BUILDING THE MARKETS OF THE FUTURE

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ABOUT OMFIF

With a presence in London, Washington and New York, OMFIF is an independent forum for central banking, economic policy and public investment – a neutral platform for best practice in worldwide public-private sector exchanges.

DMI OMFIF Digital Monetary Institute

Where the public and private sectors meet to shape the digital future of finance

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The hype is giving way to reality

As the glamour of digital assets fades, the real worth of the market is emerging. By Philip Middleton, Deputy Chairman, OMFIF

LAST YEAR, the crypto winter wiped around $2.3tn (75%) from the alleged value of digital assets, impoverishing cryptocurrency traders in the process. Many commentators were keen to call time on digital assets and conclude that the craze is over. With the advent of central bank digital currencies in major economies seemingly delayed for the foreseeable future and significant non-financial services' distributed ledger technology-based applications failing to develop compelling commercial use cases, many digital assets projects have been quietly put on ice or discontinued. Speculative interest has largely charged off to the next El Dorado: artificial intelligence.

Yet amid the rubble and against a challenging economic background characterised by slow growth, inflation and high interest rates, there is an emerging digital asset infrastructure concentrated on wholesale financial services activities.

On one hand, we have systems and businesses dedicated to the exchange and custodianship of digitalised versions of traditional financial instruments. The primary objectives are the unglamourous pursuits of increasing speed and efficiency, reducing costs and improving security. This field will largely be the domain of wholesale financial institutions and high-net-worth-individuals rather than mass retail customers. Out of the limelight, it will develop and deploy sophisticated financial architectures which will potentially strengthen the stability of global financial activities while simultaneously posing new and complex challenges for regulators and supervisors.

On the other hand, the ecosystem is entering a period of reflection and regrouping. With the meteoric rise over, the focus is shifting onto real, commercially valuable use cases, as opposed to speculative investment.

The debacles of FTX and Terra/Luna resulted in a souring of attitudes to cryptocurrency and put the industry squarely in regulators' crosshairs. The world's leading policy-makers and legislators are hashing out the details of exactly how these instruments should be treated. Although we are still a long way from global regulatory consensus, at a national level, the discussions are moving rapidly and bodies like the Financial Action Task Force and International Organization of Securities Commissions are laying the groundwork for an international approach. With that consensus emerging – alongside institutional-grade infrastructure – regulated institutions may begin to engage with cryptoassets more enthusiastically and in larger volumes.

For many wholesale financial activities, including exchanges and custody, strategic emphasis is turning towards developing a synthesis between digital and tokenised assets to avoid having to deploy parallel architectures. Most investment managers will want to be able to interact with crypto and tokenised instruments using the same systems with which they manage their traditional portfolios, so the future is likely to belong to those who can most effectively integrate token and DLT-based systems with existing ones.

This latest OMFIF study of the digital assets market arrives at an interesting juncture in its evolution. In the following pages, we discuss developments, explore major issues and venture forecasts and opinions. We would like to thank report sponsors, contributors and research participants for their generous assistance and hope readers will find the analysis stimulating and compelling.

'THE FUTURE IS LIKELY TO BELONG TO THOSE WHO CAN MOST EFFECTIVELY INTEGRATE TOKEN AND DLT-BASED SYSTEMS WITH EXISTING ONES.'

BUILDING THE MARKETS OF THE FUTURE

Efforts to tame crypto are helping to sanitise the market for traditional finance

With the launch of bitcoin in 2009, a parallel financial system was created. For a few years, it languished in obscurity but, as its fame grew and new coins were launched, it morphed into a real marketplace (albeit one a fraction of the size of the traditional financial system) with its own ecosystem of exchanges, service providers and custodians.

This system was built on principles that were specifically hostile to the traditional system: decentralisation, the removal of intermediaries and peer-to-peer, trustless exchange. Bitcoin was designed to wrest control of the world of finance from banks – both central and commercial.

Despite the apparent hostility, the gap between this new crypto financial world and the incumbent, permissioned, intermediary-based system is shrinking. We believe that, over the next few years, the lines between the cryptoasset ecosystem and the TradFi world will continue to blur until we have one unified financial system.

There are two separate forces driving this convergence. First, there is the effort – both technical and regulatory – to sanitise and tame the crypto market. Second, there is the drive to improve the technology underpinning traditional markets, much of which is due an overhaul. With the cryptoasset industry popularising distributed ledger technology, it is only natural that there would be a move to apply this to TradFi. As is the case elsewhere, the infrastructure is emerging at pace, but regulators are taking their time to adapt.

The first three chapters of the report deal with the efforts to tame crypto for institutional players, with the rest of the report focusing on the application of DLT in TradFi. Chapter 1 examines the move to deliver robust bank-grade infrastructure for custody, systems integration and supervision, to give regulated institutions confidence in trusting a market rife with scams.

Chapter 2 examines the progress towards clear regulatory frameworks for cryptoassets around the world. The US is widely regarded as lagging other jurisdictions. We examine this claim, exploring the forces hindering development in the US and the situation in alternative jurisdictions. In Chapter 3, we examine the value proposition for cryptoassets. After huge value destruction engendered by scandals and a tightening monetary policy environment, the official sector's trust in the cryptoasset class has rarely been lower. We re-examine the arguments for cryptoassets – including stablecoins and non-fungible tokens – providing genuine value to the economy.

In the second section of the report, we examine the other force driving the convergence of TradFi and crypto: the adoption of DLT in the financial industry. First, Chapter 4 explores the changes to market structure that DLT proliferation might enable – perhaps by disintermediating pieces of financial market infrastructure or facilitating more vertical integration.

Then, in chapter 5, we move onto tokenisation and the development of secondary markets for digital assets, exploring the efficiency savings that a new form factor might offer. Finally, we examine the progress made towards the creation of primary DLT-based instruments – blockchain bonds and the repurchase market.

Throughout the report, you will find thought leadership from our report partners, TP ICAP, Aquanow and Stellar Development Foundation, as well as contributions from public sector experts: Japan's Financial Services Agency, the Financial Action Task Force, former Commodity Futures Trading Commission chair, Timothy Massad, Banque de France and the European Investment

SANITISING THE CRYPTO ECOSYSTEM

While appetite for exposure to cryptoassets remains, many institutional players are deterred by the unclear regulatory environment, the frequent scams and hacks and the lack of robust bank-grade infrastructure. But progress is being made on all of these fronts.

Key findings

1. Cryptoassets are global and the regulatory response must be global too. National approaches are converging, helped by guidance from international bodies, but more is needed.

2. Robust, bank-grade infrastructure is emerging that will help give TradFi institutions the confidence to explore the cryptoassets market.

3. Though battered by scams and scandals, there is a core of value to the cryptoasset class that the crypto winter has not extinguished. ➤

Bringing crypto to TradFi

As the dust settles after the crypto winter, what will it take for traditional financial institutions to overcome their concerns and embrace the ecosystem?

THE CRYPTO community has spoken of 'the impending arrival of institutional money' in hushed tones for many years. For an asset class where growth has historically been driven primarily by retail participation, the promise of the trillions of dollars managed by institutions – pension funds, insurance funds, hedge funds – allocating sizeable amounts of their portfolios to the cryptoasset ecosystem was widely regarded as the event that would deliver the huge returns for which holders were waiting.

Institutional funds have been aware of the returns on offer in the cryptoasset ecosystem for many years, but a combination of the absence of robust regulation and the related preponderance of scams and abusive practices have kept allocations limited. With the dust settling after the crypto winter, we examine the preconditions that need to be met for regulated institutions to return to the cryptoasset ecosystem in greater number.

Infrastructure challenges

Crypto infrastructure is complicated. Developing a major presence in that industry requires a combination of specific expertise and relationships with new service providers. Phil Sham, chief executive officer of Aquanow, referred to two key problems in this area. First, a knowledge gap. 'Institutions don't know what they know and what they don't know,' said Sham. 'That's a barrier stopping them allocating more to crypto.'

Second, service providers are emerging, but with a background in servicing the needs of non-professional retail investors, they are not always suitable for the needs of institutional clients. Sham called attention to the need for 'bank-grade infrastructure' and observed that this deficit is gradually being overcome as 'crypto infrastructure providers learn the requirements of institutional providers and build all-in-one flexible platforms that adapt to each institution's unique needs'. Similarly, traditional financial service providers are learning the ropes of the crypto market to offer their customers safe exposure to the new asset class.

One key area here is custody services. While the original ethos of bitcoin encouraged investors to hold their assets directly – 'not your keys, not your crypto' was the early cry – it is very unlikely that institutional investors will wish to engage in self-custody of assets. Self-custody, being responsible for one's own private key (a long alphanumeric sequence), reduces reliance on third parties. While this might be simple for individuals (who nevertheless risk losing the private key through accident), institutions require an infrastructure not dependent on a given individual (who may fall ill or leave the company) to be able to interact with their assets. Self-custodying requires them to develop that infrastructure themselves.

To avoid this complexity, most are likely to engage a custodian. These come in several varieties. Third-party custody is the closest analogy to TradFi custody relationships. The custodian holds the assets on behalf of the customer and makes use of service-level agreements to determine the terms and conditions of how the assets are stored, when they can be accessed and how they can be moved. These kinds of solutions are capable of offering the highest level of security, though the quality differs widely in practice.

A third solution involves self-managed wallets supported by a third party. It makes use of multi-signature protections and identity verification and other institutional support, but does not take over ownership of the assets.

Custody solutions also vary in the degree of 'hot' and 'cold' storage they employ. Cold wallets store the signing keys required to move cryptoassets offline in hardware devices unconnected to the internet. Hot wallets keep those keys in systems connected to the internet so that they can be used to initiate transactions immediately.

Cold wallets are typically regarded as safer than hot wallets, but this is an oversimplification. Cold wallets must still be protected by careful, role-based permissioning and multi-signature security models. From an operational risk perspective, multiple redundant back-up locations are also a necessity to ensure that holdings are not lost in the event of a natural disaster and remain accessible through power or network outages.

'Institutions don't know what they know and what they don't know. That's a barrier stopping them allocating more to crypto.'

Phil Sham, chief executive officer, Aquanow

Custody and vertical integration

As well as the technical and operational standards that institution-grade custodians must achieve, there are also legal and accounting standards they must adhere to. In TradFi, these standards are taken for granted. In the crypto world, FTX provided a high-profile example of excessive vertical integration – custodian, exchange and proprietary trading desk all in one legal entity – and created a moral hazard that led to the alleged fraudulent misuse of client assets on a scale rarely seen since Enron.

'We hear from customers in TradFi that they want proper legal separation between different services,' said Duncan Trenholme, global co-head at TP ICAP. 'Some of the insolvencies of crypto platforms have been alleged to have been caused by misuse of customer funds to backstop liquidity issues of other services offered by the exchange. This wouldn't have been possible if the exchange doesn't own and have access to the custodian.'

Trenholme added: 'If you run an orderbook ➤

AQUANOW

INSTITUTIONS ARE COMING, BUT IS CRYPTO STILL WAITING?

Traditional financial institutions are finally beginning to embrace bank-grade digital assets that have been tried and tested by industry disruptors, explains Mike Leung, head of corporate strategy, Aquanow.

The future of finance is here. Financial institutions have been slow to adopt crypto, but digital assets are already transforming the global landscape with neobanks and non-banks leading the charge. While the PayPal stablecoin, central bank digital currency projects and other recent developments may finally awaken the incumbents, the doors to finance have already been blown wide open. The rise of embedded finance through fintechs, telecoms, ecommerce and superapps is building out new systems through embedded crypto.

Digital assets firms have been preparing for institutional adoption for years. It makes sense for traditional businesses to partner with crypto industry expertise to expedite market entry while minimising upfront costs.

Some banks are piloting ring-fenced projects, including closed-loop retail trading, wealth management products and separate digital banking subsidiaries. But integrating emerging technology into well-established regulated frameworks can be complex.

For the most part, large financial institutions have taken a cautious 'wait and see' approach to adopting crypto, waiting for regulatory clarity and weighing uncertain market opportunities against risks and resources.

While waiting for the institutions to come, digital assets infrastructure providers have been building their technologies and policies to 'bank-grade' standards. Security, compliance and scalability are just some of the non-negotiable requirements of regulated institutions for integrating blockchain technology onto their platforms.

For security, service providers must pass rigorous tests on cyber threats and control vulnerabilities. For compliance, trading and fund flows must navigate a complex web of regulatory frameworks, across securities regulation, money transmission rules and know your customer/anti-money laundering policies. For scalability, implementations must be robust in the face of significant transaction volumes and resilient against downtime.

Leading digital assets infrastructure providers have been operating at these bank-grade standards for years, but because of the non-bank clients who have led adoption. This accumulated experience means that digital assets infrastructure providers can now provide the more conservative institutions with the comfort of being tested partners.

Despite the vision for worldwide transformation of finance, the global crypto industry is still subject to local requirements. First-hand experience across different parts of the world proves that blockchain infrastructure works at scale, but the technologies and best practices still require significant adaptation in each specific country. To succeed, crypto firms will need to demonstrate flexibility in building solutions with their local partners.

While disruptive fintech and embedded finance challengers have been actively pursuing crypto use cases for digital money, banks have been slow adopters. However, incumbent banks still have many advantages when they choose to get involved due to their long-standing businesses being shaped by the regulatory and localisation requirements in their markets.

Whether bank or non-bank, all players in the crypto financial services race must ultimately find a suitable infrastructure partner. To accomplish the mission of mass adoption, crypto firms must provide the embedded crypto solutions that make technology integration and regulatory compliance easy for their clients to jump in.

'Leading digital assets infrastructure providers have been operating at these bank-grade standards for years, but because of the non-bank clients who have led adoption.'

THE BATTLE FOR A BITCOIN ETF

Exchange-traded funds are an immensely popular way for investors – both retail and institutional – to get exposure to the performance of an asset that it would be otherwise inconvenient for them to hold.

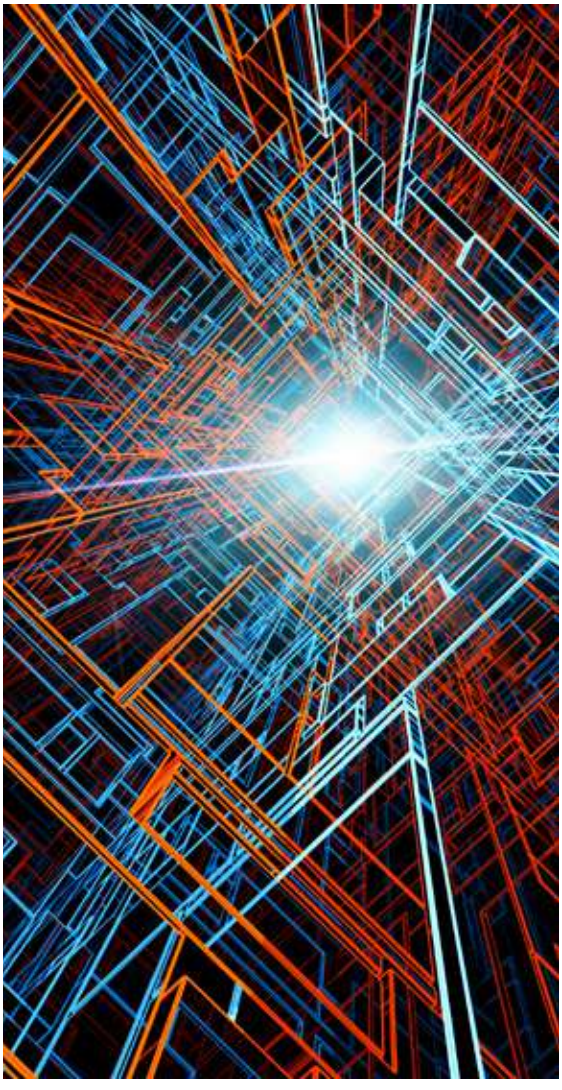
Given the operational challenges in holding cryptocurrencies, there is an obvious market for an ETF tracking the performance of various cryptocurrencies. The US Securities and Exchange Commission has, in the past, approved an ETF for bitcoin futures.

A bitcoin futures ETF is a type of ETF that doesn't hold bitcoin directly. Instead, it invests in bitcoin futures contracts. These are agreements to buy or sell bitcoin at a predetermined price on a future date. Typically, these are settled in cash, so the holder of the futures contract receives the equivalent dollar value, rather than actual bitcoins. A bitcoin futures ETF contains a constantly renewed stock of these contracts, allowing the ETFs to roughly track the price of the digital currency. However, the costs of maintaining a rolling futures portfolio mean that they give less accurate exposure than an ETF backed simply by actual bitcoin.

The SEC has yet to sanction a bitcoin ETF, based at least partly on the fact that bitcoin does not trade on US-regulated exchanges and could therefore be vulnerable to abusive trading practices without an effective oversight facility to detect these. Bitcoin futures trade on the Chicago Mercantile Exchange, which is regulated by the Commodities and Futures Trading Commission (although obviously the underlying asset is still bitcoin, which remains susceptible to abusive trading practices).

Grayscale has been leading the legal charge to get a bitcoin ETF licensed and, in late August 2023, won a major victory, with a court agreeing that bitcoin futures and bitcoin are so similar that approving an ETF of one and not the other is 'arbitrary and capricious'.

While the SEC might appeal this judgment, it seems likely that spot bitcoin ETFs are likely to become a fixture of the landscape, offering a new means for TradFi players to gain exposure to the asset class.



or perform order-matching services, and you have an over-the-counter desk acting in an agency capacity, there are potential conflicts of interest. Institutions need to be confident that there will be fair, equitable access for clients and that they won't be front-run.'

While proprietary trading and investment banking services can be uneasy bedfellows with custody and exchange, integrating the services of the latter two can offer efficiency savings when it comes to order matching. Provided there are robust safeguards, market sensitive information is not improperly shared and affiliates are not preferentially treated.

Existing system integration

Institutions have complex structures for storing their traditional assets, managing their portfolios, assessing their risk and placing orders. They have existing relationships with custodians and trading infrastructure providers, with whom they place orders, and custodians, who safeguard their assets. If engaging with cryptoassets requires them to build new infrastructure or does not smoothly integrate with their risk management systems, this will prove unwieldy.

In some respects, this could give TradFi service providers an advantage. If they are able to develop high-quality, innovative ways to allow their clients to gain exposure to cryptoassets through channels they are already familiar with, allowing them to place orders and manage risks in their existing systems, it will be difficult for native crypto service providers to develop equivalent ➤

'We hear from customers in TradFi that they want proper legal separation between different services.'

Duncan Trenholme, Global Co-Head of Digital Assets, TP ICAP

PROVIDING FIT-FOR-PURPOSE CRYPTOASSET INFRASTRUCTURE

Risk management, regulatory and security procedures at market infrastructure firms need to meet the standards of traditional markets for financial institutions to fully enter the crypto ecosystem, explain Duncan Trenholme and Simon Forster, global co-heads of digital assets, TP ICAP.

Market participants require access to global liquidity for their business operations – to raise capital, fund growth, manage their treasury needs, purchase energy and power or hedge the commodities and materials they produce.

In recent years, clients have been increasingly interested in buying and selling a new type of asset in the wholesale markets – cryptoassets. Initially it was for investment purposes, speculating that this new technology and asset would create an improved system for the efficient exchange of value. More recently, it has been to facilitate access to blockchain networks and leverage this new system for some of their business operations.

The use of blockchain networks in this way is in its early stages, as would be expected of a frontier technology that hasn't yet fully matured. Early experimentation is from technology-first or fintech companies and is usually for non-core operations. Examples have included increasing customer engagement through the issuance of non-fungible tokens rather than traditional loyalty programmes, raising capital through the issuance of a token rather than through traditional fundraising processes, or managing energy storage and off-setting the non-linear demand of the energy grid by converting excess energy into a digital store of value (bitcoin) rather than via traditional battery storage.

This has led to clients increasingly requiring access to wholesale markets to buy and sell cryptoassets and manage risk through derivatives. The expansion of wholesale cryptoasset markets will only increase as the technology matures and further operations are moved 'on-chain'. There is work to be done to develop the market infrastructure required to facilitate this, but it is well underway.

It became clear through the last cryptoasset market cycle that the existing infrastructure was not fit for purpose for institutions and sophisticated market participants. As a retail-led market, the risk management, regulatory frameworks, technology capabilities, operating models and security procedures were not at the level considered prerequisite in traditional markets and necessary for institutions to enter. With overwhelming speculative demand, it came as no surprise there were capacity-based issues, but beyond that, there were high-profile bankruptcies, bad actors, poor risk management and fraudulent activity that was left uncontrolled. Many clients lost money and many of those involved were badly burned.

Providing fit-for-purpose infrastructure is the very reason TP ICAP has been developing a range of products for this asset class and our clients. We started in 2020 by providing price discovery and execution services in regulated cryptoasset derivatives through our cryptoasset broking desk, helping our clients to manage their risk in this new asset class. We followed this up by launching Fusion Digital Assets in 2023, our Financial Conduct Authority-registered, UK-based cryptoasset exchange, to enable our wholesale clients to access the spot market with confidence.

In both cases, we've combined five years of innovation and learning about the cryptoasset class, with the systems, controls, procedures and experience that have been refined over many decades of servicing our clients in traditional asset classes.

The promise of this new blockchain-based system is starting to be delivered. Settlement will be measured in minutes rather than days, and assets can be programmed to behave intelligently and to follow pre-programmed logic. The result should mean a more efficient, transparent market, with reduced settlement costs and increased asset utility.

As the first asset class on this technology, the cryptoasset market is where this infrastructure is being developed and honed. If it matures as expected, it will be a more efficient system for our traditional asset classes, and we fully expect many of them, such as bonds, to be exchanged and traded as digital assets in future. While some view cryptoassets and digital assets as separate and distinct, we have always believed that building products for the cryptoasset class is imperative to our understanding of this technology and ensures we are well positioned to support our clients as we transition towards tokenisation.

products and to win the trust of the existing providers.

Market abuse

Widespread market abuse is a major deterrent to institutional investors allocating more substantial sections of their portfolio to cryptoassets. Wash trading in particular is believed by many to have played a major role in supporting the prices of important cryptoassets. Research conducted by Solidus Labs found evidence of wash trading in 67% of the 30,000 decentralised exchange liquidity pools it studied, accounting for $2bn worth of cryptocurrency since September 2020 and found that wash trading accounted for 13% of the total trading volume. Solidus Labs added that this was a lower-bound estimate, since the pools it studied constitute only 0.3% of the total volume, and that the true volume of wash trading during the period is 'likely an order of magnitude larger'.

Though there are many areas where new regulation might be needed to give institutions the comfort to engage with cryptoassets (see Chapter 2), abusive market practices generally do not need additional regulations. What is required is appropriate surveillance.

Given the global nature of the marketplace, there is an issue with providers operating out of jurisdictions that have limited ability for or interest in enforcing regulations. The patchy nature of enforcement makes it difficult for institutions to be comfortable with exposure to cryptoassets.

'In some jurisdictions, the laws are in place, but what is lacking is the pedigree and capacity of the supervisors to deal with an influx of crypto-related business.'

A lawyer specialising in crypto services

A lawyer specialising in crypto services said: 'We need to achieve greater comparability between the letter of the law and supervisory capacity. In some jurisdictions, the laws are in place, but what is lacking is the pedigree and capacity of the supervisors to deal with an influx of crypto-related business.'

One method of dealing with the volume of work required to clean up the crypto market sufficiently for institutional players to enter safely is to place more of the burden on the exchanges and trading venues. The UK's Financial Conduct Authority is taking this approach. Rather than continuously monitoring the market, the aim is to ensure that exchanges are carrying out their surveillance plans and have the tools, expertise and understanding to detect spoofing, front running, wash trading and suspicious transactions.

This kind of exchange-led surveillance is something that TradFi venue operators have experience in. While the tools required to perform this surveillance on cryptoassets might differ from those used for TradFi, the systems are already well defined. One of the key responsibilities regulators will face if they want to see cryptoassets become a healthy market for institutional investors is ensuring that the expertise required to oversee crypto markets is well disseminated and implemented. ■

Momentum building in cryptoassets regulation

Regulatory arbitrage in the US has allowed other jurisdictions to position themselves as safe havens.

THE REGULATION of digital assets has evolved markedly. Progress on regulatory framework design has accelerated from early developmental stages just a couple of years ago to implementation beginning in several jurisdictions. Elsewhere, international standard-setting bodies, including the Financial Stability Board, are publishing finalised copies of their policy recommendations for different stakeholders.

Action has accelerated in most jurisdictions in response to a couple of factors. One catalyst has been wider acceptance by traditional financial institutions, with growing interconnectedness raising concerns that volatile swings in prices may hold implications for financial stability. These concerns were amplified last year as cryptoasset markets were hit by a series of high-profile failures which erased roughly two-thirds of their overall market capitalisation. Failures such as FTX shone a light on governance issues in the industry and amplified the effects on investors' confidence.

Collectively referred to as the crypto winter, the shocks exposed significant shortcomings of regulatory oversight under existing frameworks and lack of consumer protection. This has provided extra impetus for regulators and afforded them greater political support to pursue stronger oversight of digital assets.

These events have also contributed to a shift in tone from many market participants. Despite the inherent conflict between crypto and traditional regulatory structures – owing to the decentralised, cross-border nature and ingrained preference for anonymity of crypto – there is a growing acceptance of the need for integration with traditional finance structures and a recognition

that robust regulations are needed to inspire sustainable growth.

'Clear regulations, which include licensing rules, taxonomies and consumer protection, are the foundations which permit businesses to invest long term in any jurisdiction', one market participant told OMFIF. 'Those jurisdictions with the most advanced, balanced and clear regulatory frameworks are the most attractive. With regulatory certainty comes business certainty. And business certainty is what then leads to investment and growth.'

Progress varies

The approach towards establishing clear rules for businesses has varied across jurisdictions. Some, such as the European Union, have established themselves as early leaders in this regulation. The Markets in Crypto-Assets Act formally establishes a bespoke regulatory framework and now awaits technical elements to be drafted.

Countries also vary in terms of how accommodative their approach is. Some jurisdictions are looking to take advantage of slow progress and hostile approaches. Jurisdictions such as Dubai have been attempting to market themselves as crypto hubs by offering clear frameworks and simple pathways to registration.

The approach towards regulating digital assets in the US is largely at odds with this trend. While most countries have sought to find a legislative, or consultation-led, solution to bring digital assets under regulators' umbrella, the US currently lacks a clear and robust regulatory framework. As summarised by a market participant: 'The US regulatory environment with respect to digital assets lags behind the rest of the world.'

Instead, the principal regulators for US digital assets markets – the Securities and Exchange Commission and Commodities and Futures Trading Commission – have persevered with an enforcement-led approach, which transcribes existing securities and commodities acts to cryptoassets.

The SEC treats all digital assets as securities, with the exception of a few major tokens such as bitcoin. This predetermination is made in accordance with its Howey test criteria – a precedent-based assessment to determine whether transactions qualify as investment contracts – and requires virtual asset service providers to register with the SEC and comply with securities law. The CFTC treats virtual currencies as commodities and regulates them under the Commodities Exchange Act.

The ease of navigating the US regulatory landscape is complicated by the dual structure of state and federal regulation. As a result, businesses are subject to a host of other state-level requirements on top of their requirements to register as a money services business with the Financial Crimes Enforcement Network for anti-money laundering purposes. There are also gaps in the existing framework, such as in spot markets and other trading facilities.

There have been some calls by government officials to address these shortcomings in the regulatory framework. An executive order in March 2022 called for closer co-operation between regulators. The US Treasury's Financial Stability Oversight Council echoed these calls and recommended that Congress pass legislation to clarify the regulators' authority.

Legislative solutions in motion

Ambiguity surrounding regulatory jurisdiction has prompted several legislative proposals from policy-makers. Far-reaching attempts made last year included the Lummis-Gillibrand Responsible Financial Innovation Act, which sought to address regulatory gaps posed by non-securities in spot markets and clarify the supervisory responsibilities of the CFTC and SEC by directing more tokens towards the commodities camp. Recent updates to the bill place an even greater emphasis on its consumer protection provisions.

More targeted bills have also been drafted to address specific asset cases such as stablecoins. The Stablecoin Transparency Act, introduced in ➤

'Clear regulations, which include licensing rules, taxonomies and consumer protection, are the foundations which permit businesses to invest long term in any jurisdiction.'

2022, looked to define asset-backed stablecoins and establish prudential rules for their reserves. This language was refined by the Clarity for Payment Stablecoins Act in July 2023, which would establish permitted issuers and ensure that issuers maintain one-to-one backing, as well as implementing requirements for disclosure and custodianship.

In the same month, the Financial Innovation and Technology for the 21st Century Act was formally introduced with the blessings of the House Financial Services Committee. The bill, which would clarify registration rules for crypto businesses with either the SEC or CFTC, represents one of the best hopes for a legislative solution at the moment. In accordance with the Ripple judgment, it clarifies that sales pursuant to an investment contract are insufficient for an asset to become a security.

Optimism surrounding these bills has varied. For the most part, the relatively bipartisan nature of this drafting process has been welcomed, but not everyone is convinced that they will be effective, with one US economist branding them a 'rush to embrace risks promoting laws which are worse than what there currently is'.

Expectations for a fast legislative solution are also moderated by the typically glacial pace of the US legislative process. It is unlikely that anything will be passed ahead of the elections in 2024, and gaps on issues such as energy consumption are yet to be resolved. The prospects of a prolonged wait for a clear regulatory framework in the US only serves to shorten the odds that digital asset service providers may be tempted to establish their operations in jurisdictions which have already established one.

'The US regulatory environment with respect to digital assets lags behind the rest of the world.'

But despite uncertainty in the timeline for regulatory treatment, there are other factors that will undoubtably dissuade businesses from moving away from the US. The capacity of demand in its domestic market is unmatched globally and its labour force is also immense and highly skilled.

Additionally, when regulations are clarified, the US regulators are unusual in their resources, experience and capacity for supervising large and complex markets. The Office of Foreign Assets Control's crackdown on illicit exchanges is evidence of this. Alongside these advantages, the US should also benefit from a second-mover advantage, giving it the opportunity to learn from other jurisdictions' regulatory efforts. One experienced observer said: 'The outcome of the EU and UK regulation remains to be seen but they're starting to achieve the needed ingredients.' The US will look to build on this progress.

However, the legislative picture is only part of the story. The final regulatory outcome will be partly determined in court with the outcome of several court cases.

Progress on principles alignment

Inadequate regulatory frameworks – whether unclear or simply unsuitable – might cause crypto businesses to move their activities elsewhere. This phenomenon has been observed in traditional financial markets and the crypto world may follow suit.

Policy-makers have been vocal about their fears that regulatory arbitrage in digital markets could risk a race to the bottom – meaning that the laxest jurisdictions with the weakest protections attract the most business. This could hold implications for financial stability even outside these jurisdictions because of the near borderless properties of digital assets.

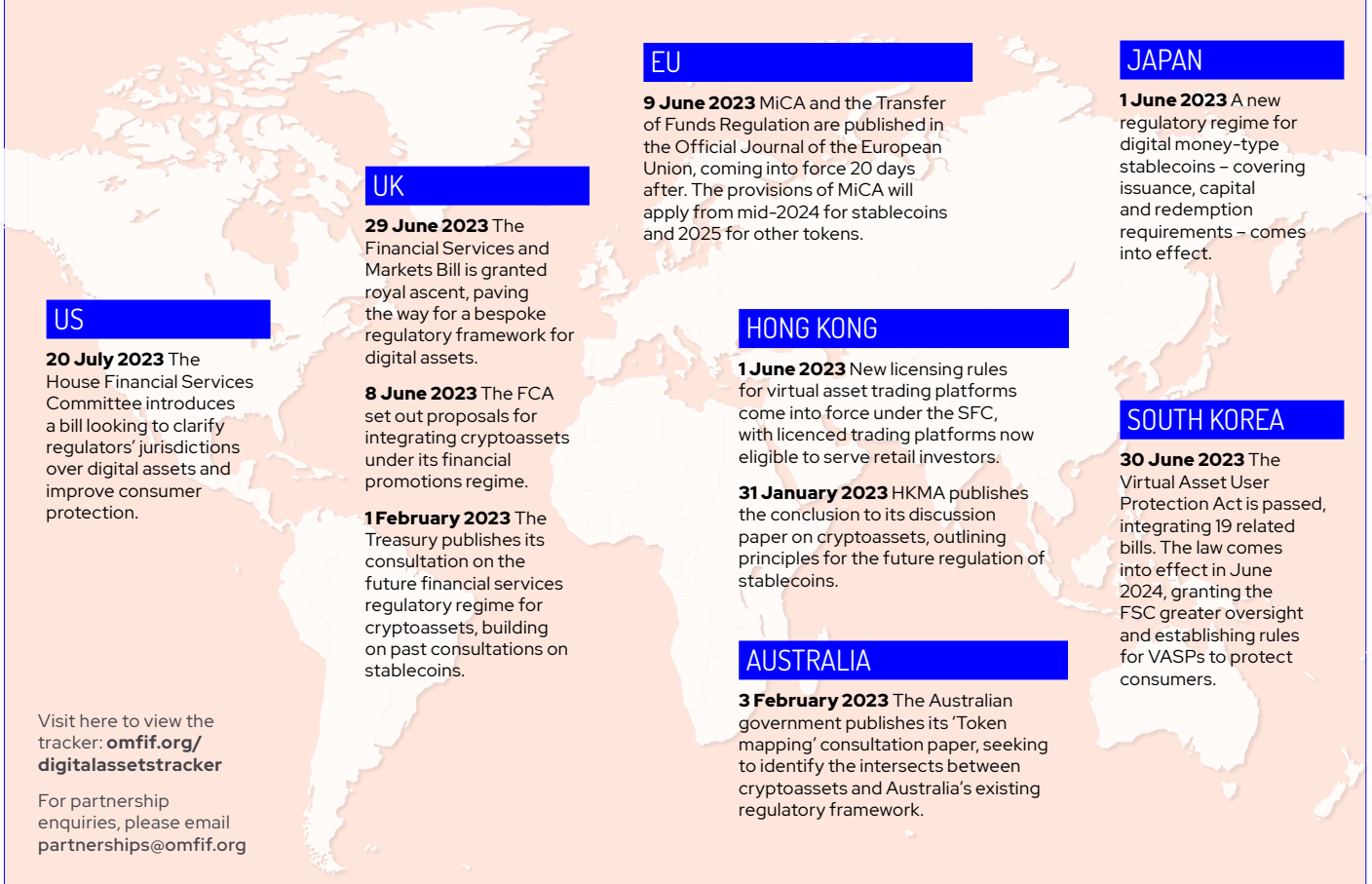
In traditional financial markets, competition on regulatory grounds tends to take place within the confines of guiding principles and rules set out by global standard-setting bodies. It is hoped that this can be replicated in digital assets markets by getting regulators to adhere to common principles, with similar buy in from crypto businesses through self-organised bodies, much like what was achieved through the Global FX Code.

Most draft recommendations and principles have been published over the last few years. The Financial Action Task Force – the intergovernmental financial crime watchdog – provided initial guidance to regulators in 2019, which was subsequently updated in 2021. In 2018, the FATF incorporated recommendation 15, otherwise called the travel rule, which would compel service providers to share data on all transactions.

DIGITAL ASSETS REGULATORY POLICY TRACKER

OMFIF's digital assets regulatory policy tracker provides a detailed account of the regulatory approaches to cryptocurrencies and stablecoins across 24 countries. Featuring a country directory and interactive map, the tracker breaks down the legal status of products and services, and includes sources from national regulators.

The tracker is updated on a quarterly basis. Key developments captured in the digital assets regulatory policy tracker include:



US

20 July 2023 The House Financial Services Committee introduces a bill looking to clarify regulators' jurisdictions over digital assets and improve consumer protection.

UK

29 June 2023 The Financial Services and Markets Bill is granted royal ascent, paving the way for a bespoke regulatory framework for digital assets.

8 June 2023 The FCA set out proposals for integrating cryptoassets under its financial promotions regime.

1 February 2023 The Treasury publishes its consultation on the future financial services regulatory regime for cryptoassets, building on past consultations on stablecoins.

EU

9 June 2023 MiCA and the Transfer of Funds Regulation are published in the Official Journal of the European Union, coming into force 20 days after. The provisions of MiCA will apply from mid-2024 for stablecoins and 2025 for other tokens.

JAPAN

1 June 2023 A new regulatory regime for digital money-type stablecoins – covering issuance, capital and redemption requirements – comes into effect.

HONG KONG

1 June 2023 New licensing rules for virtual asset trading platforms come into force under the SFC, with licenced trading platforms now eligible to serve retail investors.

31 January 2023 HKMA publishes the conclusion to its discussion paper on cryptoassets, outlining principles for the future regulation of stablecoins.

SOUTH KOREA

30 June 2023 The Virtual Asset User Protection Act is passed, integrating 19 related bills. The law comes into effect in June 2024, granting the FSC greater oversight and establishing rules for VASPs to protect consumers.

AUSTRALIA

3 February 2023 The Australian government publishes its 'Token mapping' consultation paper, seeking to identify the intersects between cryptoassets and Australia's existing regulatory framework.

Visit here to view the tracker: **omfif.org/digitalassetstracker**

For partnership enquiries, please email **partnerships@omfif.org**

Recommendation 15 has been at least partially implemented in many countries and will go live across the EU with the onset of MiCA. However, a lack of progress in non-compliant jurisdictions risks undermining its effectiveness. As one consultant noted, 'without travel rule compliance [for a jurisdiction] in the next 2-5 years… you're going to have a lot of activity which will undermine it'. Again, the global nature of cryptoassets brings challenges. Without near global compliance, wrongdoers may simply use non-compliant jurisdictions.

This year has seen the finalisation of other important principles and guidelines from a number of global standard-setting bodies and multilateral organisations. These organisations are collaborating to ensure that they are able to produce comprehensive coverage of the issues without publishing contradictory guidance.

'The global nature of cryptoassets brings challenges. Without near global compliance, wrongdoers may simply use non-compliant jurisdictions.'

This year, the FSB has released eight recommendations, while the International Monetary Fund has released nine effective policy principles. Common grounds between the recommendations were published in September 2023, emphasising the importance of legal certainty and global co-operation.

These principles are also raised by the International Organization of Securities Commissions, which aims to finalise its 18 recommendations by the end of the year. The goal is to translate IOSCO's standards for traditional finance to the digital assets sphere. One of the key areas of clarity people are hoping for is IOSCO's guidance on segregation of business functions, ➤

UNDERSTANDING JAPAN'S REGULATORY FRAMEWORK

Yu Ozaki, deputy director-general of the supervision bureau, Financial Services Agency, Japan, explains the new regulatory framework for cryptoassets and stablecoins in Japan.

JAPAN HAS taken the lead in introducing and implementing regulations for cryptoassets and stablecoins. Despite the failure of FTX in 2022, the customer assets at FTX Japan were protected, demonstrating that the regulation and supervision in Japan worked effectively.

The bankruptcy of bitcoin exchange Mt. Gox raised concerns over customer protection and money laundering in the cryptoasset business, leading to the introduction of regulations in April 2017. The new regulations defined cryptoassets and required cryptoasset exchange service providers to register with the Financial Services Agency and to comply with customer protection measures, which include segregation of customers' assets.

Additional measures, including a requirement to manage customer assets in offline wallets, were introduced in May 2020 following the Coincheck incident, in which the crypto exchange was hacked and ¥58bn ($397m) in cryptoassets was stolen.

More recently, given the important role that stablecoins play in cryptoasset transactions, Japan has introduced stablecoin legislation, which allows banks, trust banks or trust companies and fund transfer service providers to issue stablecoins and establishes regulations for stablecoin intermediaries.

The Payment Services Act defines a cryptoasset as a property value that meets the following requirements:

- Used for payment and sold to or purchased by unspecified persons
- Electronically recorded and transferred
- Not a fiat currency or currency-denominated asset
- Not a security token.

Recently revised guidance further clarifies that tokens with a small number of units issued or a high price per unit generally do not qualify as cryptoassets.

Cryptoasset exchange service providers – defined as those that conduct exchange, intermediation or custody of cryptoassets – must be registered with the FSA and comply with customer protection and anti-money laundering and counter-terrorist financing measures. The measures include requirements to manage at least 95% of customers' cryptoassets in offline wallets and to hold customer funds in trust.

To provide services to Japanese customers, a foreign crypto exchange must establish a local office in Japan. Offshore accounts held by Japanese residents should be transferred to the Japanese subsidiary. This requirement is intended to prevent global exchanges from continuing to provide crypto services in an unregulated environment.

The new regulations, which took effect in June 2023, cover the issuance and circulation of stablecoins that commit to redemption at par value (in other words, tokenised deposits and e-money stablecoins) and require their intermediaries to be registered with the FSA. Other stablecoins (such as algorithmic stablecoins) are subject to cryptoasset regulations rather than stablecoin regulations.

Tokenised deposits can be issued by depository institutions, while e-money stablecoins can be issued by trust banks or trust companies and fund transfer service providers, depending on their type (trust beneficiary rights or outstanding liabilities – for trust beneficiary rights to be exempted from securities regulations, trust assets must be held as demand deposits). E-money stablecoin issuers must maintain highly liquid assets, which should be no less than the value of the stablecoins they issued, to meet redemption obligations at any time.

A domestic intermediary may handle foreign-issued stablecoins, provided that:

- The foreign issuer is authorised to issue stablecoins under a foreign licence or registration regime that is equivalent to the Japanese regulations
- The domestic intermediary maintains sufficiently liquid reserve assets in Japan to repurchase customer stablecoins in its custody at par in the event of a significant decline in the price of the stablecoins.

The requirement for foreign issuers is intended to prevent unregulated stablecoins from circulating globally, while the requirement for domestic intermediaries is intended to ensure customer protection in Japan, since it would be difficult for Japanese customers to participate in overseas bankruptcy proceedings.

like custodian and broker/dealer.

On the legal side, UNIDROIT – the International Institute for the Unification of Private Law – has released principles on digital assets and private law that suggest regulators require custodians to mitigate risks via prudential requirements and disclosure of risks. They also state that, in the event of an insolvency, clients' assets shouldn't be held for distribution to its creditors.

One other area of convergence in international standards is that the Basel Committee on Banking Supervision has very tight limits on traditional financial institutions taking exposure to cryptoassets. One observer remarked that these are extremely onerous and could hurt innovation and use cases, since they will deter institutions from experimenting. It is possible that, as standards in the crypto industry improve, these could be relaxed.

Signs of convergence on stablecoins

Although countries are taking their own approaches in many areas, stablecoins is one topic on which convergence has been more marked. In spite of there being no universal definition for a stablecoin, as is the case with most token categorisations, they are widely considered to be cryptoassets that attempt to maintain a peg to another asset – most often some currency, commodity or basket – rather than having a free-floating market value.

In July 2023, the FSB published its final recommendations for global stablecoins. There has been convergence along many of these key points, including what the stablecoin reserves consist of, their stabilisation mechanisms and the rights of holders to redeem the coins for reserves.

Because asset-referenced stablecoins aim to maintain a fixed value, they are best regarded as payment instruments, rather than speculative assets. Accordingly, most regulators treat them separately to other cryptoassets, and certain aspects of regulations can often rest with payments systems regulators and central banks.

'The prospects of a prolonged wait for a clear regulatory framework in the US only serves to shorten the odds that digital asset service providers may be tempted to establish their operations in jurisdictions which have already established one.'

The main risks therefore are operational and prudential. Algorithmic stablecoins – stablecoins that attempt to maintain their peg via algorithmically adjusted supply – are excluded from most stablecoin regimes in the wake of the collapse of the Terra/Luna ecosystem in May 2022. If not banned for separate violations, such as in advertising, these tokens receive the same regulatory treatment as other unbacked cryptocurrencies.

Some jurisdictions have sought to minimise risk by narrowing the scope of eligible reference assets. The most recent example of this was in August when the Monetary Authority of Singapore set out its guidance for stablecoins, which restricted reference assets to the Singapore dollar and G10 currencies.

Regarding reserves, virtually all regulators have the same or similar requirements: stablecoins must be backed one for one by high-quality, liquid assets. There is some variation on the proportion that should be held in cash and the scope for what qualifies as a high-quality, liquid asset. Stablecoin issuers are also expected to comply with capital and liquidity requirements to maintain their stability and satisfy consumers' redemption rights.

Most jurisdictions that have raised stablecoin regulation have looked to restrict the type of institutions that may qualify as issuers. Japan's rules covering digital money-type stablecoins came into effect in June, restricting issuance to banks, fund transfer services and trusts, each subject to redemption requirements and required to enter risk-sharing agreements. Bank stablecoins are issued as deposits, allowing consumers to also benefit from deposit insurance. ■

ENFORCEMENT CASES TEST THE INDUSTRY

The Securities and Exchange Commission has brought crypto-related enforcement action against three important players in the industry, providing useful examples of the regulatory crackdown on perceived failures of governance.

THE FIRST notable increase in crypto-related enforcement actions by US financial regulators took place in 2018, coinciding with the 'initial coin offering boom' and the broader rise in the value of cryptoassets. At the federal level, regulators have continued to pursue an enforcement-led approach to tapering the industry (Figure 2.1).

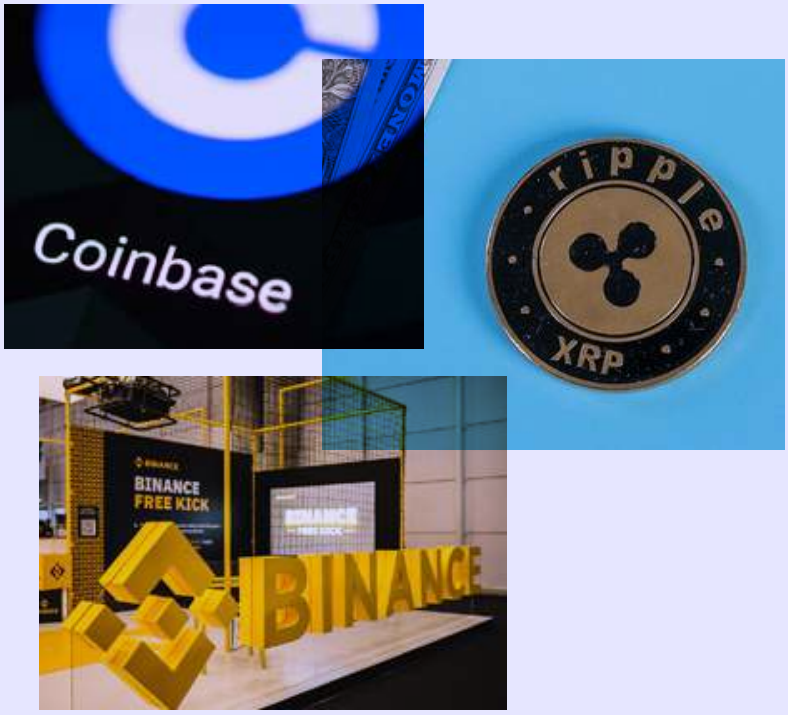
These efforts have been spearheaded by the SEC, which has been responsible for raising 100 enforcement actions up to August 2023. Significant charges have also been raised by other regulators, including more than 50 brought by the CFTC. Actions from the US Treasury's anti-money laundering (FinCEN) and sanctions enforcement (Office of Foreign Assets Control) departments have also increased since 2021.

High profile failures in 2022 highlighted serious governance defects throughout the industry. Investors were left to weather significant losses, which has granted regulators licence to direct more resources towards crypto. Enforcement actions against the industry reached record levels last year and, with close to 30 charges already issued this year, this record is set to be surpassed. Significantly, actions this year have included some against the largest virtual asset exchanges operating in the industry.

The outcomes in these cases are of disproportionate importance compared to traditional enforcement cases. In view of the poor prospects for any forthcoming legislative resolution, their outcomes have the potential to impact the ecosystem's development. They will test the boundaries of regulators' oversight, including the SEC's assertion that almost all tokens fall within their remit, and are likely to influence the trajectory of the US's future regulatory regime.

Ripple

In December 2020, the SEC filed a case against Ripple alleging that its XRP token – a native token used to settle transactions on Ripple's public ledger – constituted an unregistered security. In the SEC's view, the token constituted an investment contract, and the $1.3bn raised by the fintech through its sale was an unregistered securities offering.



'Enforcement actions against the industry reached record levels last year and, with close to 30 charges already issued this year, this record is set to be surpassed.'

This is not the first run-in that Ripple has experienced with regulators. In 2015, FinCEN issued the business a $700k fine for violations of the Bank Secrecy Act, owing to its failure to register as a money-services business and for shortcomings in its anti-money laundering programme.

XRP has, notwithstanding its direct sales to institutional investors, continued to be listed on digital asset exchanges for retail investors to purchase. With market capitalisation in excess of $26bn at the time of writing, XRP is the fifth-largest cryptoasset in the world.

The ruling on the SEC's case came down in July 2023. It concluded that, while XRP itself did not constitute a security, the nature of its sale to institutional investors satisfied the Howey test criteria for an investment contract. For retail

investors in secondary markets, who were not given the same promises as Ripple made in its direct sales, this was not the case.

The decision by courts to draw distinction around the marketing of XRP may hold wider ramifications for the SEC's ongoing cases. It has been welcomed by a number of market participants, many of whom see the verdict's separation of the token from the investment contract as undermining the SEC's tagline that all cryptoassets, with few exceptions, are securities. However, there is still a high degree of uncertainty and it is likely to be appealed.

Coinbase

Coinbase – the largest US-based digital assets exchange – may be a potential beneficiary of the recent XRP ruling.

Following a Wells notice three months earlier, Coinbase was charged by the SEC in June 2023 with operating as, and combining the functions of, a securities exchange, broker and clearing agency for cryptoassets that the SEC considers securities. By failing to register with the SEC, Coinbase is accused of circumventing supervisory requirements pertaining to consumer protection. Simultaneously, the SEC alleged that Coinbase's staking-as-a-service programme – whereby investors are rewarded for staking their assets for use in on-chain services – constitutes an unregistered securities offering.

In both instances, Coinbase has repudiated the assertion that the products qualify as securities and has filed to dismiss the case, citing the Ripple judgment. A ruling in the SEC's favour would present a major hurdle to trading platforms if it results in restrictions on projects unable to comply with traditional securities regulations.

In January 2023, Coinbase reached a settlement with the New York State Department of Financial Services after the regulator found governance failings relating to its anti-money laundering controls, incurring a $50m penalty and pledging an equal sum into improving its capabilities.

Binance

Binance, the world's largest digital assets exchange, has come under fire from both of the US' major financial regulators, with potential implications for overseas exchanges.

The CFTC sued Binance first, including its founder and former compliance chief, in March 2023. The charges accused Binance of operating an illegal digital asset derivatives exchange, and for a host of compliance failures around its implementation of anti-money laundering and user verification data.

Similar accusations were raised by the SEC in June, citing 13 offences. As with Coinbase, Binance was accused of operating as an unregistered securities exchange, broker and clearing agency, as well as making unregistered offers of its own cryptoassets, lending and staking services.

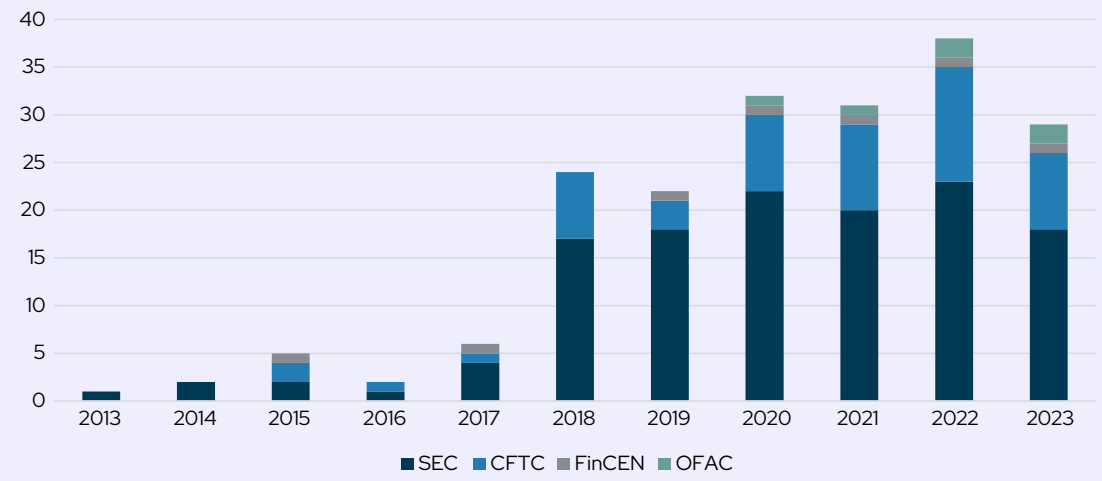
Both charges accuse the exchange of being complicit in investors' subversion of rules restricting US investors from trading on the exchange. The SEC also accuses Binance of mixing together customers' assets through its market makers, without customers' knowledge.

Binance rejects the regulators' allegations, claiming that user assets have never been at risk and that it has 'actively co-operated with the SEC's investigations and worked hard to answer their questions and address their concerns'. In responding to the SEC's decision to litigate against Binance, the exchange claimed that the enforcement actions 'appear to be in service of an effort to rush to claim jurisdictional ground from other regulators' and said that Binance is 'caught in the middle of a US regulatory tug of war'.

'A ruling in the SEC's favour would present a major hurdle to trading platforms if it results in restrictions on projects unable to comply with traditional securities regulations.'

Figure 2.1. Enforcement actions reached new heights in 2022

Digital assets-related enforcement actions taken by US federal financial regulators



Source: *SEC, CFTC, FinCEN, OFAC*

Note: 2023 data as of August 2023. Enforcement actions only include those publicised by regulators in briefings. We acknowledge that more cases are noted in annual enforcement reports.

START DESIGNING REGULATION YESTERDAY

Tom Neylan, senior policy analyst at the Financial Action Task Force, a global body tackling money laundering and terrorist financing, spoke to OMFIF about the challenges of applying anti-money laundering rules to the crypto ecosystem and the importance of rapid implementation.

OMFIF: What is the travel rule and why has it assumed such importance in the cryptocurrency market?
Tom Neylan: The travel rule is part of the suite of rules that includes customer due diligence, understanding the nature of a customer's business, making suspicious transaction reports, conducting additional due diligence on high-risk activities and customers – such as politically exposed persons – and also being licensed, supervised and regulated by the proper authorities. The purpose of the travel rule is to ensure you know who you're doing business with, so you can apply financial sanctions and block transactions if necessary, and to ensure an audit trail for investigators to follow in the event that the payment was terrorist financing.

The travel rule has become particularly important because it's among the most difficult of the tools to apply in a crypto context. It requires virtual asset service providers to exchange the identity information of the originators and beneficiaries of crypto transactions above $1,000. In traditional finance, payment messages that include personally identifiable information are sent on a private network, visible only to banks, with strong protection for privacy. In crypto, those payment messages could be sent publicly, so including personal information would expose people's identities.

To achieve the equivalent outcome in a crypto context, we've allowed messages including personal identifying information to be sent on a parallel private network to protect privacy. And we have given the industry time and support to develop the tools and protocols it needed to do this.

O: How broadly is this rule being applied?
TN: Advanced economies have made good progress in requiring VASPs to register and get licensed, and implementation of the travel rule is a few steps behind licensing and regulation. But elsewhere, progress has been much slower. Around 70% of countries are yet to regulate the sector.

Given businesses in this sector are executing cross-border transactions as a matter of routine, it poses a serious risk because unregulated countries can provide safe havens – offering an avenue for money to flow to terrorists outside of the regulated sector.

O: What about uniformity? Not all jurisdictions are applying the rules in the same way. Does that introduce problems?
TN: We regularly engage with the virtual asset industry, and they report that differences in national requirements – including for the travel rule – can prove challenging. Interestingly, we conducted a survey of over 150 jurisdictions earlier this year that found, when it comes to the travel rule, most jurisdictions have broadly the same requirements in terms of the information VASPs need to collect and transmit.

As with all regulation, complete global harmonisation is unrealistic – there are too many differences in national frameworks, risk, context and approaches to risk mitigation. This is the same reason why we see a lack of harmonisation in other financial sectors. But we also need to make sure that national requirements are clear and that authorities are co-ordinating to help the private sector deal with common challenges and considering harmonisation where possible.

O: What about prohibiting access entirely? That's an approach China has taken.
TN: The thing about prohibition is that it is not really an easy option from a technical perspective. Just making

'The purpose of the travel rule is to ensure you know who you're doing business with, so you can apply financial sanctions and block transactions if necessary, and to ensure an audit trail for investigators to follow in the event that the payment was terrorist financing.'

'As with all regulation, complete global harmonisation is unrealistic – there are too many differences in national frameworks, risk, context and approaches to risk mitigation.'

something illegal is not enough. You have to enforce the prohibition, which means you have to develop the technical capacity to find and identify the people or businesses conducting the activity and get them to stop. Very few countries have the internet surveillance infrastructure to do that. Even identifying which businesses are offering services in your country can be difficult. If a country has a rarely spoken language, advertising can be a useful predictor, but for many countries, that's simply not a guide and they need more sophisticated tools to identify activity.

O: Many people are using VASPs, but one of the principles of crypto is that it can function peer to peer, without intermediaries. Does that limit our ability to curtail illicit activity via tools like the travel rule?

TN: Yes, to some degree. It is certainly a concern and it's a risk that we are keeping a close eye on. However, to some extent, it's self-limiting. Just as with the use of cash in money laundering, there are problems with going peer to peer with crypto. In the first place, it's more technically demanding. There's also more risk and no protection in the event of an error. In the second place, many money launderers rely on intermediaries as filters, so removing that element makes their jobs more challenging. Those factors have so far limited the overall amount of money laundering taking place on a peer-to-peer basis – but this is a risk that we are continually monitoring

O: That sounds like a serious problem. What is being done about it?

TN: We're doing a lot of work to fill geographic gaps – the countries which don't yet regulate the crypto sector, helping them to make progress as a matter of urgency. A lot of that work involves getting advice and assistance from experienced countries.

What we've learned from them is that applying the travel rule and supervising the crypto sector is immensely demanding of supervisors. They need new tools, different data feeds than they use for monitoring traditional financial transactions and staff that are technically literate and understand the crypto ecosystem.

O: Can central banks build that capacity from scratch? That sounds daunting.

TN: It's certainly a challenge, particularly because of the pace of change in the crypto market – things are developing there much more quickly than in traditional finance.

In many cases, we've found that national authorities implementing this have been very slow to get off the ground. That's understandable. They have to stand up new capacity for a whole new sector. This is the first time we've exposed a new sector to regulation for several generations.

The good news is that they don't have to do this on their own. We have forums to help share experience and information. There is a growing ecosystem of blockchain analytics companies, risk assessment companies and other countries with experience that can help to provide them with the tools and guidance on how to implement the requirements.

The key message is: start designing your regulatory regimes yesterday. They need to be in place within a year or two, so work needs to be started straight away on understanding the risks, identifying the players in the sector and what they do, and which activities are risky. They should reach out, take advantage of the advice available from the FATF and other experienced countries and the tools available from the private sector.

Value propositions in a volatile market

Cryptocurrencies, stablecoins and non-fungible tokens offer new sources of value, but at the cost of concerns over regulation, security and longevity of worth.

THE CRYPTOCURRENCY market cap fell by over $2tn in 2022. This collapse was due in large part to a deluge of scandals and scams, which brought down industry titans or slashed their worth. Peak valuations were exposed as hype, juiced by a global wave of cheap money looking for returns. With inflation returning and central banks tightening monetary policy, that wave has broken and rolled back, taking crypto industry valuations with it.

Today, the once triumphant exhortations that blockchain-based decentralised finance would serve as a basis for a new system of global exchange have been reduced to equivocating murmurs. In 2010, the late Hal Finney, American software developer, wrote, 'I see bitcoin as ultimately becoming a reserve currency for banks, playing much the same role as gold did in the early days of banking.' In 2023, Finney's prediction seems far-fetched.

But while the scandals, scams and bubbles have discredited the asset class, the fall from grace and resulting more modest valuations tell us little about the future value of the cryptoasset ecosystem. A huge component of the original value proposition of cryptocurrencies was about enabling a private, permissionless means of exchange, free from the control of banks and governments.

While improvements in privacy remain important, it is becoming clear that states and financial institutions have no intention of allowing a fully permissionless system to flourish with all the implications for crime facilitation this would bring. But if this is abandoned as a principle of digital assets, what is it that makes the

instruments uniquely useful? How does this value proposition diverge between cryptocurrencies, stablecoins and non-fungible tokens (Figure 3.1)?

Cryptocurrencies

'The original vision for cryptocurrencies to serve as an alternative form of finance has not been realised,' said David Creer, global DLT and crypto lead at GFT. What was once envisioned as the foundation of a revolutionary, peer-to-peer financial system has become a highly volatile asset class for speculative investment and is perceived by many as a hotbed of scams, fraud and money laundering. Despite this, cryptocurrencies still offer value to the global financial ecosystem.

Among the most compelling arguments for the usefulness of cryptocurrencies is their potential to provide financial services to the unbanked and underbanked around the world. Cryptocurrencies can facilitate access to financial tools and services without the need for traditional banks, allowing individuals in remote or underserved regions to participate in the global economy with only an internet connection. This can partly explain why the adoption of crypto has been pronounced in countries with more limited financial infrastructure, such as El Salvador and the Central African Republic where bitcoin was adopted as legal tender. ➤

Figure 3.1. The value of digital assets in 2023

	Cryptocurrencies	Stablecoins	Non-fungible tokens
Use cases	Payment systems **Investment assets** Stores of value **Tokenomic-based incentive model for distributed network growth**	Payments systems **Stores of value** Safe haven during periods of volatility **Efficient transfers** Smart contracts	Store of digital ownership and value, including use cases for ticketing **Smart contracts** Monetise online creator works **Ownership in the metaverse**
Case for value	Payments processed on a 24/7 basis **Atomic settlement reducing counterparty risk** Decentralised governance **Secure delivery versus payment settlement** Stores of value for countries	Payments processed on a 24/7 basis **Extremely cheap processing fees** Secure DVP settlement **Decentralised governance** Potential store of value for under-banked populations or in countries with volatile currencies **Efficient smart contracts**	Legitimate means of capturing digital ownership **Efficient smart contracts** Potential benefits for content creators **Improved security in exchanges through DVP settlements**
Case against value	Volatility **Unclear regulatory environment** Energy intensiveness of proof of work **Reputation damage due to poor crypto market crash** Counterparty risk	Unclear regulatory environment **Reputation damage due to fraudulent products and scams, particularly around algorithmic stablecoins** Counterparty risk **Potential to be crowded out by traditional finance or central banks**	Often highly speculative **Unclear if digital ownership is truly comparable with physical ownership**
Recent developments	Bitcoin has done relatively well as a store of value **Alternative, efficient consensus mechanisms**	Potential for incoming regulations around algorithmic stablecoins **Emergence of stablecoins to support microtransactions** Volume of transactions was nearly as high as Visa's transaction volume in 2022	NFT sale value per day has plummeted since its peak in 2021 **Use cases for NFTs have grown, including potential applications in supporting smart contracts**
What would need to happen to bolster value	Rekindle public trust by supporting anti-money laundering/know-your-customer tools **Reduce volatility** Support faster processing times and enable wider usage **Integrate with existing financial and regulatory structures**	Rekindled trust from both the public and from regulators **Clear guidelines and regulations around stablecoin pegs and safety** A clear sense of how stablecoins might be used amid growing efforts by traditional finance and central banks to support fast and cheap digital payments	NFTs would need to emerge as a legitimate store of ownership, beyond speculative hype **Digital ownership should be further legitimised** Wider use of NFTs to support mainstream transfers of digital ownership and smart contracts, such as ticketing

THE CURIOUS CASE OF WORLDCOIN

Worldcoin is an example of a distributed network with a growth model driven by tokenomics. It gives users a means of verifying 'unique personhood' – that they are a real person with only one account. This aims to solve the problem of bots and fake virtual identities and was conceived by OpenAI as a means of preventing people from fraudulently claiming universal basic income more than once.

It does this by scanning users' irises, providing biometric data which is used to generate a novel digital ID. For signing up, users are rewarded with Worldcoin tokens. Transacting in these verifies that both sender and recipient are Worldcoin users and therefore real people. By rewarding people for signing up with tokens, there is a natural incentive for the network to grow.

Worldcoin does come with several notable risks and detractors, however. It has been accused of targeting lower-income communities to attract sign-ups through financial incentives. In 2023, hackers stole login credentials of Worldcoin operators, allowing them to view internal data. No personal user data was compromised, but this provided fuel for critics of Worldcoin who argue that a private company should not be responsible for maintaining sensitive biometric data, even if they promise to delete it after using it to generate a digital ID.

The potential for abuse is significant. BlockBeats alleged that people in Cambodia and Kenya were selling their iris data for $30 on the black market. And there are legitimate concerns about the potential for data misuse by Worldcoin. While it is unclear whether Worldcoin will emerge as a dominant system of payments, its underlying technology may provide a hint for where payments systems will move in the future.

As well as lowering barriers to entry, cryptocurrencies enable frictionless cross-border transactions. Adam Garetson, partner at Gowling WLG and adjunct professor of blockchain and digital assets at Western University, argued that currently the 'most useful feature of crypto comes from the ability to move assets quickly'. The modern financial system is filled with intermediaries in payment exchange, particularly across borders. While transaction speeds vary, cryptocurrencies allow users to operate without reliance on a multitude of traditional intermediaries.

However, the efficiency of sending crypto across borders comes at a cost. Circumventing intermediaries in many cases means circumventing regulations designed to prevent financial crime, particularly money laundering.

Illicit cryptocurrency activity totalled $20bn in 2022 out of the roughly $1tn market, which is less than 1% of total crypto transactions. And yet, cryptocurrency pseudonymity has meant trade-offs in the enforceability of anti-money laundering and know-your-customer processes. This is particularly true for international transactions. Where transactions go through intermediaries like crypto exchanges, there is an opportunity to apply KYC and AML requirements – such as identity document verification – for platform participation. But cryptocurrencies can be transacted peer to peer and it is very difficult to apply KYC restrictions in such cases.

This capacity for peer-to-peer exchange also has implications for privacy. Crypto proponents often refer to the permissionless nature of exchange that it enables. The crypto system of public and private keys enables pseudonymous exchange. This is an essentially anarchic feature and one that regulators are keen to crack down on.

'Digital currency ownership in Turkey was the highest in the world at 27.1% followed by Argentina at 23.5%, and those countries' annual rate of inflation peaked at 51% and 104% in 2022 respectively.'

Nevertheless, it offers an important avenue for delivering aid securely and privately to those suffering from government oppression. It also provides a standard of privacy by default that the regulated and official sector should be encouraged to emulate insofar as doing so is consistent with appropriate supervision and crime prevention. Raising the standard of privacy in transactions that consumers can expect is a desirable outcome, even though it introduces technical challenges for law enforcement.

Blockchain is often touted as a secure and operationally resilient system, providing a reliable means of exchange. This is true in some senses. The core ledger system immutably records transactions and is resilient to fraud. Distributed networks also lack the single point of failure that affects some centralised systems. However, the ancillary infrastructures of custodians, exchanges and interoperability bridges are far less secure and have proven vulnerable to hacks and frauds.

While still more volatile than the S&P 500, bitcoin seems more capable of maintaining a stable value than alternatives and, with the scams of the crypto winter behind us, it may become yet more stable. But though its popularity makes it more liquid than other cryptocurrencies, bitcoin has other challenges. Creer described it as 'the least advanced, from a technical perspective, and very much hampered by using a proof-of-work consensus mechanism'. He added that: 'Many businesses would be reluctant to use something that is known to be extremely energy inefficient.'

Beyond privacy and security, smart contracts, which self-execute, automate and verify complex processes, offer a great deal of promise for a variety of industries. This functionality provides benefits to supply chain management, legal agreements,

housing contracts and purchases and government transfers. Through the development of smart contracts, cryptocurrencies would cut down on considerable lagging in the deployment of contract money exchanges, because it would self-actuate as soon as sufficient conditions for the transaction to proceed are met.

It is also important to consider the unique models of network growth cryptocurrencies enable. Creating a token with a specific purpose within a network imbues it with value for that network. Distributing these tokens as an incentive to those who join the network creates a model for growth. While this model can be abused (as was popular during the 2017 initial coin offering boom) and is susceptible to pump and dump scams, properly regulated, tokenomics provides an organic incentive structure for network development. This is something that businesses outside the crypto ecosystem are increasingly interested in adopting.

And yet, there remain considerable challenges facing the continued use of cryptocurrencies. The first of these is volatility. In some respects, volatility was the main appeal of cryptocurrency before the crypto winter began. The big swings in value were an opportunity for speculators to make outsized profits with high leverage. As Chris Ostrowski, chief executive officer and founder of SODA, remarked, 'far too much crypto activity is based on speculation'. The result is that cryptocurrencies, including bitcoin, can experience rapid and unpredictable fluctuations. While attractive for investors with high-risk tolerance, this hinders cryptocurrency adoption as a means of payment.

But perception of this as an obstacle is culturally specific. In some markets, where the local financial system and currency might be less stable, cryptocurrencies can provide a haven from inflation or a weakening exchange rate. Digital currency ownership in Turkey was the highest in the world at 27.1%, followed by Argentina at 23.5%, and those countries' annual rate of inflation peaked at 51% and 104% in 2022 respectively.

A second and more general obstacle to crypto adoption is the confusing regulatory environment that holds back cryptocurrencies from offering more utility. Creer argued that: 'The lack of progress for crypto in this area is firstly due to global regulation not being in place for payments via crypto, making it a niche form of payment only available in certain locations.' Garetson echoed this sentiment, making the point that 'ambiguities in regulations have hurt progress towards adoption and market stability'.

The crypto ecosystem has also done its own reputation plenty of damage. The number of 'trash coins' and 'meme coins', of limited use and value – as well as credible reports of wash trading, market manipulation and insider trading – have hurt public trust and made regulators hostile. Ostrowski remarked that this has been 'terrible for the industry, and it is hard to see how proponents could have done a worse job making the case for cryptocurrency'. Garetson similarly commented that the market correction 'has had a humbling impact on the space'.

'Bitcoin is'the least advanced, from a technical perspective, and very much hampered by using a proof-of-work consensus mechanism. Many businesses would be reluctant to use something that is known to be extremely energy inefficient.'

David Creer, global DLT and crypto lead, GFT

While cryptocurrencies have struggled for widespread adoption, there is one possible channel for the creation of a digital currency with a huge user base. Ostrowski argued that: 'The only entities that could today create an alternative digital currency would be big tech companies.' This is because their technical sophistication, market size and audience would give them the capacity and global reach to generate a natural marketplace.

The Libra/Diem project from Meta (then Facebook) was a good example of this. Given the incentives for governments to maintain control of the money supply, clamping down on such initiatives became almost inevitable. Governments are not likely to tolerate the domination of cryptocurrencies if it would remove any capacity from their side to enact monetary policy and would prevent them from serving as genuine alternatives to fiat.

Stablecoins

Stablecoins, a subset of cryptocurrencies, are designed to maintain a stable value by guaranteeing a peg to another asset like a traditional fiat currency or commodity. They aim to address the volatility issues associated with many cryptocurrencies while still offering the efficiency gains and decentralisation of blockchain technology.

The absence of a free-floating value means that stablecoins are not valuable as an investment asset. Instead, they seek to provide value for users as a tokenised form of cash, giving users the ability to pay cheaply and quickly with 24/7 settlement ➤

Stellar Development Foundation

DESIGNING A PRACTICAL FRAMEWORK FOR DECENTRALISATION

A straightforward approach to decentralisation can inform and empower policy-makers, write Lesley Chavkin, head of policy, and Alexander Wu, graduate fellow, Stellar Development Foundation.

DECENTRALISATION is a way of classifying how a system operates. In general, a system that is 'decentralised' operates through a series of rules that coordinate the contributions of diffuse individual components, or nodes. These nodes are self-organised, and interactions among nodes collectively achieve the system's goal without the need for a central guiding or authoritative entity. As such, each node contributes to the purpose of the system and one node or component cannot operate the system independently.

Decentralisation does not imply a lack of order or structure simply because the network has no reliance on a central authority. In fact, decentralised networks are rules-based, highly organised, predictable systems. Protocols dictate how the network operates and how participants in consensus communicate and interact with one another, meaning that governance is embedded into network design. In general, in a decentralised system, individual actions are consequential to the system in which they participate and participants are incentivised to act in a way that serves the collective good: maintaining a secure, trustworthy and rules-based system.

Assessing decentralisation

Building consensus around what decentralisation is – and is not – and how to determine whether a blockchain network is decentralised lays the groundwork for developing appropriate regulatory approaches. Yet given the varied and novel aspects of blockchain-based technology, a one-size-fits-all approach to determining decentralisation is neither appropriate nor practical. The blockchain industry is nascent and will continue to develop over time; many of the fundamental assumptions that hold now will become outdated, making an overly prescriptive definition outdated or irrelevant.

As a starting point in assessing decentralisation, we recommend the development of a straightforward framework for evaluating a network's degree of decentralisation, one that allows regulators the ability to evaluate specific attributes of a network and its underlying protocol. A broad framework that draws on high-level principles allows for adaptability and avoids a situation in which strict criteria developed today fail to capture future innovations.

To this end, we created a simplified framework that isolates two key dimensions of decentralisation: network architecture (whether there are single points of failure), and governance and decision-making (whether power is centralised) (see Figure 1). We recognise that other dimensions of decentralisation exist beyond the two we have identified, and that nuance is lost in developing simplified evaluation criteria. However, a highly complex framework would be incompatible with easily administered policies and would be burdensome to apply in practice.

Implications for regulators

With centralised systems, policy-makers are charged with assessing whether a central authority operates responsibly and transparently. Laws, regulation and rules condition the behaviour of central authorities and engender trust with system participants. But decentralisation allows for an alternative model of trust, one that does not depend on centralised authority. Decentralised systems are designed so that no single actor or affiliated group can exert undue influence or control over the system, and it is the protocol that conditions the behaviour of participants in the system. In a truly decentralised system, trust is shifted away from a centralised authority and to the system itself.

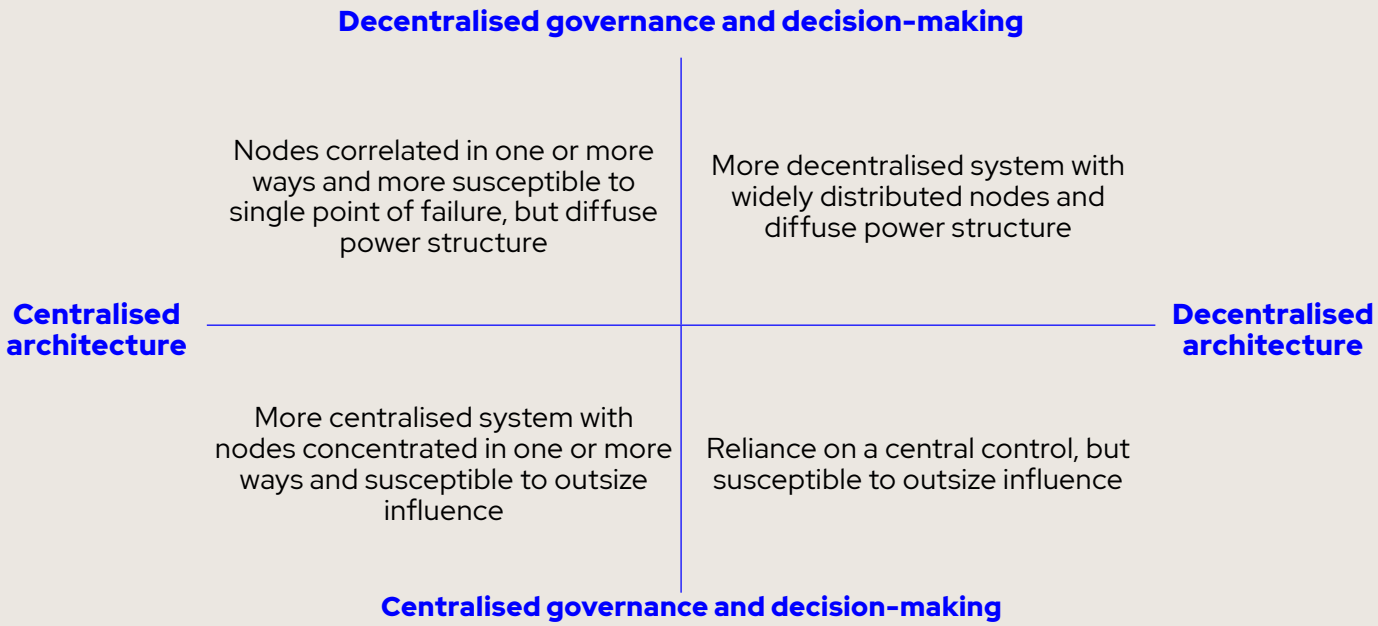
'Given the varied and novel aspects of blockchain-based technology, a one-size-fits-all approach to determining decentralisation is neither appropriate nor practical'

In decentralised systems, policy-makers must assess whether the underlying protocol of a decentralised system eliminates the risks associated with centralised authority. Where decentralised systems do not eliminate or sufficiently mitigate risks associated with centralised authority, oversight and regulation should follow. For example, if there is a security vulnerability in a protocol that is exploited, how is that vulnerability addressed? If there is a risk of collusion among entities running nodes, how can that risk be alleviated? Regulation can solve these gaps in trust.

Ensuring consumer and investor protections, promoting market integrity and mitigating systemic risks remain key priorities for policy-makers, whether looking at centralised or decentralised systems. Yet decentralisation raises fundamental questions about the nature of regulation, and how that regulation is deployed most effectively. In confronting this unfamiliar territory, policy-makers will be challenged to rethink the very nature of oversight.

'The blockchain industry is nascent and will continue to develop over time; many of the fundamental assumptions that hold now will become outdated, making an overly prescriptive definition outdated or irrelevant'

Figure 1. Key dimensions of decentralisation



Source: *Stellar Development Foundation*

and the ability to settle delivery versus payment, while not being exposed to the volatility of the cryptocurrency market.

Data from Brevan Howard Digital show that stablecoins appear to have been generally resilient in the face of the crypto crash – while decentralised exchange volumes plummeted by 60% in 2020, stablecoin volumes were down only 11%. The Federal Reserve has concluded that deposit-backed stablecoins could serve as an adequate safe haven during periods of crypto market distress.

The ability to facilitate cross-border transactions without intermediaries like banks makes stablecoins particularly well suited for remittances, reducing transaction costs and processing times. Like cryptocurrencies, stablecoins can provide financial services to individuals who lack access to traditional banking systems. People in regions with unstable economies or limited financial infrastructure can use stablecoins to store value and access digital financial services. One initiative for widening stablecoin use through cost-effective mobile micropayments is Lightning Labs' Taro protocol, which brings fast and cheap transactions to bitcoin. In theory, this could link DeFi more effectively to its initial objective of serving as a commonplace means of exchange.

The volume of stablecoin transactions has been impressive. According to a report by Brevan Howard Digital, there were $11tn on-chain stablecoin transactions in 2022, compared to $11.6tn for Visa. Of course, the nature of these payments is different – people who trade high volumes of securities don't do so with Visa. Yet the sheer volume of transactions signals the genuine potential for stablecoins to serve as a means of efficient and high-volume payments.

At the same time, stablecoins are marked by much of the same absence of sufficient AML/KYC standards that affect cryptocurrencies. They may also limit countries' abilities to implement capital controls. Despite efforts to improve these standards, there are legitimate questions about whether regulations are anathema to the core promise of DeFi: anonymity and freedom from centralised oversight. Stablecoins and exchanges that implement robust KYC and AML provisions may be forced to surrender key aspects of their underlying promise, beginning to resemble the payment systems of traditional finance more closely.

But while stablecoins allow users to avoid the volatility of cryptocurrencies, they are still subject to operational and prudential vulnerabilities. A key issue that must be resolved if stablecoins are to become trusted instruments is prudential requirements. Ostrowski argued that there is a serious 'question about stablecoin reserves and their leverage – what's actually backing them and how many reserves do they actually have?' This is one of the biggest problems, he said. 'It's not clear what it's in their reserves.'

These persistent operational and prudential risks made the ensuing regulatory clampdown on stablecoins, especially algorithmic ones, justified and unsurprising. Because of the damage to the industry, it creates opportunities for traditional private finance companies to wield their incumbent advantage to control the stablecoin market.

'While decentralised exchange volumes plummeted by 60% in 2020, stablecoin volumes were down only 11%.'

The question of what role stablecoins will occupy if central banks issue their own digital currencies remains unsettled. Central bank digital currencies would deliver many of the benefits of stablecoins, perhaps undercutting their value proposition. But, 'Although there are many CBDCs which are being developed and a few pilot projects, there are few in production and most of the major economies are in the early phases of development,' said Creer. 'So regulated stablecoins are a good alternative until these projects are completed'. He added that, 'there may also be some countries that may never get to a working CBDC, due to political stability or contrasting views.'

Many envisage stablecoins and CBDCs functioning in parallel. But offering the same cross-border functionality as stablecoins could be challenging for CBDCs. They may also be capped for institutional use or otherwise restricted, opening a niche for stablecoins.

Non-fungible tokens

Non-fungible tokens quickly garnered a reputation as the most absurd by-product of the digital asset speculative bubble. The cheaply produced and

low-resolution images have commanded purchases as high as $92m. And yet, NFTs might be one of the more enduring innovations of the DeFi movement. NFTs represent ownership of unique assets that are indivisible and cannot be exchanged on a one-for-one basis like cryptocurrencies.

Despite the reputation, the value proposition for NFTs is in some ways more obvious than for fungible tokens. Ostrowski observed that, 'An NFT can represent value if it's connected to a real-world asset, much in the same way as the deeds to a property represent value.' The question is whether representing ownership in token form offers operational efficiencies.

As Garetson commented, 'There is a lot of potential value in tokenisation, whether that's through a currency or some form of fungible or non-fungible token. There's a lot of value in being able to fractionalise traditional assets and exchange them in a rapid way.' Due to the often absurd manifestations of NFT technology, onlookers 'conflate the underlying technology with the specific use cases,' he added. The former may be valuable even if instances of the latter appear patently ridiculous. NFTs carry with them much of the same capacity to enact instant and cheap asset transfers that other forms of DeFi products do. They can similarly support DVP settlement, helping improve security in global transactions.

The concept of digital scarcity is important as it allows artists and online creators to sell digital art, music, videos and other content, providing a new revenue stream and protecting their intellectual property rights. This enables monetisation for creators by allowing them to side-step traditional gatekeepers (such as record labels and galleries). None of this suggests that NFTs might serve as a form of currency exchange, but these benefits do hint at the possibility of NFTs serving as a legitimate form of social and financial market value. Such value may grow if the metaverse becomes a functioning entity and emerging marketplace.

More immediately, NFTs, like cryptocurrencies and stablecoins, can be programmed with smart contracts, enabling them to have built-in functionality. This opens the door to dynamic content, where the value or appearance of an NFT can change over time or based on specific conditions, adding a layer of interactivity and engagement for collectors. NFTs also offer an initial layer of verification to purchases as well as the potential for more seamless transfers of ownership for things like event tickets, protecting against scams.

And yet, NFTs have been the subject of one of the most spectacular investment bubbles in history. The emphasis on financial gains rather than the intrinsic value of the content led to a market crash as economic conditions changed. Daily sales have plummeted since the peak in 2021 – down to about 9,000 sales a day in November 2022 from 183,755 in August 2021. And the lack of physical presence may result in diminishing value over time. Since NFTs do not provide tangible experiences, there is a question about whether they will be able to maintain lasting value as the hype around digital assets fades. ■

'There is a lot of value in tokenisation, whether that's a currency or some non-fungible token. There's a lot of value in being able to fractionalise and exchange in a rapid way.

Adam Garetson, partner, Gowling WLG, and adjunct professor of blockchain and digital assets, Western University

APPLYING DLT TO FINANCE

For years, distributed ledger technology has promised to bring efficiency savings and new functionalities to primary markets. At last, the technology is emerging and regulations are catching up. Both remain unproven, but a distributed future of finance looks more realistic than ever.

Key findings

1. DLT might render some financial market infrastructure obsolete. Regulatory sandboxes are giving market participants the chance to test that claim.

2. The tokenisation of financial products is progressing rapidly. Combined with robo-advisory services, it could enable a more liquid and flexible market, giving investors the opportunity to better express their views through their portfolios.

3. Banks and issuers are working hard on the creation of new, digital primary market instruments, which would settle on demand and be programmable. The pace of issuance is accelerating rapidly.

DLT: a catalyst for new market structures

Simpler and more efficient financial infrastructure is possible with distributed ledger technology.

AN EARLY PROMISE of the advent of distributed ledger technology was that it would deliver opportunities to simplify the structure of financial markets, reducing the number of intermediaries and the complexity of the systems we use to process financial transactions.

Bitcoin and cryptocurrencies were invented to enable peer-to-peer exchange of values. Traditional finance, by contrast, is built on an extensive and complex network of intermediaries and service providers. The innovations offered by DLT, when applied to traditional markets, may allow for a simpler market structure.

It may be possible for the traditional financial system to learn some lessons from the cryptocurrency ecosystem here. Traditionally, when stocks are traded, the clearing house, brokerage, exchange and custodian are all separate entities, independently regulated. The Bank for International Settlements published its principles for financial market infrastructures in 2012, outlining a set of international standards for payment, clearing and settlement in financial markets. Adhering to these standards is key to ensuring the financial system can withstand shocks.

However, this complex infrastructure, though resilient, was designed to clear and settle transactions in a paper-based system and the result is that settlement takes a matter of days, depending on the asset class and jurisdiction.

For the digitally native crypto ecosystem, settlement takes place digitally and in real time, so requiring separate entities to perform the tasks is not technically necessary to ensure security. Transactions are recorded on a single distributed ledger, rather than numerous centrally held ledgers that must be regularly reconciled.

Further integration might yield even more efficiencies. Crypto exchanges also argue that, by integrating exchange and custodian, they can effectively facilitate order-matching more efficiently, then execute it with delivery versus payment settlement, mitigating counter-party risk.

Vertical integration in cryptoasset service providers is often criticised by regulators as a source of moral hazard. Of course, segregation is important in some respects – in the wake of the FTX debacle, few will be comfortable with proprietary trading outfits integrated with exchanges and custodians. But it is important to note that TradFi institutions often perform a variety of functions – including brokerage, market making, prop trading and custody – under the same banner.

The important protection is not that these functions are performed by separate legal entities, but that customers' interests and assets are protected by hygienic balance sheets, robust information barriers, separate governance structures and appropriate regulatory supervision.

With those in place, it is worth examining the degree to which technology can reduce the need for multiple intermediaries. Each entity involved in facilitating a transaction has operating costs to meet and therefore fees to levy. If it is possible to provide a comparable level of security and operational resilience with fewer costly intermediaries, this should improve market efficiency.

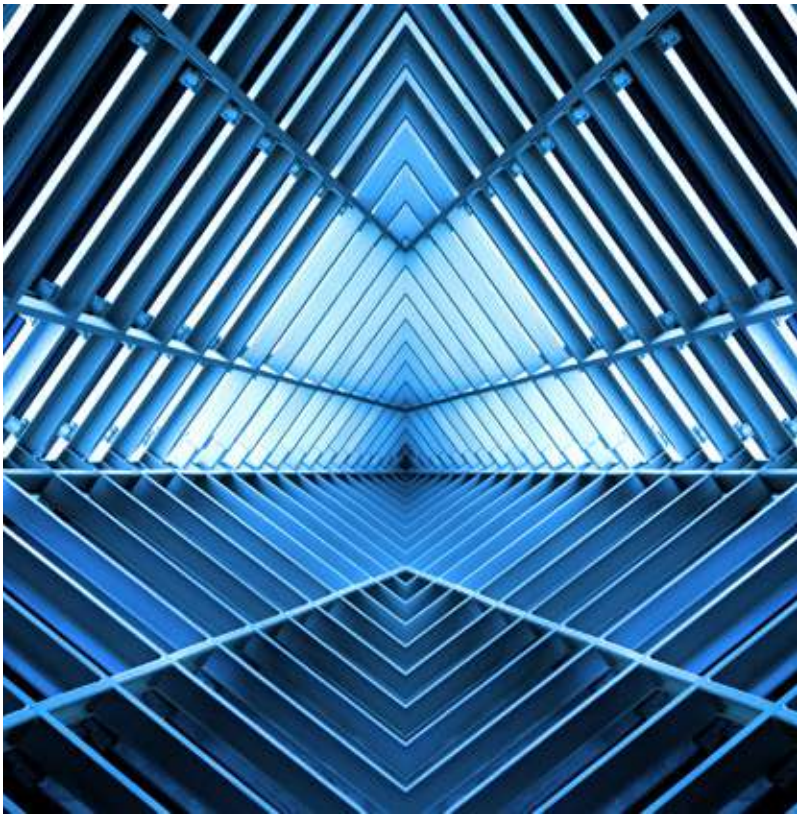
In regulated markets, however, this is not just a question of technical sophistication but of regulatory approval. While blockchain proponents are proud to say that they can deliver real-time settlement, in many financial markets, settlement is a legal, rather than a technical concept. It cannot be delivered outside of the context of the regulated financial market infrastructure that has the responsibility of determining that settlement has taken place.

But laws can be changed. The European Union's DLT pilot regime, which began in March this year and runs until 2026, is a first step in examining whether DLT can fulfil some of the roles presently occupied by centralised FMIs. It is expected that the UK's digital securities sandbox will fulfil a similar role.

The EU is blazing a trail

The DLT pilot regime permits limited exemptions from certain components of the Markets in Financial Instruments Directive 2014 and the Central Securities Depositories Regulation. Investment firms or market operators can register themselves as DLT multilateral trading facilities, with fewer transaction reporting obligations than traditional systems (provided all the relevant details are directly and immediately accessible to national competent authorities). Central securities depositories can register themselves as a DLT settlement system, allowing them to settle tokenised financial instruments. These functions can be combined in a DLT trading and settlement system, which enables an investment firm or market operator to function as its own CSD.

'It's about connecting our existing secondary markets to a new precision settlement process enabled by an industry DLT, or public blockchain infrastructure, rather than on a traditional CSD,' said Duncan Trenholme, global co-head of digital assets at TP ICAP. 'We've seen a lot of development to date in the primary issuance process for new digital assets, particularly in fixed income for bonds, but there is a lack of secondary markets for these assets after the main issuance. Investors need this functionality available for trading and liquidity purposes, and it needs to interface with the major DLTs or public blockchains that have the most industry adoption.'



'We've seen a lot of development to date in the primary issuance process for new digital assets, particularly in fixed income for bonds, but there is a lack of secondary markets for these assets after the main issuance.'

Duncan Trenholme, global co-head of digital assets, TP ICAP

For TP ICAP, an electronic market infrastructure and information provider, the ability to make use of DLT as a settlement medium is an important opportunity. 'As a major trading venue, the settlement and general post-trade process for trades in our traditional markets are often operationally intensive and have high costs, including the capital we have held as margin, costs associated with settlement fails and late settlement fees,' said Trenholme. 'An infrastructure that offers technology-enabled precision settlement, over shorter-time horizons and that can be automated through smart contracts, is very powerful for us and ultimately our clients.'

Simon Forster, fellow global co-head of digital assets at TP ICAP, explained in more detail: 'At TP ICAP, we process huge transactional volumes across every major asset class. A percentage of that takes place on a matched principal basis, which means that TP ICAP is buyer to every seller and vice versa. This is especially relevant in equities and fixed income markets, and the latter has seen early traction in digital-native issuances due to the operational costs involved in transacting in those markets.'

TP ICAP has been developing expertise in ➤

IMPROVING PAYMENTS AS WELL AS REGULATION

PayPal's new stablecoin could make a difference to both traditional payments systems and regulatory frameworks, argues Timothy Massad, research fellow and director of the Digital Assets Policy Project at the Harvard Kennedy School.

PAYPAL'S ANNOUNCEMENT that it will launch a stablecoin – a crypto token with its value tied to the dollar – shook up the insular world of payments and the Washington regulatory community. This move is important for three reasons.

First, it is a significant test of whether crypto technology can bring benefits to the real economy. Second, it could bring much-needed competition to the payments industry. And third, it could help bring about what Washington has thus far been unable to achieve – a federal regulatory framework for stablecoins. That can help reduce risk and maximize opportunities of this new technology. (Full disclosure: I am a member of PayPal's advisory council on Blockchain, Crypto and Digital Currencies.)

Since its inception, crypto activity has had little connection to the real economy. Bitcoin was meant to be a new type of electronic cash and a peer-to-peer payments system when it was launched in 2009, but it is a speculative asset that is not widely used for payments. To date, when traditional institutions like Fidelity and Blackrock have entered the sector, they have done so to cater to their clients' desires to invest in crypto tokens, not to change the way business is generally conducted.

But stablecoins could make a difference, and PayPal's action could be the best test yet. Stablecoins were invented to make it easier to trade crypto because they provide a way to instantly settle a transaction on a blockchain for a fixed dollar value. But they could have broader application to payments.

Our payments system can benefit from that type of disruption. All non-cash payments today are based on an account-to-account model that involves multiple steps with multiple institutions. Separate movements of the information – name and account of payor and payee and amount – and the value are also required. '

Most Americans would probably say the payment system works fine – credit cards, mobile banking and payment apps provide convenience, reliability and safety. But our system is relatively slow and expensive compared to what is possible. This is especially a problem with cross-border payments. While we all pay for that, those deficiencies hurt lower-income people the most. They often cannot wait three days for a paycheck to clear and incur overdraft charges or resort to expensive check cashing services to pay their bills. They often can't obtain credit cards but subsidise them by paying the same prices for goods and services. They also pay a lot to send money to families abroad.

There are potentially many ways to improve payments, and stablecoins may not be the best one. But stablecoins – and tokenization generally – could improve payments by combining messaging, reconciliation and transfer of value all at once, instantly. They also offer new opportunities through programmability.

But stablecoins today also have risks, and I have long argued we need a federal regulatory framework because of these risks. Put simply, stablecoins are not inherently 'stable'. There are efforts in Congress to pass legislation, but a consensus has not been reached. PayPal obtained the necessary approvals under state law to launch a stablecoin, and its action might encourage Washington to come to agreement on a federal framework.

PayPal's action has been compared to Meta's (then Facebook) attempt to launch a stablecoin, called Libra (and later Diem). But there are big differences. PayPal has always been a payments company, and it is using a new technology that it believes can create significant efficiencies and opportunities in payments.

Meta is a social media platform that wanted to enter financial services to capitalize on its data advantages. It was challenging a traditional principle of financial regulation, which is that commercial companies should not be in banking, where payments have traditionally resided.

Finally, it's also possible that stablecoins could help maintain the global importance of the dollar. Its primacy in global commerce is based on multiple factors, and there appear to be no immediate threats. But many other countries are moving rapidly to explore digital technology, including through projects to create non-dollar-based systems for international payments. We need to make sure the technology of dollar-based payments is modernised, and regulated stablecoins might be one way to do that.

DLT NOT A MAGIC BULLET

It is important to note that DLT integration is not the only means of improving asset settlement in financial markets. 'There are a lot of people experimenting with blockchain, looking to make issuance cheaper, faster and more automated,' said NowCM's Robert Koller. 'But we can do this with the present system. Tokenisation is not necessarily a part of that.'

NowCM believes that the key to improvements is not blockchain but the structuring of data so that it can flow freely between counterparties and intermediaries, seamlessly and automatically integrating with each participant's systems. By creating a comprehensive data model for bond issuance, NowCM can bring down the cost and the time required to set up an issuance programme. NowCM issues a bond on behalf of its client, then passes the liability on entirely transparently as a back-to-back loan.

The eventual use case NowCM envisions is something Koller referred to as 'permanent funding', where the marginal cost of issuing a new bond is brought down such that, instead of selling a $3bn benchmark every couple of months or so, an issuer might come to the market every day for smaller, more granular and flexible funding, allowing them to respond to market conditions on a fluid basis.

this type of infrastructure initially within a new asset class for the firm, the cryptoasset class, through its Financial Conduct Authority-registered cryptoasset exchange Fusion Digital Assets. 'The cryptoasset class is where we've seen the most demand from clients for DLT/blockchain-based assets to start with. Fusion Digital Assets, our cryptoasset exchange, has an initial settlement cycle that takes place T+0 once a day,' said Trenholme. 'However, we have built the infrastructure so that we can be flexible with when and how often we settle – a precision settlement process – and in future we can tailor the settlement cadence to suit the asset class. Not all asset classes will suit atomic or immediate settlement, and clients may wish to continue to leverage the benefits of trade netting.'

Of course, the pilot is just that. The regime is scheduled to run for six years and enables only limited volumes – although these may be upped midway through the regime. DLT shares can only be traded from issuers with a market cap of under €500m, while DLT bonds are permitted only up to €1bn. Perhaps more importantly, DLT market infrastructure operators should not admit new DLT instruments to trading if doing so would increase the aggregate market value of DLT instruments to over €6bn. If, through capital appreciation, the value of DLT instruments reaches €9bn, the DLT market infrastructure operator must engage a transition strategy, moving DLT instruments over to traditional settlement architecture.

For NowCM, this factor limits the value of the DLT pilot regime. 'We have a DLT multilateral trading facility and we could do the settlement under the pilot regime but, so far, we haven't found a real use case,' said Robert Koller, chief executive officer of NowCM. 'This infrastructure is only valuable if it's institutional and scalable, but the cap means there's not really any benefit for us to build that, and until we have clarity on where the sandbox is going, we don't want to invest too heavily in something that may not continue.'

A role for intermediaries?

CSDs and other intermediaries have no intention of being rendered obsolete. While it may be possible to use DLTs to securely settle transactions peer to peer without a central party managing the process, some intermediaries might still be able to carve out a role for themselves.

Given their roles are (for the moment) enshrined in regulation, if they can upgrade their systems to deliver the benefits of tokenisation on their own terms, they will be much more difficult to disintermediate. It remains to be seen whether the DLT pilot regime will deliver proof that DLT systems can adhere to the BIS principles for financial market infrastructures as rigorously as regulated intermediaries do.

At present, progress is coming from individual banks and service providers working on their own digital asset platforms using different standards and different blockchain protocols. This makes market fragmentation a major concern.

Issuers will not accept a digital asset solution that compromises the liquidity of their assets. Any successful digitalisation platform will need to be accessible to the complete universe of potential investors. That might result in reliance on interoperability bridges, porting assets from one chain to another. These have a reputation as unreliable and are likely to result in a loss of smart contract functionality.

The challenge is to cause the market to coalesce around a particular standard. 'Part of the problem is neutrality,' said Koller. 'Banks are unlikely to want to use their competitor's platform if it involves giving that competitor potentially valuable data.'

This might provide an opportunity for CSDs to play a role as a standard-setter. Since their position at the centre of securities markets is enshrined (for the moment) in regulation, they have an opportunity to establish standards via their own tokenisation protocol and disseminate this throughout the market.

Euroclear's partnership with Fnality, which aims to deliver a means of settling tokenised cash versus tokenised securities, is a clear example of a CSD attempting to work its way up the value chain. ■

'This infrastructure is only valuable if it's institutional and scalable, but the cap means there's not really any benefit for us to build that, and until we have clarity on where the sandbox is going, we don't want to invest too heavily in something that may not continue.'

Robert Koller, chief executive officer, NowCM

Buyside innovation unlocking new markets

The tokenisation of assets has been extremely difficult to implement, but the value proposition is now better understood.

IT DID NOT take long for people to work out that tokens traded on distributed ledgers could represent ownership of all kinds of assets, not just the tokens themselves. A system for securely tracking the ownership of assets and providing an efficient means of exchanging them has applications far beyond trading cryptocurrencies. Representing financial instruments and real-world assets – everything from commodities to real estate to art – in this way could yield efficiency savings and open up new functionalities and business opportunities (Figure 5.1). In a report, published in March 2023, Citi estimated that up to $4tn could be tokenised by 2030.

While the potential benefits have been well understood for a long time, implementing tokenisation has proven immensely challenging. The established methods for representing ownership of particular asset classes have a great deal of inertia. Replacing these methods, or at least updating them to integrate a new asset form factor, will take a lot of work.

Service providers are already doing their best to develop solutions that abstract the work away from banks and investors. But despite the expected benefits tokenisation would deliver, the infrastructure on which it would rely is still too immature for widespread adoption. Changing foundational infrastructure for systemic markets requires regulatory developments. Some jurisdictions are enacting these, but progress is piecemeal and proceeding at different paces for different asset classes.

One of the key obstacles is a lack of standardisation among the blockchain protocols being used. While it is likely that tokenised assets

will occupy a variety of different blockchains, for the benefits to be realised people and institutions need to be able to exchange tokens freely and easily without complex on-boarding procedures for each new protocol. 'The problem is a lack of homogeneity for data standards,' said Irfan Ahmad, head of commercialisation for Asia Pacific and the Middle East and North Africa at State Street Digital. 'There are over 100 blockchain protocols and we need better solutions for interoperability. Bridging is universally agreed to be the most risky function – it's not good for breeding efficiency. We need a best practice to be established.'

One issue is that, while bridging allows tokens to be created on a new blockchain representing ownership of original tokens, these will not carry over the smart contracts that contain the functionality of the original token.

Swift has made some important progress on interoperability. It has conducted experiments that demonstrate that the Swift network and the Chainlink Cross-Chain Interoperability Protocol solution can enable financial institutions to use their existing back-end systems to interact with tokenised assets and transact across both public and private sector platforms.

Tokenisation of financial instruments

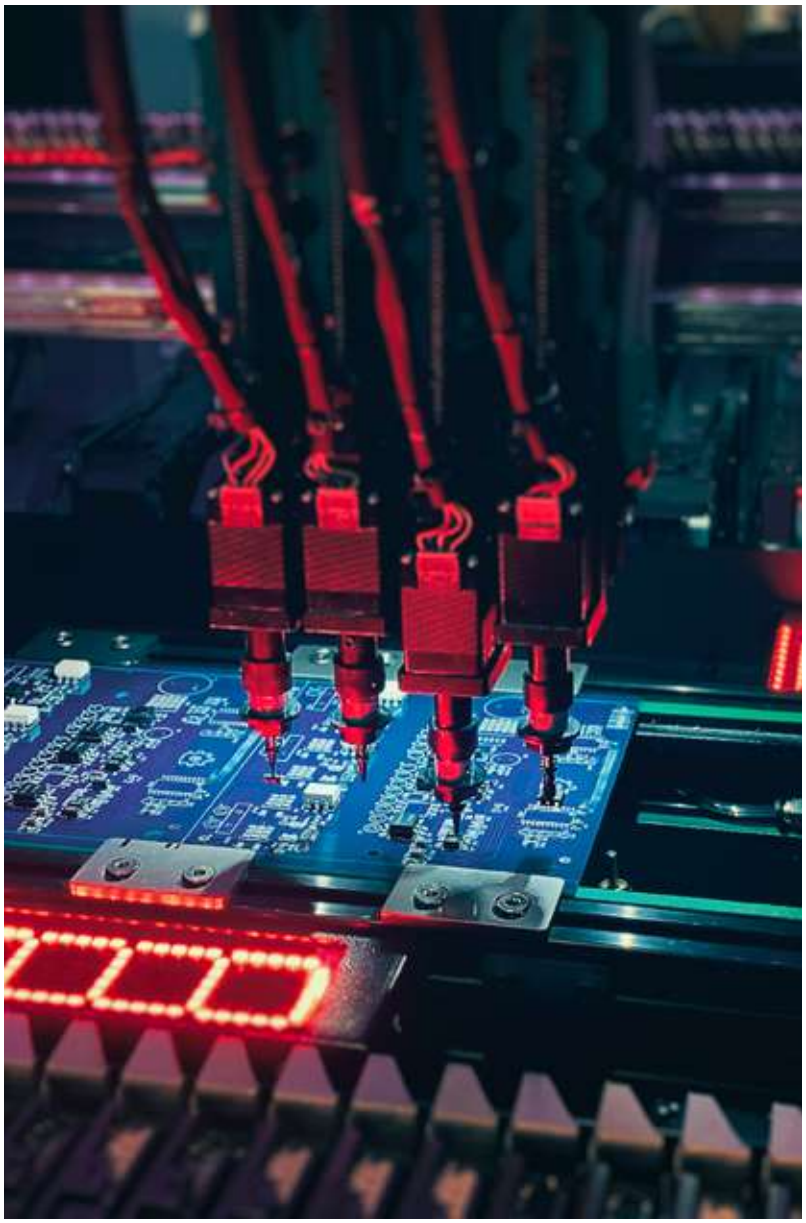
While the universe of potentially tokenisable assets is broad, it is not surprising that progress has been the most rapid in financial instruments. Banks and issuers are setting up platforms for the primary issuance of bonds, but these are not really attempting to solve the problems of secondary market liquidity.

However, on the buyside, things have been progressing in a different direction. Large asset managers are buying up traditional assets, then issuing blockchain tokens representing their ownership.

'The key value proposition is creating an internet-native technical infrastructure for trading these instruments,' said Ben Dean, director of digital assets at WisdomTree. 'From the customer's perspective, they don't need to know anything about the tokenisation going on at the back-end. The experience is a payment, trading, saving and investing infrastructure that is faster, lower cost and more convenient than what they currently have.'

The ability to deliver this kind of low-cost trading infrastructure is allowing WisdomTree to branch out from its traditional business-to-business model with WisdomTree Prime, a direct-to-retail brokerage service launched in summer 2023, presently operating in 20 US states and expected to be offered in all 50 by the end of the year.

WisdomTree is not alone in pursuing tokenisation of traditional financial instruments. State Street, Franklin Templeton and others are all beginning to offer these instruments to their clients.



But which assets?

Since tokens can represent anything, we must ask the question of where tokenisation can add the most value. Broadly speaking, there are two philosophies here.

First, tokenisation can unlock liquidity in assets that are traditionally illiquid, like private equity, debt and real estate. Through a combination of fractionalising and broadening reach to anyone with an internet connection, a functional liquid market can be created for instruments where that does not presently exist. Sam Ten Cate, a regulatory consultant at State Street Digital said: 'These are very manual markets without much automation. For me, that's where tokenisation can make the biggest difference.'

The second option is to tokenise highly liquid, high-volume products like exchange-traded funds. From Ten Cate's perspective, 'There's already a high degree of automation and there's less to be gained in terms of efficiency savings by implementing DLT.'

Dean felt otherwise. 'It's true that the ➤

'These are very manual markets without much automation. For me, that's where tokenisation can make the biggest difference.'

Sam Ten Cate, regulatory consultant, State Street Digital

existing infrastructure for trading ETFs is fairly efficient. It could be improved, and incremental improvements are still worth making. If the technology becomes uniformly adopted, the benefits could be even more significant.'

Ahmad also pointed out that tokenising illiquid assets is challenging. 'Valuation of illiquid assets often doesn't happen in real time. Consider real estate: valuations are done by independent parties on a quarterly basis generally. Pricing in real time doesn't really make sense in that context.'

Dean said that, though WisdomTree is pursuing the second option, he believes that the first option may also produce valuable innovations. 'It's a question of supply and demand. If you provide the supply – creating tokens representing illiquid assets – will that generate enough demand for a liquid, efficient marketplace to emerge? It's possible. We'll see how it develops.'

Fractional ownership

One of the key benefits often touted of tokenisation is the ability to split up assets into fractions that can be separately owned. For a particular asset, this might not seem like an especially powerful tool – issuers could always issue smaller denominations if they wanted to access investors that high-ticket values exclude and companies can split their shares if they become inconveniently expensive.

'While it is likely that tokenised assets will occupy a variety of different blockchains, for the benefits to be realised people and institutions need to be able to exchange tokens freely and easily without complex on-boarding procedures for each new protocol.'

However, from the point of view of portfolio construction, there can be more important benefits. Ahmad explained: 'We are in the midst of a generational shift in investing habits. New investors are coming into the market and they expect to be able to express their views and philosophies in market terms. They want to be able to consider ESG themes and vote with their portfolios. That need is being partly met by the proliferation of robo-advisory services at large asset managers, but it can be met more effectively with fractional ownership enabled by tokenisation. That will allow investors to take much more granular and precise levels of exposure to the assets they want to hold.'

Tokenisation of cash still a key step

Tokenising assets is all very well, but many of the benefits – particularly the reduction of counterparty risk from delivery versus payment settlement – are realised most effectively alongside a tokenised cash solution. Whether that comes in the form of central bank digital currencies, tokenised bank deposits or stablecoins – or some combination of the three – will depend on the jurisdiction. But this is far from

Figure 5.1. Tokenisation can benefit asset owners, service providers and investors

Potential benefits from tokenisation by stakeholder type

	Asset owners		Service providers		Investors	
	Revenue opportunity	Cost efficiency	Revenue opportunity	Cost efficiency	Revenue opportunity	Cost efficiency
Improved capital efficiency Lower cost of capital and free up capital in transit					◆	◆
Democratisation of access Access to new secondary markets; greater liquidity					◆	
Access to new pools of capital with lower minimum investment required	◆					
Operational cost savings Opportunities to embed manual and error-prone product-structuring and asset-servicing tasks into the token smart contract and eventually across a portfolio		◆		◆		◆
Enhanced compliance, auditability and transparency Embedding of rules and credentials into the token smart contract (e.g. investor qualification, carbon credit verification)		◆		◆		◆
Cheaper and more nimble infrastructure Open-source technology driven by thousands of Web 3 developers and billions of investment dollars		◆		◆		◆

Source: *McKinsey*

a simple prospect. While the form factor of an asset does not necessarily change its regulatory status substantially, digital cash is a more novel concept.

Nevertheless, there is a variety of contenders emerging. USD Circle, built on the Stellar blockchain, is a popular stablecoin based in the US. State Street Digital is working with Fnality to produce a synthetic CBDC, working alongside central banks to find a solution for DVP settlement. Société Générale Forge is working on a stablecoin that would provide a means of settling in tokenised cash without constituting a claim on SocGen as a credit.

It is also worth considering tokenised money market funds as a means of payment. While stablecoins typically pay no interest, MMFs do – but they can be tokenised, as has been demonstrated by Franklin Templeton whose tokenised MMF passed $270m assets under management in April this year. The stability and steady returns of MMFs, combined with the efficient settlement of tokenisation might make them a more popular form of tokenised cash than stablecoins, particularly in times of high inflation.

'It's a question of supply and demand. If you provide the supply – creating tokens representing illiquid assets – will that generate enough demand for a liquid, efficient marketplace to emerge? It's possible. We'll see how it develops.'

Ben Dean, director of digital assets at WisdomTree

In large part, this report is about charting the progress in evolving from the status quo – moving from two mostly separate financial systems for traditional instruments and digital native instruments to one integrated system incorporating both types of assets. One demonstration that this has been achieved would be the posting of tokenised versions of traditional instruments as collateral for decentralised finance lending operations.

'We are beginning to see the blurring of the lines between the traditional and the native digital financial worlds,' said Dean. 'Using tokenised instruments as collateral for DeFi is technically feasible, but at present, DeFi applications are pretty niche. They're for expert users who are comfortable managing their own keys. There may be mass demand in the future, but we'd need to see DeFi become more approachable to the average user before that could happen. If it is not easy to use for the average person, it may never expand beyond a niche product.' ■

Digital bond progress is accelerating

While blockchain bonds are yet to meet their full potential, there have been encouraging signs of progress in adoption over the past few years.

THE FIRST blockchain bonds emerged in 2018 but, in the intervening five years, their promise of a revolutionary, quicker and safer foundation for a digital bond market has yet to be fulfilled.

That's not to say that process has stagnated, however. Although there is no real secondary market to speak of as yet, the pace of primary issuance is accelerating with a handful of deals being launched in the past year from bond market mainstays like the European Investment Bank, KfW, Hong Kong Monetary Authority and Siemens.

'A lot of the deals have been proof-of-concept trades,' said Alex Caridia, managing director and head of public sector markets at RBC Capital Markets. 'But with growing industry expertise and blockchain technology itself maturing, we've observed trades becoming increasingly sophisticated over the last few years. We saw shadow ledgers four years ago, now we're seeing full systems of record with an asset ledger connected to a cash ledger with real-time settlement.'

Significant milestones

The EIB has been spearheading the development and sophistication of digital bond issuance. Since 2021, it has issued four digital bonds in three different currencies and in different coupon formats, using both public and private blockchains and settling in both experiments using central bank digital currencies and commercial bank tokens.

Earlier this year, the EIB achieved more milestones in the digital bond market, with the use of privately

issued settlement tokens rather than experimental CBDCs, which the EIB had used for its previous digital bonds.

'This will allow scale for digital bonds going forward rather than waiting for CBDCs, which may not be issued in the immediate future as central banks – rightly so – will be doing a lot of due diligence around this,' said Asif Sherani, head of debt capital markets syndicate, Europe, Middle East and Africa, at HSBC, one of the banks that led the transaction. The £50m two-year bond was the EIB's first digital bond in sterling and the first to be issued using a combination of private and public blockchains.

There have also been significant milestones achieved with transactions in Germany following the arrival of the Electronic Securities Act in June 2021. This legislation allows for the dematerialisation of a bond's global note and gives issuers the option to choose between paper-based and electronic issuance.

In December last year, KfW became the first issuer to launch a digital fixed-income bond in the form of a central register security based on the Electronic Securities Act. The €20m two-year transaction was carried out by Clearstream on Deutsche Borse's D7 digital post-trade platform with Deutsche Bank acting as lead manager.

'Prior to the legislation, no security in Germany could be issued without a physically signed note, including bonds and commercial paper,' said Tim Meirer, senior treasury manager at KfW, a specialist in the digitalisation of capital markets documentation who worked on the transaction. One of the main benefits of the platform is dematerialising the physical note, removing the need to create physically signed notes.

Other benefits of digital issuance via the D7 platform include the shortening of the extensive and multi-day issuance process to just a few minutes. This saves time, manual effort and processing costs. 'However, there are still some manual steps necessary and, therefore, the platform is working on creating a fully integrated digital workstream,' said Meirer. 'It's an evolution of the existing processes in improving the front-to-end process.'

The platform also needs to work on the life cycle functionalities for debt capital market products. Bonds cannot currently be tapped via the platform and only bonds that are listed in Frankfurt can be emitted through the platform. Opening it up for international securities identification numbers would help enable broader adoption of the system.

Siemens followed up with its own transaction in line with Germany's Electronic Securities Act in February of this year in the first digital bond on a public blockchain. The legislation has provided two possibilities for issuing digital bonds. One is through a central registry while the other is a decentralised route with a crypto registry, making central clearing unnecessary. This latter route is somewhat similar to the provisions in the European Union's distributed ledger technology pilot regime, which allows DLT trading facilities to act as their own central securities depositories.

'We have asked central banks in the Nordic region to do some CBDC experiments with us, but at this time they are not looking at wholesale CBDCs and are more focused on retail CBDCs. But we remain keen to get central banks to work with us.'

Johan Hörmark, project manager, SEB

The Siemens transaction used the latter solution, issuing the bond via a public blockchain without using CSDs. The bonds were also sold directly to investors without the need for banks to act as intermediaries like in a typical bond issuance. DekaBank, DZ BANK and Union Investment were the investors in the €60m one-year bond.

The disintermediation, as well as moving away from paper and towards public blockchain, significantly reduced the settlement time from eight to two days. Same-day settlement would also have been possible if a cash-on-chain solution was available.

The regulatory challenges for this mode of decentralised issuance have not yet been entirely resolved or harmonised between different jurisdictions. Bonds issued via a crypto security register are currently not eligible for inclusion in the European Central Bank's collateral programmes, which include only securities registered with CSDs. As this reduces the number of potential buyers for the bond, it makes it less valuable than conventionally issued bonds.

Since CSDs provide infrastructure for trading financial instruments, issuing one without listing at a CSD makes secondary trading challenging. A viable secondary market in digital bonds in Germany would require something equivalent to the multilateral trading facility and settlement systems established by the EU's DLT pilot regime.

Sustainable blockchain

One of the big barriers to widespread adoption of blockchain is that it is considered a high energy-consuming technology. This is particularly true for blockchains that, like bitcoin, are verified by proof-of-work consensus, which requires validators to use computer processing power to find a cryptographic solution. Since the security is tied to an expenditure of effort, proof-of-work blockchains necessarily consume large amounts of electricity. Ethereum ➤

PUBLIC VERSUS PRIVATE BLOCKCHAIN

There is a lack of consensus over whether digital bonds should be issued on a public or private blockchain. Many public blockchains reward validators with fees for verifying transactions. Since these validators have not undergone know-your-customer processes, some institutions may be uncomfortable participating in a system that rewards them. However, others prefer the greater transparency and broader access public blockchains entail.

'Deals on public blockchain are held on a registry, which gives more visibility and transparency,' said Callsen. 'Ultimately there is no consensus whether it's public or private. It's more a matter of the permission levels and desired transparency, which may or may not be beneficial.'

The EIB has issued deals using both private and public blockchain and even a combination of the two. 'In principle, we are indifferent in respect of private or public blockchain solutions. However, a combination of the two, together with cross-chain interoperability, seems to be the most promising solution,' said Richard Teichmeister, head of the non-core currencies and special transactions division at the EIB. 'Such a model may offer a consensus allowing various private blockchain-based sub-ecosystems to co-exist while communicating between themselves through public blockchain-based networks.'

is verified by proof of stake, which does not consume as much energy as proof of work (although it may be more energy-intensive than centralised solutions).

Skandinaviska Enskilda Banken and Crédit Agricole launched a 'sustainable and open' platform for digital bonds in April 2023 that uses significantly less energy than other blockchain platforms and encourages a lower environmental footprint.

'It all started about two years ago when EIB issued a few requests for proposals for digital bonds and mandated SEB and Crédit Agricole for a Swedish krona issuance,' said SEB's Johan Hörmark, who was the project manager leading the work on the platform. 'EIB had a substantial list of demands in ensuring the issuance was very green and done on blockchain. So, over the last two years, together with Crédit Agricole, we have been working on this project.'

'After evaluating several blockchain technologies, in the end, we decided to create our own platform, which consists of an underlying blockchain technology using a validation protocol that we call proof of climate awareness,' said Hörmark. 'Then there is the smart contract framework that can be reused on all Ethereum blockchains, called SO bond – sustainable and open bonds.'

This new approach gives bond market participants an architecture that allows them to evaluate the environmental impact of market operations – something that does not exist in traditional infrastructure.

'We get asked whether our blockchain platform is more efficient than the likes of Euroclear and ClearStream and the answer is that we don't know because these figures are not disclosed,' said Hörmark. 'But we want to stress the fact that we make the environmental footprint of our platform transparent and possible to evaluate and benchmark against others.'

In June, the EIB used the platform to issue its first digital green bond with a Skr1bn two-year trade to fund climate-related projects. 'The EIB transaction was very well received in the market and there is a lot of interest in these transactions,' said Hörmark.

The platform's open, transparent and secure model makes it an ideal fit for use with CBDCs. 'We have asked central banks in the Nordic region to do some CBDC experiments with us, but at this time they are not looking at wholesale CBDCs and are more focused on retail CBDCs,' said Hörmark. 'But we remain keen to get central banks to work with us.'

Investor engagement

The other key focus for the platform is to engage with investors. 'What we are focused on now is on the investor side,' said Hörmark. 'We are having talks with large custodians around the world that have a huge pool of assets about how we can integrate them into our platform.'

The lack of investor engagement is a major issue with blockchain and DLT adoption in the bond market. Experiments with DLT in fixed income have been largely conducted between banks and issuers with very little engagement from institutional investors. If the market is to take off, it needs to achieve a critical mass of adoption.

'Investors require a huge amount of education as they are at the very beginning in understanding this,' said Caridia. 'It's a bit like other new types of issuance that have emerged like green bonds or bonds linked to the new risk-free rates. But, in those instances, the issuance method was the same, it was just a different theme or structure. Here, we are talking about having investors on a private network on-boarded with new technology'.

'For this to become mainstream, we'll need large-scale adoption of regulated, low-volatility cash-on-ledger solutions that can interoperate with asset ledgers,' added Caridia. 'Cash-on-ledger is the enabling technology that will be a catalyst for greater adoption of blockchain-based transactions.'

'Today, most investors don't want to buy a stablecoin or cryptocurrency asset to transact their bonds. Having regulated, low-volatility cash-on-ledger solutions that can interoperate with bond ledgers will enable digital bond issuance to pick up and investors will focus on it a lot more.'

Alex Caridia, managing director and head of public sector markets, RBC Capital Markets

This is where CBDCs or other future regulated stablecoins from a reputed institution could play an important role. 'Today, most investors don't want to buy a stablecoin or cryptocurrency asset to transact their bonds,' said Caridia. 'Having regulated, low-volatility, cash-on-ledger solutions that can interoperate with bond ledgers will enable digital bond issuance to pick up and investors will focus on it a lot more.'

The importance of CBDCs in increasing adoption of digital bonds is a view shared by others. 'There is consensus that a safe, reliable and digital form of cash which is compatible with DLT-based securities could be of great importance,' said Gabriel Callsen, director of fintech and digitalisation at the International Capital Market Association. 'Wholesale CBDCs are critical in unlocking the full potential of DLT-based securities by accelerating settlement, enabling new business models and supporting access to funding for the real economy. That said, the potential risks and ramifications of wholesale CBDCs across financial markets warrant further consideration – notably interoperability between retail and wholesale CBDCs as well as from a cross-border perspective.'

The entry and adaption cost for investors is also quite high in terms of the resources and time needed to onboard the new technology, although this should decrease over time.

Another significant barrier for investors is the lack of standardisation in this market. 'There is no standardised way to buy and hold DLT securities as most transactions and experiments are bespoke,' said Callsen. 'This makes it difficult to have a standard approach, which is one of the main impediments for investors to transact on a large scale.'

Common standard

The lack of a common standard in both the technology being used for digital bonds and the structure these deals have taken with various platforms is the single biggest barrier to wider adoption of blockchain and DLT in the bond markets. There is no model to follow, so market participants are pursuing their own approaches.

'As digital pioneers, we recognise we're in the very early stages of the evolution of blockchain-based bonds,' said Caridia. 'On one hand there is no common model that can be followed in terms of the structure of the deals, the platform or even the underlying technology stack. Today, each bank or provider wants to use the proprietary platform they've built, which results in a certain degree of fragmentation.'

Caridia added: 'On the other hand, there is also a lot of opportunity – today's pioneers are gaining valuable experience on legal and regulatory requirements, commercial models and technology design, which will help them build robust and efficient future platforms for the industry.'

Interoperability is the key word here, with the various segments of the bond market coming together to work in a coordinated way. 'There are a number of different challenges in this segment,' said Callsen. 'There are diverging legal and regulatory requirements for DLT-based securities in different jurisdictions and a lack of interoperability.'

'There is consensus that interoperability is critical to avoid market fragmentation, ensure efficient capital allocation and help this segment become scalable,' added Callsen. 'Interoperability is a multifaceted concept, encompassing legal and regulatory treatment across different jurisdictions, operational considerations between DLT networks and traditional infrastructure, as well as at the securities level and within different tranches.'

Interoperability is a key feature of any successful digital asset ecosystem. ICMA has been working to promote interoperability and reduce fragmentation through various initiatives. In March this year, ICMA launched its Bond Data Taxonomy, which provides a technology and vendor-neutral handbook to define DLT-based securities both tokenised and in a digitally native form unambiguously. ICMA, together with the International Swaps and Derivatives Association, International Securities Lending Association and hosted by the Fintech Open Source Foundation, has also launched the common domain model, a standardised open-source model for how financial products are traded and managed across the transaction life cycle.

'From ICMA's perspective, it is key to bring together all relevant stakeholders across the market, which is why we created a working group focused on DLT and blockchain in bond markets nearly two years ago,' said Callsen. 'The aim of the working group is to support this market segment to become scalable, liquid and more efficient through harmonisation and common standards. A key focus is to promote interoperability by using ICMA's Bond Data Taxonomy and explore a common approach in relation to risk factors and disclosure in bond documentation.'

Creating a common standard and reducing fragmentation are the next steps in bringing the adoption of digital bonds closer to reality. Issuers need to also think about focusing on the asset and bonds side of transactions and how they can use blockchain for other funding-related activities and processes. There needs to also be a greater focus on investors, which will come with the arrival of CBDCs or other regulated stablecoins in the future.

'Then we will end up in a place where most bond issuance is digital, but we're years away from that and maybe even decades away,' said Caridia. 'But an increasing number of public sector issuers are looking at digital bonds and how to boost inefficiencies across the bond issuance process.'

'Given the sheer volume of our issuance, it is highly relevant for us to look at digitalisation processes, which are needed for efficiency gains, including conducting business faster and safer,' said Markus Schmidtchen, head of treasury at KfW. 'We are still at the very beginning of the digitalisation process.' ■

'There is no standardised way to buy and hold DLT securities as most transactions and experiments are bespoke. This makes it difficult to have a standard approach, which is one of the main impediments for investors to transact on a large scale.'

Gabriel Callsen, director, fintech and digitalisation, International Capital Market Association

BLAZING A TRAIL IN WHOLESALE CBDC

The Banque de France has been exploring the feasibility of incorporating distributed ledger technology into payments systems for financial markets. Claudine Hurman, director of innovation and financial market infrastructure at Banque de France, discusses the Banque's strategic approach to digital payments in capital markets.

OMFIF: Can you give a brief summary of the Banque de France's cutting-edge experiments with wholesale central bank digital currencies?
Claudine Hurman: The Banque de France has conducted 12 experiments on wholesale CBDC since 2020 in collaboration with market participants, exploring different distributed ledger technologies and focusing on two key strategic use cases: the tokenisation of finance and the improvement of cross-border transactions.

The experiments demonstrate the operational feasibility and practical implementation of three models for issuing a wCBDC directly on DLT: the interoperability model, the distribution model and the integration model, all three being complementary. The BdF has published a report on the main conclusions of these experiments.

These analyses contribute to the Eurosystem's exploratory work announced in April 2023, which aims to study how large-value financial transactions recorded on DLT platforms could be settled in central bank money.

O: In financial markets, many asset classes are settled in central bank reserves. How would wCBDC improve on that?
CH: The use of central bank money to settle most securities is a lesson from the 2008 financial crisis. The Bank for International Settlements' Committee on Payments and Market Infrastructure and the International Organization of Securities Commissions have strongly encouraged its use and it is a key principle for financial market infrastructures as it is the safest and most liquid settlement asset. But today central bank money is not available in a tokenised form for wholesale payments. Investors could therefore decide to resort to cryptoassets, mainly stablecoins, for settling the cash leg of securities transactions on DLT.

The use of stablecoins as settlement assets triggers risks and inefficiencies, such as liquidity fragmentation, and does not provide the safety brought by central bank money. This is why a wCBDC needs to accompany and secure the settlement of tokenised transactions. This view is widely shared by central bankers. There is a real push for CBDCs at the global level for financial stability and to avoid privatisation of money.

O: What are the key advantages of an on-chain means of settling cash?
CH: The existence of cash and security tokens on the same ledger could allow for an atomic settlement – in other words a settlement of a delivery versus payment transaction that is both instant and simultaneous. It could also facilitate the development of potential smart contracts to implement desired features, such as automated compliance monitoring. On the contrary, separate cash and security ledgers would require a third party or a mechanism to coordinate the transaction.

O: Could a stablecoin or other tokenised form of private money achieve the same ends?

'There is a real push for CBDCs at the global level for financial stability and to avoid privatisation of money.'

‘Central banks and international regulators have a key role to play in steering this change in the right direction. It is with this objective in mind that we have conducted experiments in partnership with other central banks and will continue to do so.’

CH: Alternative forms of tokenised money are emerging, such as stablecoins or tokenised commercial bank money in the form of tokenised deposits. Stablecoins have proved that they are prone to counterparty and liquidity risks because of their fluctuating value and their strong dependence on the quality of their issuer. Tokenised commercial bank money appears to be a more serious alternative as the two-tier model has already proved its worth.

However, in this case, the use of central bank money will still be necessary in ensuring the convertibility of the various commercial bank tokens issued. It will also be required to settle systemic transactions as it is the safest settlement asset available. Tokenised commercial bank money and wCBDC do not achieve the same ends, but are complementary as they are not intended to be used for the same transactions or at the same scale.

O: How would a wCBDC work for transactions taking place across borders?

CH: Currently, real time gross settlement systems are not interoperable, and the introduction of wCBDCs would be an opportunity to start from scratch and enable interoperability between market infrastructures at an international level. As part of Project Mariana, the Banque de France is working on its distribution model for issuing wCBDC, which involves multiple domestic DLT platforms that are all connected to a single shared DLT platform, where payment versus payment and delivery versus payment take place. This experiment contributes to the design of a single platform, as envisaged by the BIS with the concept of a unified ledger, or by the International Monetary Fund with the concept of XC platforms.

O: What’s the next step on the journey towards digital capital markets?

CH: As outlined in our report, implementation of wCBDC will require a strong international co-operation to ensure strong interoperability and the adoption of common standards. New technologies offer an opportunity to improve this situation but, in the absence of coordination, each actor could be tempted to develop its own standards, which would be detrimental to improving cross-border payments. Central banks and international regulators have a key role to play in steering this change in the right direction. It is with this objective in mind that we have conducted experiments in partnership with other central banks and will continue to do so.

The way forward also lies in the exploration phase on the settlement in central bank money of transactions recorded on DLTs launched by the Eurosystem earlier this year, which created a market contact group to foster dialogue with the industry and will lead to new experimentations. ■

Why repo markets are due for a digital overhaul

The introduction of distributed ledger technology could revolutionise repurchase agreements.

COMMONLY KNOWN as repos, repurchase agreements are a form of funding that enables a party to sell securities to realise short-term cash before buying them back at a higher price. A crucial and widely traded instrument, the introduction of distributed ledger technology to the market is already generating efficiency savings by speeding up settlement time.

According to the International Capital Market Association's March 2023 European Repo Market Survey, the value of the repo market based on outstanding contracts in Europe was €10.4tn. Repos come in two forms: a bilateral repo between a lender and borrower and a triparty repo, which is coordinated by a third party. Given the scale of the market, efficiency savings can offer material cost reductions, freeing up valuable capital.

Legacy infrastructure

'The repo market falls back on a lot of the infrastructure of the bond market, particularly in terms of the settlement platforms for these transactions,' said Charles Adams, executive director and head of Europe, Middle East and Africa credit and sovereign, supranational and

agency repo trading at JP Morgan. 'There are positives and negatives with a lot of these platforms, but they are built on decades-old infrastructure, so that's why there is the potential for greater efficiencies through DLT and blockchain. The absence of upgrades to these systems means DLT can enjoy huge wins in creating greater efficiencies in the repo and bond markets.'

The delayed settlement of repo transactions can cause collateral to be trapped, creating counterparty credit risk and making them prone to failures and errors. The current platforms require multiple processes and parties to be involved, creating a fragmented system. There is also a lack of transparency on the life cycle of repo issuance.

However, the amount of work needed to overhaul this means that adoption of DLT has been arduous and progress limited. 'DLT adoption has been very slow in the repo market as it requires huge restructuring of the current systems,' said Adams. 'We have had success with our Onyx intra-day repo platform. The platform has so far been predominantly US-centric as there is a lot of liquidity in US Treasuries.'

Platforms emerging

Onyx's Digital Assets platform is a private-permissioned, Ethereum-based DLT platform. It was launched by JP Morgan in 2020 as the world's first bank-led blockchain platform, enabling delivery versus payment settlement for repo agreements. The platform also enables the simultaneous exchange of tokenised deposits and collateral. As of the end of 2022, it had processed over $500bn in repo transactions.

Over the last year, banks such as BNP Paribas and DBS have executed trades on the Onyx Digital Assets platform, becoming the first banks in Europe and Asia, respectively, to have complete trades on the platform.

The next step is for the Onyx platform to develop its offering beyond US Treasuries. 'The natural extension is to look at euro government bonds and the SSA market,' said Adams.

Meanwhile, Broadridge, the global fintech firm, launched its own DLT repo platform in 2021 and now transacts $1tn per month. The platform recently executed its first cross-border intraday repo transaction involving UBS and a global Asian bank. The distributed ledger repo platform provides flexible settlement cycles based on the needs of counterparties while reducing operating costs and risks of repo activity.

Following the first cross-border intraday repo transaction, other banks such as Société Générale have also executed intraday repo transactions on Broadridge's distributed ledger repo platform.

Scaling challenges

But can these platforms scale up and transform the repo market? Will all the various parties in the infrastructure of the capital markets subscribe to this new way of transacting? There are some doubts.

'I think there will be resistance to moving in this new direction from the current traditional settlement providers and other market participants whose business could be mitigated ➤

'I think there will resistance to moving to this new direction from the current traditional settlement providers and other market participants whose business could be mitigated by the new settlement through DLT.'

Charles Adams, executive director and head of EMEA credit and SSA repo trading, JP Morgan

BRINGING DIGITAL BONDS CLOSER TO REALITY

Richard Teichmeister, head of the non-core currencies and special transactions division at the European Investment Bank, discusses its digital bond experiments, the need for new infrastructure in the capital markets and how to increase the focus of institutional investors in these transactions.

OMFIF: EIB has been at the forefront in the development of the digital bond market. How would you sum up your digital bond experiments? What are the benefits of these transactions, the lessons learned and the challenges ahead?
Richard Teichmeister: Since early 2021, we have launched four digital bonds in three different currencies (euro, sterling and krona), in three different formats (zero, fixed and floating rate-coupons), relying on French, German and Luxembourg laws, using public and private blockchains – including a green technology-based blockchain – settling in a representation of central bank digital currencies and commercial bank tokens, respectively.

Probably the most obvious benefit was the substantial reduction of settlement times, which we brought down to intraday settlement on some deals. What these transactions have also shown is that different banks have proposed different technical solutions. The challenges ahead will consist in the industry having to find some form of consensus on a target operating and technical model that is compliant with regulatory requirements and that allows for easy access by investors.

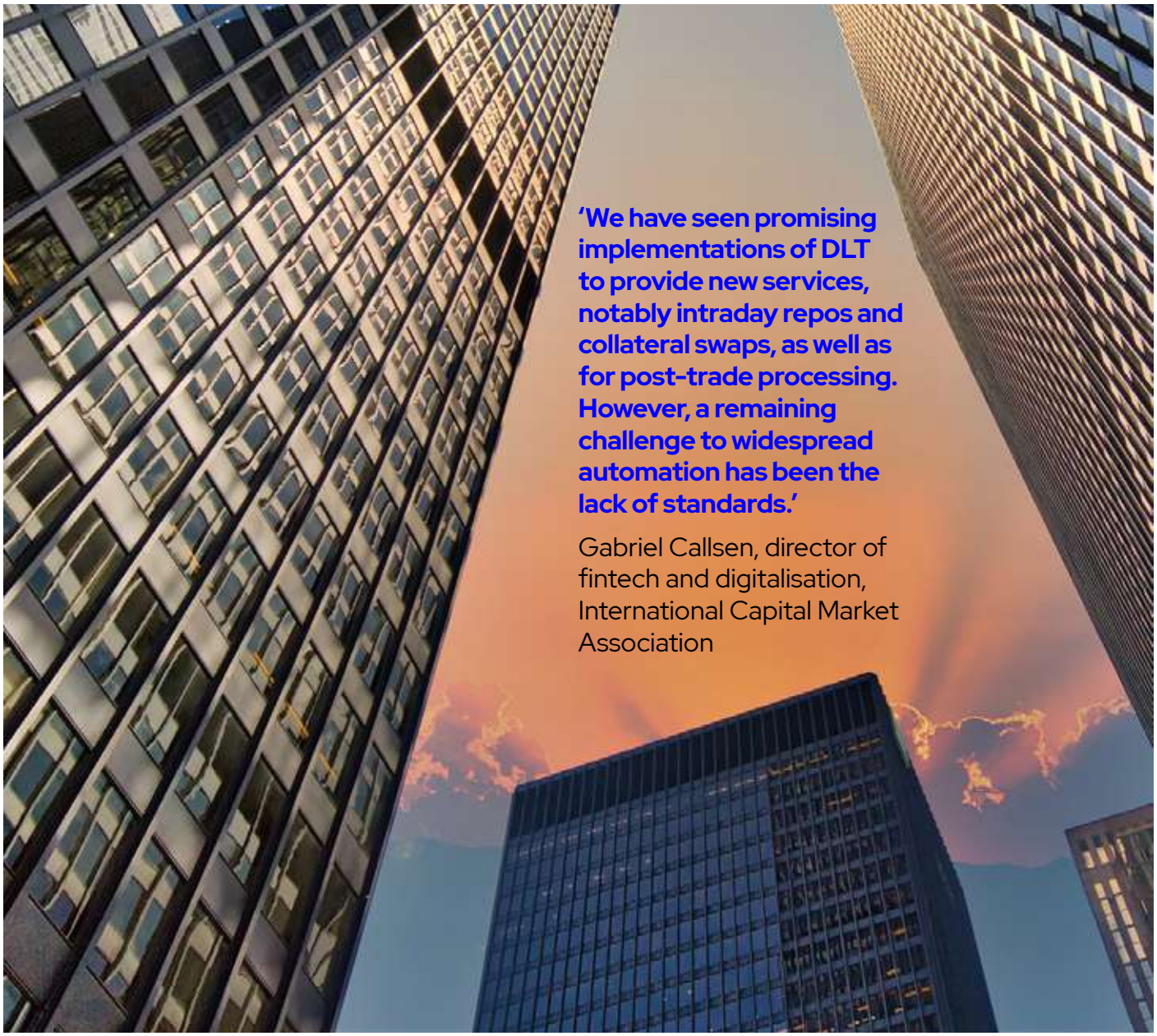
O: Do you have a preference between using private or public blockchain?
RT: In principle, we are indifferent in respect of private or public blockchain solutions. However, a combination of the two, together with cross-chain interoperability, seems to be the most promising solution. Such a model may offer a consensus allowing various private blockchain-based sub-ecosystems to coexist while communicating between themselves through public blockchain-based networks.

O: What is required to increase the focus from institutional investors in digital bonds?
RT: Harmonisation in regulation, European Central Bank eligibility and secondary market liquidity are certainly important factors. Equally important is entry or adaptation cost for investors. This cost should decrease over time but seems to be quite high now in terms of resources and time as well as financially. If there is no consensus about a widely acceptable technical solution many investors will be reluctant to move into this new technology.

O: What are the next steps in the EIB's experiments and plans in this area?
RT: So far, we have been working with dealer banks focusing mainly on primary market processes and enlarging the range of bond types issued on chain. In our efforts to integrate a larger portion of the transactional value chain, we intend to assess possibilities to make better use of new digital technologies in other funding-related activities and processes.

O: At present, issuers are looking more at the asset and bond side of these transactions. Should there be more focus on the cash side?
RT: It is only natural that issuers focus on the bond side as this is the product they sell for cash. Digital cash solutions need to be developed not only for debt market operations but also for other financial transactions. It is hard to imagine how such widely accepted solutions could be implemented without the involvement of central banks and payment system providers.

'Digital cash solutions need to be developed not only for debt market operations but also for other financial transactions.'



'We have seen promising implementations of DLT to provide new services, notably intraday repos and collateral swaps, as well as for post-trade processing. However, a remaining challenge to widespread automation has been the lack of standards.'

Gabriel Callsen, director of fintech and digitalisation, International Capital Market Association

by the new settlement through DLT,' observed Adams. 'There is a conflict of interest. So this might mean taking smaller steps and initially finding a bridge between the current systems and DLT.'

Traditional settlement providers such as Euroclear and Clearstream would naturally be resistant to a new settlement system that might undercut their business. In response, Euroclear is said to be working on developing its own DLT bond settlement platform and has been experimenting with blockchain technology for some time. It led a series of pilot bond transactions with Banque de France using its own digital currency and has executed almost 500 instructions in primary and secondary markets.

The other big issue in the implementation of DLT in the repo market is the lack of standardisation, which is also an issue with the adoption of this technology in the bond market (see Chapter 6).

'We have seen promising implementations of DLT to provide new services, notably intraday repos and collateral swaps, as well as for post-trade processing,' said Gabriel Callsen, director of fintech and digitalisation at the International Capital Market Association. 'However, a remaining challenge to widespread automation has been the lack of standards. This is something that the common domain model, which we developed jointly with the International Swaps and Derivatives Association and International Securities Lending Association, seeks to address.'

ICMA's CDM provides a common language that defines a transaction end to end, based on industry best practices. It also generates code, which developers can use out of the box to build trading and post-trade solutions. While it is technology-neutral, the CDM lends itself to DLT applications where nodes in a network exchange and validate transaction details based on a common interpretation. ■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