Executive Order emphasizes the need for tokenization and permissionless blockchain technology in financial markets. Meanwhile, the EU's DLT Pilot Regime explores the integration of DLT into capital markets. To ensure the continued advancement of this field, the EU and the US should work together within international bodies like the BCBS to support the development of permissionless base layer financial market infrastructure.

As tokenization and DLT adoption in capital markets accelerate, the EU must move beyond the DLT Pilot Regime and update its capital markets rulebook to fully embrace digital assets. A key step is supporting on-chain cash settlement assets like wholesale CBDCs, tokenized commercial bank money, and stablecoins, which are essential for global interoperability and cross-border transactions. The EU should allow MiCA-authorized stablecoins for on-chain settlement outside the DLT pilot regime. Additionally, addressing fragmented custody rules across member states with a unified regulatory framework is vital to enable cross-border custodial services and foster the growth of DLT-based financial markets.



DAVID DUROUCHOUX

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How can banks better serve clients engaging with digital assets?

Banks have generally taken a cautious approach to the crypto asset class which has been growing actively for over a decade now (Bitcoin 2009, Kraken 2011, Coinbase 2012, Ethereum 2015, Binance 2017, SG FORGE 2018).

With the price of Bitcoin reaching highs above 100k€ and the passage of time, the active client-base has grown steadily, generally without the benefit of consumer protection regulations present in the regulated investments market.

Many such clients now seek an aggregated service combining assets from Traditional Finance (TradFi) with Decentralized Finance (DeFi).

What could banks offer them?

First, ensuring safe custody of crypto assets is key, so as to be able to enter securely into this technology which relies strongly on IT and cryptographic tools which can be attacked. Cryptography makes it possible to create accounts and passkeys which cannot be broken, but the surroundings tech stacks can be (internet pages, social hacking, etc.), as we have seen in the recent Bybit case. Banks have the processes to manage this complexity and provide end-to-end secure environments.

Second, those assets have to be offered in a compliant manner. Regulated banks are subject to the highest standards, ensuring that clients accessing crypto assets have been passing strong KYC procedures before landing on their web or mobile app.

Third, the clients will increasingly need a flexible offering to bridge between traditional assets and crypto assets: that the reason why Societe Generale FORGE issued EurCV, the first Euro-based stablecoin. Issued by a bank, and thus compliant with both banking regulation AND with the DeFi world, it acts as a form of commercial bank money adapted to delivering products and services of the new digital world.

To be fully effective, it needs to interoperate smoothly with other banks and with the central bank. That is the reason why we support the adoption of a wholesale CBDC under a form of a token to reduce the technology gap between the two forms of digital money and to guarantee a seamless experience at the minimal cost of operation.

This wholesale CBDC would be a strong anchor, issued by the central bank, and is the best choice for regulated banks who want to issue or operate stablecoins while keeping an appropriate level of risk management in the service of their clients.

> **Wholesale CBDC is a strong anchor for banks who want to operate stablecoins securely.**

Taking a step back

The Draghi report showed that the key driver of the rising productivity gap between the EU countries and the US has been digital technology ("tech") - and that Europe currently looks set to fall further behind. An important reason why EU countries' productivity diverged from the US in the mid-1990s was Europe's failure to capitalize on the first digital revolution led by the internet - both in terms of generating new tech companies and diffusing digital tech into the economy.

To address this productivity gap, the European economy needs to better integrate new technologies. In certain areas of the financial sector, adoption of blockchain or distributed ledger technology (DLT) could offer the potential for very significant productivity gains due to the automation of market transactions and of the back offices of financial institutions.

The potential market of blockchain on the EU economy is significant. The Global Financial Markets Association (GFMA) has estimated that DLT has the potential to create ~16tn USD global markets for illiquid assets by 2030.

The AFME states that EU is currently well-positioned in the race on primary issuance of tokenized bonds, but needs to remove regulatory blockers to enable at-scale development of blockchain-related financial services.

The EU has also been a pioneer in markets in cryptoassets by being the first large economic zone to enact a comprehensive regulation on cryptoassets and stablecoins with the MiCA Regulation. Currently most major international market participants are registered under national cryptoassets regulations and working towards compliance with MiCA, or already have a MiCA license.

The stablecoin market is currently around USD 200Bn outstanding, of which 99% is USD underlying. Comparing to the current forex reserves worldwide made of 60% of USD and 20% of EURO, we see the potential for a Euro-based stablecoin market reaching EURO 60Bn.

Societe Generale FORGE expects significant growth in the market for tokenized assets, and is working actively alongside with, mostly, European partner-banks who share a common vision for regulated and secured instruments within the crypto ecosystem.

GFMA Report, "The impact of DLT in Global Capital Markets", impact-of-dlt-on-global-capital-markets-full-report.pdf (May 2023)

AFME, Use of DLT and Tokenisation in Financial Markets A Proposed Vision and Policy Recommendations, 20241104_ AFME Submission to EC_Final- update. pdf (November 2024)

Draghi report link: 97e481fd-2dc3-412d-be4c-f152a8232961_en (europa.eu)