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Distributed Ledger Technology & Secured Transactions: Legal, Regulatory and Technological Perspectives - Guidance Notes Series

Note 2: Regulatory Implications of Integrating Digital Assets and Distributed Ledgers in Credit Ecosystems

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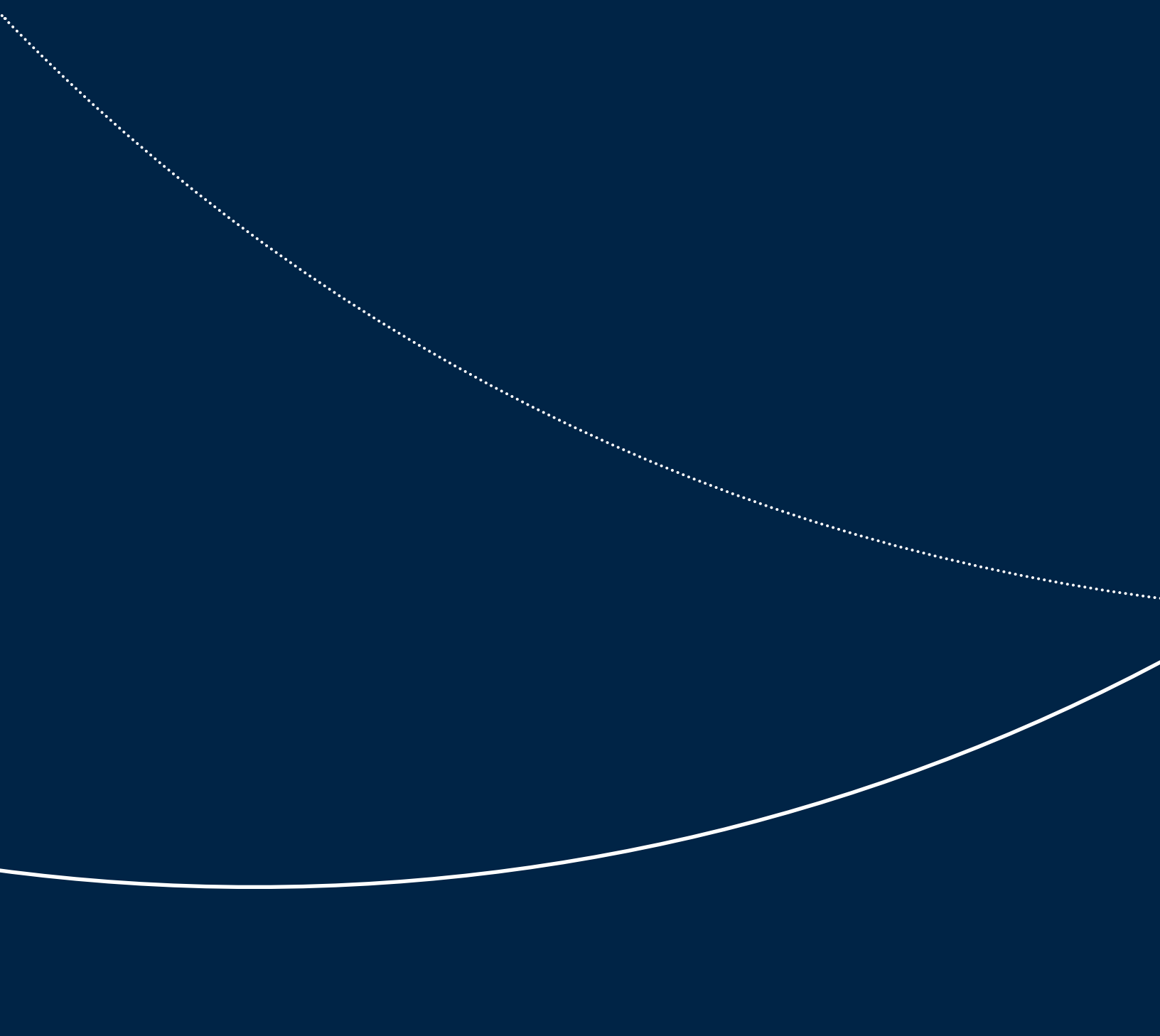
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ABBREVIATIONS

| | |
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| AML | Anti-money laundering |
| BCBS | Basel Committee on Banking Supervision |
| BIS | Bank for International Settlements |
| CBDC | Central bank digital currency |
| CFT | Combating the financing of terrorism |
| CFTC | Commodities Futures Trading Commission |
| DLT | Distributed ledger technology |
| ECB | European Central Bank |
| FATF | Financial Action Task Force |
| FINMA | Financial Market Supervisory Authority |
| ICO | Initial coin offering |
| KYC | Know your customer |
| STCR | Secured transactions and collateral registry |

Distributed Ledger Technology & Secured Transactions: Legal, Regulatory and Technological Perspectives - Guidance Notes Series

Note 2: Regulatory Implications of Integrating Digital Assets and Distributed Ledgers in Credit Ecosystems



EXECUTIVE SUMMARY

This guidance note focuses on the regulatory implications that the deployment of distributed ledger technology (DLT) entails for secured transactions and collateral registry (STCR) frameworks. In particular, it examines the regulatory regimes applicable to three DLT-STCR outputs: (i) the use of digital assets implementing DLT as collateral, (ii) the application of DLT in platforms supporting secondary markets for the valuation and disposal of collateral, and (iii) the application of DLT in collateral registries. In light of the central role of the first output, the analysis focuses on the regulatory dimension of transactions that are secured with different forms of digital assets. General regulatory trends and approaches are isolated, and an analysis of secondary markets is offered. As collateral registries fall largely outside the perimeter for regulated activities, considerations regarding the third DLT-STCR output are limited to instances where coordination with special regimes is required or advised.

This analysis shows that an effective integration of DLT in various aspects of secured-transactions frameworks and lending practices requires coordination with several regulatory regimes governing financial services, activities, and institutions. Several factors render such a coordination key for the development of DLT-STCR outputs.

First, some digital assets and related activities share the same economic characteristics as traditional (regulated) financial products. In order to limit regulatory arbitrage—whereby new technologies and financing arrangements are deployed to sidestep regulatory regimes—the reach of existing regulatory and supervisory regimes has been extended in most jurisdictions. For instance, when digital assets are created and issued for the purpose of sourcing funds from the public—notably, through initial coin offerings—their regulatory treatment is determined by domestic securities and capital markets laws.

Second, bespoke regulatory regimes and sandboxes, allowing for simplified regulatory treatments, have been set up in various jurisdictions with the intent of promoting new forms of financial innovation while ensuring supervisory oversight. Hence, digital assets and related activities might either be regulated under existing laws concerning financial services or be subject to bespoke regimes. In both circumstances, taking digital assets as collateral and transferring them in secondary markets must comply with regulatory standards designed to preserve market integrity, financial stability, and the safety and soundness of financial institutions.

Third, new regulatory regimes are being devised to address emerging challenges and risks associated with the implementation of DLT in finance and, in particular, the diffusion of new digital assets. For instance, significant efforts have been made at the international level, under the mandate of the Group of Twenty, to ensure that rules concerned with anti-money laundering (AML) and with combating the financing of terrorism (CFT) apply to digital assets and related activities. As a result, DLT-STCR outputs are likely to intersect with AML/CFT rules, either under existing rules for financial services or under a novel regime introduced by the Financial Action Task Force.

Fourth, more regulatory efforts are being developed to fine-tune existing policies and address potential gaps. Risks posed by the diffusion of nascent and untested technologies have prompted internationally coordinated regulatory responses aimed at preserving the stability of the financial system. A case in point is offered by the development in the context of stablecoins,



which are digital assets that can be used for payment purposes and have their value linked to fiat currencies or other assets. As large-scale projects to launch stablecoins have been put forward, domestic regulators and central banks have started to examine the systemic implications of such initiatives. At the international level, the Group of Seven set up a working group to study the regulatory implications of such assets. In this context, the deployment of stablecoins for STCR purposes requires careful coordination with a variety of regulatory regimes, including those concerned with the prudent management of banking institutions and payment systems. Furthermore, in response to a call by the Group of Twenty, the Financial Stability Board has been tasked to address regulatory, supervisory and oversight challenges related to “global stablecoin” arrangements.

Fifth, DLT-based systems and products developed to promote access to finance are designed to integrate within the credit ecosystem. In this process, clarity in the regulatory treatment of digital assets and related markets not only provides certainty and predictability—thus minimizing compliance risk—but also constitutes a validation mechanism supporting their inclusion in the formal economy. Regulated financial institutions, for instance, might not be able to invest in or use the services of DLT-based secondary markets, such as those established to trade receivables, if these platforms are not recognized as licensed financial institutions. Similarly, the risk mitigation of secured transactions might be ineffective if security rights are created in digital assets that have been issued without complying with applicable regulatory standards.

Based on the foregoing dynamics, this study indicates that the existence of a clear and predictable regulatory environment is an essential condition to promote the development of DLT-STCR outputs in support of financial inclusion policies. A precise assessment of the applicable regulatory standards for each DLT-STCR output, however, can be conducted only at the domestic level. In fact, apart from general international recommendations and emerging trends, the regulatory framework applicable to each DLT-STCR output varies considerably across jurisdictions and depends largely on the technical and economic features of the output under consideration. To guide regulatory assessments in different domestic contexts, this guidance note offers an analytical framework that isolates three intertwined ways in which different regulatory regimes might affect the development of DLT-STCR outputs.

The first manner in which regulation has an impact on DLT-STCR outputs is by imposing regulatory requirements directly on the output. In other words, a given output might fall within the regulatory perimeter established for regulated activities. This aspect is particularly relevant for the first two DLT-STCR outputs: taking digital assets as collateral and applying DLT in secondary markets for the valuation and disposal of collateral. Depending on the legal system, if a given digital asset meets the definitions of “securities”, “financial instruments”, “commodities”, “currency”, or “deposit”, the creation of a security right, its perfection, and the transfer of collateral, custody, and intermediation may be regarded as regulated activities. In a similar vein, secondary markets for collateral might be regulated as “trading venues” and platforms facilitating or offering loans backed by digital assets that are qualified as commodities might be subject to commodities-trading rules and require compliance with different forms of licensing requirements. As new applications are developed, regulatory responses and public policies might affect DLT-STCR outputs in new ways. For instance, some jurisdictions have been implementing bespoke regimes to regulate the use of DLT. In these circumstances, collateral registries implementing such a technology

would need to coordinate with such bespoke regimes.

The second way regulation has an impact on DLT-STCR outputs is through rules that are concerned with their use by market participants. A key incentive for a financial institution to take collateral is the mitigation effect against credit risk, and such an effect is recognized by prudential regulation. In this regard, a key question is whether digital assets can perform such a function and, thus, can be taken into account in the calculation of capital adequacy and provisioning requirements. In general, the Basel Committee on Banking Supervision indicated the necessity for a cautionary approach. In particular, digital assets that do not represent any claim or liability, such as Bitcoins, under the current interpretation of prudential standards, are unlikely to offer a valid credit protection. Differently, digital assets that represent underlying claims and liabilities might be treated for prudential purposes in accordance to the risks they pose, which include operational and legal risks associated with the new technology. In a similar vein, the development of a secondary-market platform for digital assets needs to take into account design and governance issues. Absent a regulatory regime ensuring that governance and design issues have been addressed, the participation of regulated financial institutions in secondary markets for digital assets that may be used as collateral remains limited.

The issuance of digital assets backed by public authorities also have an impact on the DLT-STCR outputs. Projects aimed at launching central bank digital currencies, for instance, are likely to affect the secured-transactions framework indirectly yet profoundly. In light of their general impact on lending markets, the effect of central bank digital currencies on secured-transactions framework requires further assessment, focusing on several key aspects, including (i) the design of the digital currency and its impact on core central bank functions; (ii) the structure of local credit markets and the coordination with policies promoting cashless societies; and (iii) key legal and regulatory definitions, such as legal tender, money, and bank account.

Finally, regulation and DLT-STCR outputs can interact in a synergetic fashion. The development of DLT-STCR outputs could benefit from coordination with initiatives aimed at ensuring regulatory compliance. As this guidance note indicates, the creation of security rights in digital assets and their disposal in secondary markets presupposes compliance with applicable regulatory provisions. The same technology—combined with artificial intelligence and, in particular, machine learning algorithms—has been used to facilitate the automation and accuracy of the compliance process. Hence, although further studies are needed, coordination with regulatory regimes and compliance could occur through DLT. In this regard, the cost of compliance related to the extension of credit could be reduced, while ensuring the implementation of sound risk-management practices.

INTRODUCTION

Coordination between secured-transactions law and the regulatory framework governing lenders and lending activities is key to promoting inclusive and sound access to credit.¹ As the regulatory environment evolves with new international standards progressively implemented at the domestic level, secured transactions and collateral registry (STCR) reforms are increasingly geared to integrate with conduct of business and prudential regulation regimes.² In line with such ongoing coordination, this guidance note focuses on the regulatory implications that the deployment of distributed ledger technology (DLT) entails in the STCR context. In particular, it examines the regulatory regimes applicable to the three DLT-STCR outputs: (i) the use of digital assets based on DLT (also known as crypto-assets) as collateral;³ (ii) the application of DLT in platforms supporting secondary markets for the valuation and disposal of collateral; and (iii) the implementation of distributed ledgers in collateral registries.⁴

In light of the central role of the first DLT-STCR output, this analysis develops from those regulatory regimes affecting transactions that are secured with different forms of digital assets. As illustrated in detail in this guidance note, the regulatory implications for secondary markets largely cannot be divorced from the regulatory qualification attributed to digital assets therein circulating. Given that collateral registries fall largely outside the regulatory perimeter set for regulated activities, considerations of the third DLT-STCR output are limited to instances where coordination with special regimes is required or advised.

A fundamental point of this guidance note is that effective integration of DLT-based systems in secured transactions frameworks and business practices requires coordination with a wide spectrum of regulatory regimes governing financial services. The applicability of specific requirements is not limited to the situation where the secured creditor is a regulated financial institution, like a bank, that takes digital assets as collateral. Depending on the legal system, other financial institutions might also be required to comply with specific regulatory standards when dealing with digital assets—for instance, through platforms implementing distributed ledgers to liquidate collateral. Several factors render the impact of financial regulation key for the implementation of DLT-STCR outputs.

First, the implementation of new technologies to promote access to finance implies a broader availability of financing means. Those means include the development of DLT-based products, such as digital assets and secondary markets, that present the same economic characteristics as existing regulated activities. For instance, the issuance and distribution of digital assets for the purpose of sourcing funds from the public is likely to fit squarely into the regime governing the offering of financial instruments or securities. In such circumstances, the creation of security rights in digital assets and their disposal in secondary markets intersects with domestic securities and capital markets laws.⁶

Second, new regulatory regimes are being devised to address emerging challenges and risks. Significant efforts have been made at the international level to ensure that anti-money laundering (AML) and combating the financing of terrorism (CFT) regimes apply to the entire spectrum of digital assets and related activities.⁷ In addition, new risks posed by the diffusion of nascent and untested technologies have been emerging. A case in point is offered by the developments in the field of DLT-based assets linked to fiat currencies (stablecoins), which prompted a larger policy debate on the need for a global regulatory framework.⁸ As DLT and digital assets are progressively integrating with traditional financial and economic activities, consumer protection and stability concerns are taking a central role in the regulatory agenda of domestic and international regulators alike.⁹ Coextensively, the regulatory treatment of exposure to digital assets has been evolving,¹⁰ requiring regulated financial institutions to adopt prudent approaches in dealing with digital assets.



Third, regulation enables the diffusion of DLT-STCR outputs. The development of DLT-based systems is animated by its promise to promote inclusive access to finance through novel or improved financing mechanisms. Assessing whether this promise is achieved is beyond the scope of this guidance note; nonetheless, as the analysis will show, the existence of a sound and conducive regulatory environment—or, in the lack thereof, its establishment—represents an essential condition to promote an inclusive and sustainable access to finance.

All in all, regulation validates the use of digital assets and, more broadly, the integration of distributed ledgers in financial activities. Regulated financial institutions, for instance, might not be able to invest or use the services in DLT-based secondary markets, such as those established to trade receivables, if these markets are not subject to prudential requirements and ongoing supervision. Similarly, as illustrated in this guidance note, the risk mitigation of secured transactions might be ineffective if security rights are created in digital assets that have been issued without complying with regulatory standards. Notwithstanding its relevance, the regulatory perimeter in which each DLT-STCR output might fall is neither static nor sharp. The traditional financial regulatory framework overlaps with a variety of regulatory approaches that are being developed or are in the process of being implemented, both at the domestic and international level, to address the challenges posed by the integration of technological advancements and financial activities (FinTech). The result is a complex scenario in which the same output might be treated in considerably different fashion across jurisdictions or even within the same jurisdiction.

This guidance note is organized in eight sections. Section 2 introduces the main regulatory issues, concerns, and approaches characterizing the policy context in which DLT-STCR outputs are developed. Section 3 examines the impact of the emerging international framework concerned with the maintenance of market integrity on DLT-STCR outputs. Particular attention is given to the interaction between DLT-STCR outputs and rules designed to avert the risk that new technologies may be used to finance illicit activities. Section 4 focuses on the prudential standards for digital assets and related exposures. As the impact of financial regulation is determined largely by domestic initiatives, section 5 introduces an analytical framework to assess the intersection between different DLT-STCR outputs in virtually any jurisdiction. In light of the proposed analytical framework and the unfolding international developments, section 6 examines the key regulatory challenges related to the possibility of taking digital assets as collateral. Section 7 examines the implementation of DLT in the context of secondary markets. A conclusive section follows, highlighting the key findings of this guidance note.

2 DLT-STCR OUTPUTS IN CONTEXT

The benefits of integrating financial activities and distributed ledgers have been highlighted in different international forums. Most notably, the Bali FinTech Agenda launched by the International Monetary Fund and the World Bank Group tied the use of new technologies, including DLT, to the sustainable development goals.¹¹ Within such a high-level policy framework, projects aimed at implementations of DLT in financial services and systems have been developing at a fast pace, with international and domestic regulators leading cutting-edge programs.

Regulators have been examining how DLT could facilitate the integration of financial markets and improve their efficient functioning. In cross-border payments, for instance, DLT is considered key to reducing the complexity and cost of such transactions while increasing their speed and transparency.¹² In this regard, the Bank of Japan and European Central Bank (ECB), under the so-called Project Stella, have been exploring the possibility of synchronizing settlements between different types of ledgers (and currencies) to facilitate cross-border payments and overcome interoperability issues.¹³

DLT also has the potential for indicating a new paradigm affecting monetary and banking systems, as the debates on digital currencies issued by central banks demonstrate.¹⁴ Finally, projects to promote the integration of distributed ledgers with compliance, risk-management, and monitoring systems of financial institutions have been launched, signaling possible applications of new technologies in financial regulation (RegTech) and supervision (SupTech).¹⁵

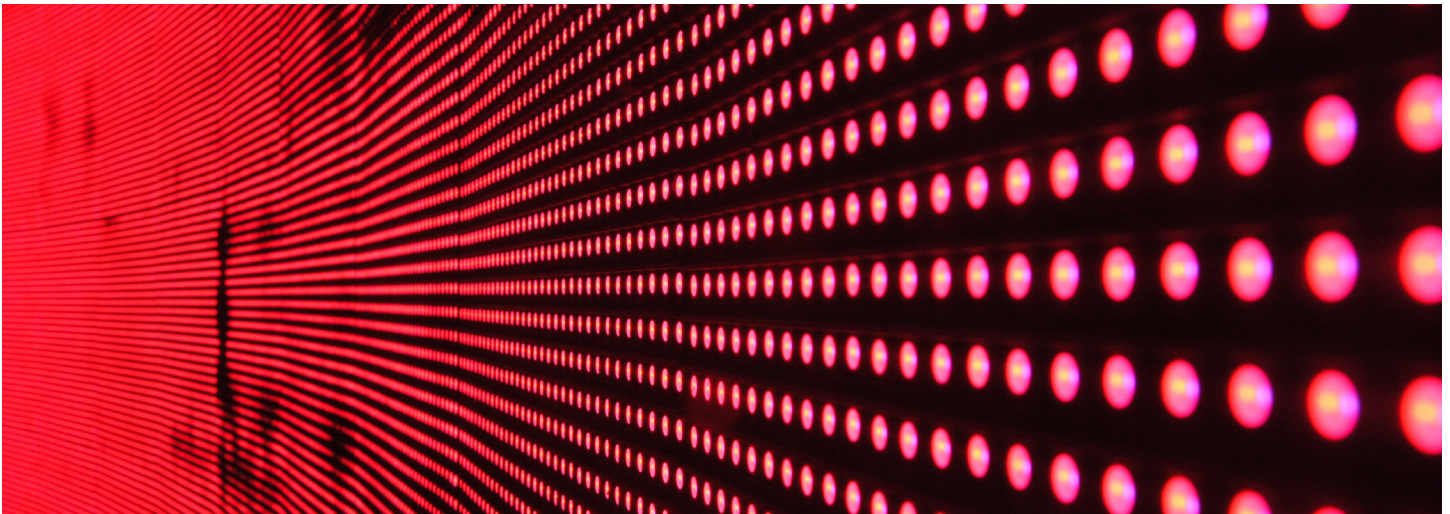
The versatility and diffusion of distributed ledgers across a wide spectrum of financial activities pose new risks. Specific regulatory concerns have been emerging, leading international and domestic regulators to develop different approaches to harness the potential of DLT without compromising key regulatory objectives, such as market integrity and financial stability. Section 2.1 introduces the key regulatory issues that, in turn, have led to a variety of responses, as illustrated in section 2.2. As the regulatory environment is poised to evolve, section 2.3 introduces the general trends.

2.1 REGULATING FINANCIAL INNOVATION: KEY CONCERNS

Although a favorable attitude toward DLT is emerging, three intertwined regulatory concerns are surfacing in respect to its application in the financial context. The first concern relates to the tension between the social benefits related to financial innovation and its possible uses for purposes of regulatory arbitrage. Digital assets and, more generally, the integration of DLT with mainstream finance, represent a form of financial innovation¹⁶—one that is technology based, fast developing, and with potential implications for the wholesale and retail segments of lending markets. Like other forms of financial innovation, DLT-related activities may, unwittingly or by design, sidestep regulatory provisions without formally breaching any rules. DLT-related activities, therefore, might pose similar or new threats to markets and their participants.¹⁷

Hence, the primary regulatory concern is not with DLT, per se; rather, it is with possible applications that might pose new or unknown risks. The case of initial coin offerings (ICOs) illustrates this dynamic. ICOs involve the issuance of digital assets (tokens) for crowdfunding purposes. According to a recent study conducted by the Asian Development Bank, ICOs raised more than \$17.1 billion globally between July 2017 and October 2018, of which \$8.7 billion were raised in two ICOs.¹⁸ Since the losses associated with the purchase of these assets could be significant, the avoidance of basic rules to raise funds from the public (for example, disclosure requirements) presents significant risks.¹⁹

Second, the rapid diffusion of DLT might entail unintended consequences that threaten the smooth functioning of the financial system. As financial intermediaries and market infrastructures perform vital roles in the management of systemic, business, and operational risks, the introduction of DLT—which promotes disintermediation—requires policy makers and regulators to consider how such risks are to be addressed. A case in point is represented by AML/CFT regimes. AML/CFT



regulation relies largely on financial intermediaries to act as gatekeepers that apply know-your-customer (KYC) rules.²⁰ In this regard, and as elaborated in section 3.1, the Financial Action Task Force (FATF) has issued a binding interpretative note to bring both digital assets and providers of services related to digital assets within the perimeter of AML/CFT regulation.²¹

More generally, the integration of DLT within the wider financial system and the diffusion of digital assets might occur at a very fast pace. Hence, regulators might witness previously irrelevant new entities or products growing to a position of systemic relevance²² and their soundness affecting the stability of the financial system as a whole. A case in point is offered by the debate surrounding the proposed project known as Libra, which involves the issuance of an international digital currency whose value is tied to a basket of government-backed assets and linked to a popular social network with billions of users worldwide.²³ A project of this scale would imply the establishment of a new global systemically important financial institution and raise core questions about both the immediate risks posed to financial systems and the ability of current regulatory regimes to curb such risks.²⁴

Third, the lack of regulation stifles, rather than facilitates, the diffusion of forms of financial innovation that benefit society. Without rules, or with rules that are unclear, ambiguities in the applicable requirements exacerbate compliance risk. A phenomenon of adverse selection might emerge, whereby the new technological advancements are exploited primarily for illegitimate purposes—as the connection between Bitcoin and illicit activities indicates.²⁵ Conversely, uncertain regulatory treatment and opaque governance structures discourage financial institutions to engage with new forms of financial innovations, limiting the use of digital assets as collateral and participation in DLT-based secondary markets.

2.2 REGULATORY APPROACHES

By and large, differences in how the aforementioned concerns are addressed explain the diverse regulatory treatment of digital assets. Some jurisdictions have adopted a rather cautionary approach, banning certain digital assets or prohibiting regulated financial institutions from dealing with such assets. For instance, while sustaining the development of DLT solutions and their integration with the mainstream financial system, the People's Bank of China has banned ICOs, taking a stance against a specific use of the technology.²⁶ Other jurisdictions, such as the United States and European Union, have adopted instead a wait-and-see approach, aiming to acquire further expertise to stimulate the development of new markets. Hong Kong has been promoting a risk-based and technology-neutral regulatory approach²⁷ whereby rules are applied based on the economic characteristics and risks of financial activities, irrespective of the technology deployed.

In some cases, the regulatory pendulum swings fast. For instance, banks in Thailand were banned from offering services to secondary markets dealing with cryptocurrencies in February 2018, but the ban was relaxed in May 2018 when a new regulatory framework was implemented.²⁸ In a similar vein, the Republic of Korea is considering revisions to the outright ban on the issuance of digital assets.²⁹ Even within the European Single Market, which typically presents a high level of regulatory harmonization, there currently is no uniform regime. In the European Union, the regulation of DLT outputs is, in fact, left largely to member states. However, two recent reports pertaining to the regulation of digital assets—issued by

the European Securities and Markets Authority and the European Banking Authority—set the stage for the creation of a separate, bespoke, EU-wide regulatory regime.³⁰ In all likelihood, the emerging regulatory regime aims to create a level playing field, promote technological neutrality, and address current regulatory voids.

In general terms, new financial products and activities are benchmarked against existing statutory objectives commonly enshrined in the mandate of financial regulatory authorities. Notably, such overarching objectives articulate in two broad categories of regulatory regimes. The first category encompasses rules designed to protect the integrity of financial markets—that is, the ability of markets to operate fairly, efficiently, and in support of licit activities. Typically, the protection of market integrity consists of measures aimed at protecting customers, including retail customers, and at regulating the conduct of financial institutions. In this respect, a primary concern is that digital assets might be sold like a type of retail financial instrument without complying with key requirements, such as KYC rules, the mandatory disclosure of information that is material to investors' decisions, and the suitability obligations of the proposed instrument for retail purposes.³¹

A second broad category of regulatory regimes is represented by prudential regulation, which aims at maintaining the soundness of individual financial institutions and the stability of the financial system in its entirety. Prudential regulation encompasses a variety of rules that are concerned with (i) keeping financial institutions viable and, failing that, ensuring their orderly liquidation, and (ii) increasing the ability of the financial system to withstand shocks that could compromise its proper functioning.³² As these measures affect the level and management of risks taken by banks and other financial institutions,³³ the potential risks associated with digital assets, including DLT-STCR outputs, require the establishment of

specific regulatory safeguards. As illustrated in section 6.3, the calculation of capital requirements under the Third Basel Capital Accord³⁴ requires considering the accrued risk associated with digital assets taken as collateral, including their price volatility. In addition, in light of the diffusion of DLT in the mainstream financial system, new prudential regulatory regimes are likely to emerge.³⁵

2.3 FINANCIAL REGULATION AND DLT-STCR OUTPUTS: GENERAL TRENDS

Within this heterogeneous and fast-changing landscape, financial regulation is primed to have a profound impact on the development of DLT-STCR outputs. First, global efforts to ensure coordination have been intensifying. Defining internationally harmonized policies and regulatory approaches was a priority at the Group of Twenty meeting held in Osaka in 2019.³⁶ International standard setters such as FATF, the Financial Stability Board, and the Basel Committee on Banking Supervision (BCBS) have been adapting or planning to adapt existing standards to address the challenges posed by digital assets and monitor the integration of DLT into financial services. These international initiatives are primed to affect the establishment of DLT-STCR outputs directly with regard to AML/CFT rules (as noted in section 3) and prudential regulation (section 4).

Second, where existing securities law is sufficiently developed, regulators' reach may extend to digital assets and related secondary markets that reflect traditional financial activities. For instance, in the United States, the Commodities Futures Trading Commission (CFTC) indicated that natively digital assets used as currencies qualify as commodities for the purpose of the application of the Commodity Exchange Act of 1936. However, digital assets might also be assimilated to investment contracts, thus falling under the remit of the Securities Exchange Commission under the Securities Act of 1933. Such regulatory classifications result in requirements affecting the use of digital assets as collateral and the establishment of secondary markets for collateral, as illustrated in sections 6 and 7, respectively.

Third, bespoke regulatory regimes are emerging to address new challenges, clarify ambiguities in existing laws governing securities and capital markets, promote FinTech, or simply gather information on nascent technologies. In Malta, for instance, the Maltese Digital Innovation Authority, established in 2018, has specific jurisdiction over technological innovations—DLT in particular—and coordinates with existing financial regulatory authorities. More generally, a recent study indicates that sandboxes are active or planned in more than 50 jurisdictions around the world.³⁷ Although the structure of sandboxes varies significantly across jurisdictions, they generally aim to promote FinTech by creating a safe environment where new technological solutions are tested. Domestic authorities, in turn, monitor these activities and determine the applicable regulatory requirements. Such an approach dovetails with the recommended strategy to promote coordination between

secured-transactions law reforms and prudential regulation, which can include DLT-based solutions.³⁸

In general terms, one of the most critical aspects for DLT-STCR outputs is the debate among domestic and international policy makers concerning the possible introduction of a new class of assets. Such a definitory effort would be particularly useful for those digital assets that do not represent traditional investment products and, therefore, are more likely to escape domestic securities and capital-markets law. This is the case of natively digital assets that are integral to the functions of a DLT-based system or have been issued to allow users to interact with the DLT system—for instance, providing access to specific services. Such tokens, although they have value among users, do not represent a financial claim. Adding granularity in the existing regulatory categorization, albeit at the risk of increasing complexity, would also allow more accurate monitoring of the diffusion and effective use of digital assets as collateral.

From a practical perspective, the absence of reporting standards to differentiate among financing activities involving DLT is an obstacle to monitoring development and assessing risks. For instance, it might be difficult for domestic authorities simply to determine how many financial institutions accept digital assets as collateral if those loans are classified as general “secured loans” for reporting or accounting purposes. Ultimately, this issue fuels a larger governance problem currently being debated at the domestic and international level—that is, the lack of data on the effective interlinkage between natively digital assets and economic and financial systems.³⁹

3 MARKET INTEGRITY AND DLT-STCR OUTPUTS: INTERNATIONAL STANDARDS

The possibility of taking a digital asset as collateral and the enactment of initiatives to facilitate the establishment of reliable secondary markets presuppose that the parties to these arrangements are not involved in illicit activities and, more broadly, that the market for digital assets operates in a fair and efficient fashion. In the context of digital assets and DLT-based platforms, protecting market integrity poses specific challenges. Decentralized exchanges and peer-to-peer platforms can be used for illicit purposes easily, as they allow transactions to be concluded anonymously. Furthermore, disintermediation and decentralization eliminate key control and responsibility functions, creating the conditions for the illegitimate exploitation of DLT-based outputs.

The protection of market integrity has been developing in two primary regulatory areas. First, international efforts have progressively extended the application of AML/CFT requirements. As a result, the implementation of KYC rules is primed to become central to the development of any DLT-STCR output. Second, growing emphasis is given to avoiding abusive practices in the market. The decentralized nature of DLT paired with a lack of regulatory regimes renders digital assets prone to price manipulation, thus affecting their ability to serve as collateral. (See annex A.) The applicability of existing regulatory regimes concerned with avoiding abusive practices depends on whether, in any given jurisdiction, a specific DLT-based platform for the secondary market is considered a regulated activity. Section 6 illustrates this point in the context of secondary markets and domestic regulatory regimes. The remainder of this section focuses on the applicability of international AML/CFT provisions to DLT-STCR outputs.

3.1 ANTI-MONEY LAUNDERING AND COMBATING THE FINANCING OF TERRORISM

FATF coordinates actions to monitor risks related to recent technological advancements. In 2015, FATF issued guidance for the implementation of a risk-based approach and, in 2018, amended Recommendation 15 to extend to a range of digital assets.⁴⁰ The resulting regulatory framework centers on the notion of “virtual assets” that are defined as “a digital representation of value that can be digitally traded, or transferred, and can be used for payment or investment purposes.”⁴¹ Excluded from the definition are digital representations of fiat currencies and other financial assets that are already covered by FATF recommendations. Thus, Recommendation 15 largely extends the existing AML/CFT regime to transactions involving the exchange of virtual assets as well as to a “virtual asset service provider,” defined as a natural or legal person conducting activities involving the exchange, transfer, safekeeping, administration, and control of virtual assets, as well as “participation in and provision of financial services related to an issuer’s offer and/or sale of a virtual asset.”⁴²

Consequently, DLT-STCR outputs involving assets that are either assimilated to other financial instruments under domestic regulatory regimes or categorized as “virtual assets” are subject to international standards for AML/CFT. The requirements, depending on the activities, range from the implementation of digital identity mechanisms to implement KYC rules, to licensing and registration requirements. Preventive measures (for example, customer due diligence, recordkeeping, or reporting of suspicious transactions) should also be applied, and an adequate supervisory framework should be established. Notwithstanding the general trend toward a more profound alignment with FATF standards, the effective implementation of AML/CFT regimes varies across jurisdictions. In May 2019, the U.S. Financial Crimes Enforcement Network issued a guidance clarifying that regulation pertaining to money services businesses applies to those businesses engaged in the activity of transmitting and accepting “currency, funds, or other value that substitutes for currency.”⁴³ This statutory definition encompasses anything as long as the parties to a transaction attribute a “value that is equivalent to or can substitute for currency.”

Hence, the issuance, distribution, and organized exchange of digital assets, including decentralized applications, might qualify as money transmitters subject to the federal AML/CFT standards and licensing requirements.⁴⁴ Similarly, the European Union in 2018 amended the regime on AML/CFT with the adoption of Directive 2018/843, better known as the Fifth Anti-Money Laundering Directive, which entered into force on January 10, 2020. The directive expands the scope of the AML/CFT regime to providers engaged in exchange services between digital assets and fiat currencies as well as to custodian and wallet providers. Unlike the U.S. regime, it applies neither to providers offering exchange services between different digital assets nor to providers of financial services for ICOs. As a result, depending on the specific product developed in the DLT-STCR context, different AML/CFT requirements might apply. (See table 3.1.)

Table 3.1: Applicability of AML/CFT in the DLT-STCR Context

| | DLT-STCR OUTPUT | FATF | USA | EU (2020) |
|-----------------------|--------------------------------------|------|-----|-----------|
| Digital to fiat | Secondary markets for digital assets | √ | √ | √ |
| Digital to crypto | | √ | √ | X |
| Transfer of assets | | √ | √ | √/X * |
| Safekeeping (wallets) | Custodianship | √ | √ | √ |
| ICO-related services | Collateral | √ | √ | X |

* Only if it falls under the definition of electronic money under Directive 2009/110/EC.

The application of AML/CFT regimes occurs through KYC rules. Typically, KYC rules require financial institutions to verify the identity of customers (individuals or legal entities) and verify their counterparties and the origin of their assets. KYC rules represent the cornerstone of AML/CFT regimes and, in practical terms, are often integrated with the due-diligence processes that financial institutions must perform for risk-management purposes and to ensure the fair treatment of customers. KYC rules affect DLT-STCR outputs in two different fashions. First, rules might apply directly. Platforms supporting receivables trading or secondary markets for digital assets might have to apply KYC standards, verifying the origin of the claims and the identity of users. Second, AML/CFT rules might have an indirect effect on DLT-STCR outputs. For instance, even if digital assets are not regulated, per se, financial institutions might not be able to take them as collateral if their origin is uncertain.

In light of the broad scope of Recommendation 15, it has to be ascertained whether AML/CFT rules also apply to collateral registries. This may arise in the context of a notice covering a digital asset that meets the definition of “virtual asset” under FATF recommendations. Specifically, although collateral registry will not fit into the FATF definition of “financial institution,”⁴⁵ an extensive interpretation by regulators or lawmakers could lead them to consider the collateral registry a “virtual asset service provider.” This interpretation, however, appears to have limited applications in jurisdictions that have implemented a collateral registry system based on the Model Law on Secured Transactions elaborated by the United Nations Commission on International Trade Law (UNCITRAL).

The function of collateral registries under the UNCITRAL Model Law is to provide a notice that a security right might exist in an asset covered thereunder.⁴⁶ The registry is not concerned with the creation or enforcement of a right in the digital asset, or with its actual control. It is, instead, concerned with facilitating monitoring and eventual enforcement. Triggering the application of the AML/CFT rules would require considering the registration of a notice as an operation “enabling the control over virtual assets,” according to the interpretative note to Recommendation 15.⁴⁷ Yet, a registration does not allow the borrower or the creditor to control any asset.

AML/CFT regimes would not apply to the registry in a secured-transactions framework that does not provide for perfection of a security right in a type of asset by registration, such as Article 9 of the U.S. Uniform Commercial Code for bank accounts.⁴⁸ Hence, if the potential application of the rules for virtual asset service providers to collateral registry is a concern, lawmakers may consider adjusting perfection rules in their domestic secured-transactions law. Concomitantly, it should be ensured that the AML/CFT regimes are applied to other financial institutions and service providers that are both in a better position to monitor digital assets and perform an instrumental role in the circulation of such assets.

A different type of collateral registry may provide for the registration of ownership rights in relation to digital assets. In other words, these registries would record both ownership and security rights similar to registries for motor vehicles.⁴⁹ In such circumstances, in line with international recommendations,⁵⁰ specific analyses should be conducted considering both the domestic legal framework for collateral registries and the AML/CFT ecosystem where digital assets are taken as collateral.

4 THE PRUDENTIAL TREATMENT OF DIGITAL ASSETS

Presently, the prudential treatment of digital assets is not subject to specific international standards. Capital adequacy standards do not encompass provisions tailored to digital assets. Yet general guidelines are emerging as domestic and international organizations monitor how banks and other regulated financial institutions deal with this new type of assets. Intimately connected with debate concerning the definition of a new category of assets, a general trend is emerging to define the prudential treatment for different types of digital assets. In particular, at the international level, the Financial Stability Board and BCBS have provided guidance to clarify the risk associated with digital assets and the need for banks to adopt a cautionary and conservative approach.

4.1 PRUDENTIAL PRINCIPLES FOR DIGITAL ASSETS AND CRYPTO-EXPOSURES

The Financial Stability Board in June 2019 issued a report to the Group of Twenty on the implications of decentralized financial technologies for the stability of financial markets. Notwithstanding the benefits related to the implementation of DLT in financial services, including trade finance and lending activities, the report noted that stability risks emerge. In particular, though formally based on a decentralized technology, DLT systems entail new forms of concentration risks. Such risks arise from different sources, such as the concentration of ownership of certain digital assets—related to the so-called whale phenomenon (see annex B)—and the concentrated control over both the source code and the infrastructure governing trading in digital assets. In addition, the connection between digital assets and automation processes can give rise to procyclicality concerns,⁵¹ whereby the value of digital assets has a positive correlation with the general state of the economy. Hence, in the event of worsening economic conditions, the value of these assets may depreciate suddenly. Finally, the general issues related to the anonymity and lack of clear responsibilities of DLT-based systems could create significant challenges in the context of recovery and resolution regimes for financial institutions.⁵² Such regimes, in fact, rely on centralized recordkeeping where claims and collateral are known and ascertainable in order to ensure the orderly resolution of troubled financial institutions.

From a micro-prudential perspective, digital assets also pose specific challenges. In this regard, the BCBS is coordinating with the Financial Stability Board in order to define the key traits of a prudential framework for digital assets. Moreover, the BCBS is conducting quantitative analysis to determine the current level of banks' exposure to digital assets and their present risks, clarify the prudential treatment of digital assets, and monitor developments related to digital assets to determine their implications for banks and supervisors.⁵³

As risks are assessed, the BCBS has called for a conservative approach toward digital assets. Particular attention has been given to those assets that are not issued by governments or public authorities, such as digital currencies created by central banks. (See section 6.4 for details.) In this context, the prudential treatment of digital assets should reflect their evolving nature and consider a variety of salient factors, including the core features of the assets considered,⁵⁴ their economic functions,⁵⁵ their design to generate value, cashflow, and the existence of effective stabilization mechanisms limiting fluctuations.⁵⁶

In developing prudential regulatory regimes for digital assets, the BCBS has been following three general principles. First, as noted at the outset of this report, digital assets might reflect the same economic function of traditional (regulated) financial instruments and thus pose the same risk. (See section 2.2.) Following the principle “same risk, same activity, same treatment,” the BCBS indicates that the prudential framework should not favor or disfavor the use and diffusion of digital assets; rather, it should gauge and curb any additional risk posed by such assets.⁵⁷ Second, the prudential framework for digital assets should be simple and flexible, thus excluding the possibility of designing complex models to determine regulatory requirements.⁵⁸ Third, the prudential treatment suggested by the BCBS for digital assets should be considered as a “minimum standard,” indicating that jurisdictions that forbid banks to have exposures to digital assets will be deemed in

compliance with international prudential standards.⁵⁹

The aforementioned general principles govern the prudential treatment of direct and indirect exposures that banks might have toward digital assets that are not backed by government or public authorities. Such exposures might emerge from banks directly issuing, exchanging, or investing in digital assets. They equally emerge from loans secured with digital assets or extended to entities investing in these assets. In general, it might be difficult for banks to calculate risk on an exposure that involves a digital asset, due to the lack of reliable data.

Key concerns are the high degree of volatility and the fact that digital assets are an immature class, given the lack of standardization and fluid evolution. These very characteristics give rise to a variety of financial risks for banks. (See box 4.1.) Hence, the BCBS has advised banks to undertake more stringent due diligence on customers and assets, implement adequate governance and risk-management policies, fully disclose any material exposure to digital assets, and engage in an open dialogue with the supervisory authorities, with the aim to reduce the risks associated with digital assets.

Box 4.1: Exposure to Digital Assets: Key Financial Risks

Credit and counterparty risk: Banks holding digital assets that entail a legal obligation between the issuer and the holder of such assets might be subject to credit risk arising from the claim on the issuer.

Liquidity risk: Banks that hold digital assets or take them as collateral might not be able to convert them into cash with minimal or no loss in value.

Market risk: Banks are exposed to the risk associated with the high volatility of the price of digital assets, and absent transparent and liquid secondary markets, it might be difficult to conduct reliable valuations.

The general concern that existing prudential regulation is unequipped to grasp the risks of digital assets emerges in various jurisdictions. In the European Union, the European Banking Authority clarified that until new regulatory guidance is given, exposures to digital assets (referred to as “crypto-assets”) should be treated conservatively, potentially requiring additional capital requirements.⁶⁰ In the United Kingdom, the Prudential Regulation Authority, in one of its “Dear CEO” letters to banks, investment firms, and insurers, noted that digital assets represent “a new, evolving asset class,” and classification “will depend on the precise features of the asset.”⁶¹

4.2 CAPITAL REGULATION

Two fundamental paradoxes are associated with the prudential treatment of digital assets. First, it might be difficult to assess precisely their diffusion in the banking sector. If digital assets are qualified as any other financial assets or liabilities—without specific differentiation or specific reporting standards—their effective deployment might escape rigorous risk analysis. Lack of sufficient granularity in the classification of digital assets thus might hinder efforts to calibrate prudential standards. However, an increase in the precision of regulatory classifications corresponds to a surge in complexity and rigidity. Second, the applicability of regulatory and accounting principles is unclear for natively digital assets that do not represent a financial claim on, or a financial liability of, any (natural or legal) person. As these assets are considered valuable by their users and are used as means of investment or exchange, the definition of adequate reporting standards is of paramount importance.

In respect to digital assets that do not represent a financial claim or liability, a cautionary approach has been emerging. For instance, digital assets could be considered a medium of exchange and thus qualify as cash for the purpose of accounting standards, or they might fit into the definition of commodities. In light of the lack of sufficient information and the underdeveloped market, a more prudent approach has been recommended.

In particular, the ECB notes that these assets could be classified as intangible assets under International Accounting Standard 38,⁶² which establishes the accounting treatment for intangible assets that are not dealt with specifically under

other international financial reporting standards, such as patented technologies, computer software, or Internet domains. It identifies specific mandatory criteria for such assets to be recognized for accounting purposes. In particular, an intangible assets should (i) be identifiable, in the sense that it can be separated from other assets to be sold or transferred; (ii) be able to generate economic benefits that are transferred to the financial institution; and (iii) have value that can be measured in a reliable fashion. The effective ability of natively digital assets to meet these recognition criteria is unlikely, given their high volatility and the uncertain economic benefit for the financial institution. If such criteria are not met, International Accounting Standard 38 requires considering any expenditure on the asset as an expense.

The ECB indicates that digital assets not representing any claim or liability would have to be deducted prudentially.⁶³ This means that banks should consider the value of these assets as wholly lost. In addition, and regardless of the classification for accounting purpose, a 100 percent stable funding is likely to be applied. As a result, any exposure to natively digital assets would have to be covered fully in its value by an equal amount of other liquid assets. The ECB justifies this treatment by noting that “it reflects the potential difficulties of monetizing crypto-assets through sale (or using it as collateral in secured borrowing transactions) over the course of one year without significant expense.”⁶⁴ As more data is gathered, further regulatory guidance on the calculation of capital charges for different DLT-based assets is expected.

Box 4.2: Valuation

For the valuation of digital assets, the mark-to-market or fair-value accounting and valuation principles must be deployed. The mark-to-market valuation method involves recording the value of an asset to reflect its current market levels and aims to provide a realistic appraisal of the asset’s current financial situation.

Problems can arise, as mark-to-market accounting can become volatile if market prices fluctuate greatly or change unpredictably, leading to measurements that do not accurately reflect the underlying asset’s true value. The value of assets may vary rapidly due to changing market conditions and because buyers and sellers keep coming in and going out in an irregular fashion, often due to unreliable information or overoptimistic or overpessimistic expectations of cash flow and earnings.

5 THE REGULATORY PERIMETER FOR DLT-STCR OUTPUTS: AN ANALYTICAL FRAMEWORK

Alignment with market-integrity rules and prudential requirements is a prerequisite for DLT-STCR outputs to promote responsible and inclusive access to credit. However, the applicable regulatory regimes vary depending on the DLT-STCR output, its design, and the jurisdiction where it is implemented. Consequently, prior to creating security rights in digital assets or before establishing a DLT-based secondary market for collateral, a regulatory assessment should be conducted. To this end, section 5.1 offers an overview of how regulatory regimes could affect DLT-STCR outputs, while section 5.2 puts forward a method to be followed in specific context to determine the regulatory requirements applicable to DLT-STCR outputs.

5.1 THE IMPACT OF REGULATION ON DLT-STCR OUTPUTS

The regulatory framework governing financial services and activities might affect DLT-STCR outputs in the following three ways:

1. Regulatory regimes might apply to the identified outputs directly. For instance, if a digital asset qualifies as a financial instrument, depending on the jurisdiction, the creation of a security right, its perfection, and the liquidation of collateral, custody, and intermediation may be regarded as regulated activities.
2. Regulatory regimes affect DLT-STCR outputs indirectly by imposing regulatory requirements on the secured creditor, rather than on the output, per se. For instance, when regulated financial institutions take a digital asset as collateral or operate in platforms for secondary markets, they must comply with disclosure and prudent risk-management requirements.
3. Regulatory considerations promote a synergetic integration of DLT-STCR outputs and existing or emerging regulatory initiatives deploying distributed ledgers. For instance, information on a movable asset recorded on a DLT might facilitate its transparent valuation and, thus, its liquidation in secondary markets. In addition, a DLT-platform for secondary markets might be designed to facilitate regulatory compliance and supervisory functions.

In light of the potential impact on DLT-STCR outputs, it is of primary importance to assess whether and to what extent different regulatory regimes in different jurisdictions affect a specific DLT-STCR output, whether directly, indirectly, or through synergetic integration.

5.2 ASSESSMENT METHOD

Reflecting the threefold impact of financial regulation on DLT-STCR outputs, a three-step method is proposed to perform a regulatory assessment. The first step requires financial institutions to ascertain whether a given DLT-STCR output falls within the regulatory perimeter. For instance, the issuance and distribution of a given digital asset might be considered a regulated activity and thus be subject to securities and capital-markets laws. Such a determination depends largely on domestic definitions of securities and financial instruments, which in turn might be enshrined in primary or secondary legislation and further clarified through regulatory guidelines and judicial interpretation.⁶⁵ Although some tokens fit into this definition and, thus, are treated as securities, gray areas emerge when other digital assets are considered.

As discussed in section 6.1, the regulatory taxonomy for digital assets is not harmonized, and different definitions might apply for different legal and regulatory purposes. In addition, natively digital assets pose new challenges, as the application of existing regulatory regimes for securities and investment contracts might not apply.

For instance, when digital assets (in the form of tokens) represent an incentive to create and maintain a public ledger in public and permissionless systems,⁶⁶ those digital assets might present some or none of the characteristics of traditional financial instruments or investments. In this regard, domestic regulators are focusing on identifying those digital assets that might fall outside existing regulatory perimeters. Typically, this category includes, as noted by the ECB, any “asset recorded in digital form that is not and does not represent either a financial claim on, or a financial liability of, any natural or legal person, and which does not embody a proprietary right against an entity.”⁶⁷

In this context, the development of a DLT-STCR output should consider the interactions with regulatory categorizations established under the regulatory regimes for regulated activities and introduced through bespoke regimes. This point is particularly salient for security rights in digital assets and for the establishment of a secondary market for DLT-based assets. In the former case, depending on the legal system, the intersection between secured-transactions law and regulatory definition might affect the applicable perfection and enforcement rule. (See box 5.1.) Based on the regulatory nature of the digital assets under consideration, as examined in section 6, securities, banking, and payment regulation might apply, requiring specific licensing regimes. In the case of secondary markets for digital assets, as noted in section 7, DLT-based platforms might be regarded as trading venues, thus requiring compliance with an articulated set of rules. Finally, where DLT-STCR outputs are subject to bespoke regulatory regimes, the integration of a distributed ledger in a collateral registry might also have to comply with specific requirements introduced to regulate the application of nascent technologies.

Box 5.1: Secured-Transactions Law and Regulatory Classifications

A key issue is whether the regulatory classification attributed to a given digital asset has any consequences on the applicable rules on perfection. For instance, in the United States, a digital asset might be classified either as investment property, where control may be used to perfect the security right, or as a general intangible, which requires registration. (See DLT-STCR Law and Registry Note, section 2.2.) Under this regime, the classification depends largely on the parties who may agree to treat the digital asset as a financial asset for the purposes of secured-transactions law. The different classifications under regulatory regimes and in other legislation, such as for the purposes of the commodity exchange laws, do not affect the perfection rules.

In other jurisdictions, however, the regulatory classification of a given digital asset might have an impact on the applicable regime governing the creation, perfection, and enforcement of security rights. For instance, if a domestic secured-transactions law refers to the definition of financial instruments provided in the regulatory framework and digital assets are considered as financial instruments under the same framework, then security rights in digital assets are likely to follow the regime normally applied for financial instruments.

The second step is to determine whether lenders, such as banks or other financial institutions, are subject to specific regulatory requirements whenever they deal in digital assets or invest in an activity implementing a new technology. This aspect has been explored far less, but it is poised to increase in relevance as DLT integrates into mainstream financial systems. The effective development of DLT-STCR outputs is likely to be affected by regulatory frameworks that subject lenders to business-conduct rules and prudential requirements.

Banks and other financial institutions, such as institutional investors, are generally not allowed to participate in secondary-market platforms that are not regulated. As a result, market liquidity in such circumstances is constrained. Moreover, as discussed in section 6.3, the prudential treatment of collateral for calculating capital requirements might, in practice, discourage banks from taking a digital asset as collateral. In fact, the effectiveness of any asset, including digital assets, as collateral depends on whether it mitigates credit risk without exposing the secured creditor to new operational, legal, and technological risks.⁶⁸

Finally, the third step is to identify whether DLT-STCR outputs can leverage the interaction and coordination of other initiatives that implement DLT within the regulatory perimeter. As a general trend, interest is growing in integrating distributed ledgers in various aspects of business activities. A case in point is the recent amendment to the Delaware

General Corporation Law allowing for the inclusion of distributed ledgers in corporate governance structure and reporting standards.⁶⁹ This development indicates that core functions of corporations can be performed through a DLT system that also ensures regulatory compliance. In this regard, DLT-STCR outputs can be designed to integrate with initiatives that are aimed at fostering the integration of new technologies with regulatory and supervisory activities, referred to as RegTech.

The development of a given DLT-STCR output, such as a collateral registry or a platform for the secondary market, could benefit from coordinating with initiatives aimed at ensuring regulatory compliance. A complete treatise on how different outputs can link with emerging RegTech activities falls outside the scope of this guidance note. Nonetheless, it is important to note that distributed ledgers—combined with artificial intelligence and, in particular, machine learning algorithms—have been used for monitoring and risk-management purposes. In particular, DLT has been implemented to improve and streamline customer due-diligence processes, increase the traceability of transactions, remove duplication of efforts, and ultimately facilitate the automation and accuracy of reporting standards and compliance requirements. (See box 5.2.) A further step—currently examined by regulatory authorities—is the possibility of a supervisory framework that monitors compliance by analyzing and interacting with the distributed ledger of tokenized markets, a scenario termed “embedded supervision.”⁷⁰

Box 5.2: KYC/AML Processes on Blockchain

In 2018, a group of financial firms, regulators, and corporate clients conducted a trial of a KYC-compliance application built upon R3’s Corda blockchain platform. Parties of this project have been private institutions, such as ABN AMRO, Société Générale, BNP Paribas, and Deutsche Bank, and public entities, including National Bank of Egypt, the Federal Reserve Bank of Boston, the Central Bank of Colombia, and the Superintendency of Banking and Insurance of Peru.

The model allows corporate customers to create and manage their own identities and then grant permissions to multiple participants to access the data. This can lead to improved efficiency by eliminating the need for each financial institution to attest and update KYC records individually. The model also helps avoid data-privacy and security problems, since only parties with permission from the customer have access to the data. The group managed to conduct more than 300 transactions in 19 countries across eight time zones.

Novel technological advancements are key to promote a greater coordination between STCR outputs and social, economic, and regulatory environments. As DLT outputs are aimed at fostering access to credit and financial inclusion, reflecting the general expectations attributed to FinTech,⁷¹ their implementation should also facilitate compliance with relevant requirements promoting the integrity and soundness of financial markets. From a policy standpoint, such an approach is in line with the current efforts to promote sound and inclusive access to credit through coordination between the legal and regulatory elements comprising the credit ecosystem.⁷² In practical terms, this requires addressing interoperability and scalability issues if different DLT-based systems are implemented in a given jurisdiction.

6 DIGITAL ASSETS AS COLLATERAL: REGULATORY IMPLICATIONS

Compliance with applicable regulatory regimes is a premise for taking digital assets as collateral. In any given legal system, to determine which regulatory regime applies to a given digital asset, it is key to ascertain whether its issuance, intermediation, and transfer are regulated activities. The outcome of such assessment depends largely on applicable securities laws and on the classification of digital assets under domestic regulatory frameworks. If the issuance and transfer of digital assets are considered regulated activities, the ability of lenders to take such collateral or the possibility to dispose of it in a timely manner will be affected by applicable regulatory requirements.

Section 6.1 introduces four main archetypes of tokens that could serve as collateral, indicating their emerging regulatory treatment. Section 6.2 considers the special case of stablecoins. The difficulties of considering digital assets as eligible risk mitigants for the purposes of capital requirements are illustrated in section 6.3. In light of the potential impact on lending practices that the introduction of digital currencies issued by central banks might have, their core traits and current developments are illustrated in section 6.4.

6.1 REGULATORY CLASSIFICATION OF DIGITAL ASSETS

The tendency across regulatory regimes is to classify tokens into three main categories—namely, payment tokens, security and investment tokens, and utility tokens.⁷³ Yet, given that the same digital asset could serve different purposes, the boundaries are often blurred, and a new category, referred to as hybrid tokens, is emerging. Depending on the classification offered, different regulatory standards might apply to govern their issuance and distribution.

The contours and core features of these categories are subject to change. Technological advancements and new business applications require novel regulatory classifications. Moreover, absent a uniform taxonomy, different jurisdictions use various terms to refer to the same class of assets. For example, payment tokens are also referred to as “exchange tokens” (United Kingdom) or “currency tokens” (Israel), whereas security and investment tokens are also referred to as “security tokens” (Abu Dhabi and Hong Kong), “asset tokens” (Switzerland), or “investment-type crypto-assets” (European Securities and Markets Authority).⁷⁴ Nonetheless, a set of core technological characteristics and practical uses is identifiable and briefly presented below.

PAYMENT TOKENS

Payment tokens—often referred to as cryptocurrencies—usually operate in permissionless, decentralized networks, as they are not issued or backed by any central authority.⁷⁵ They are used primarily as a means of payment for goods and services or the transfer of money or value.⁷⁶ The most prominent examples of these tokens are Bitcoin and Litecoin. In general, payment tokens are designed to be used like traditional fiat currencies. However, they are not recognized as legal tender, and they are not considered an equivalent to money, as they represent neither a stable medium of exchange nor a reliable store of value.

The regulatory treatment of payment tokens is not harmonized and, in some jurisdictions, remains uncertain. By and large, cryptocurrencies that are natively digital and do not represent any underlying financial claim or liability tend to escape existing regulatory perimeters established for securities and related financial products. Nonetheless, two general regulatory trends have been emerging. First, as illustrated in section 3.1, an international consensus has been consolidating for the application of AML/CFT rules to financial institutions dealing with such assets. Second, even though domestic regulators are not treating the most common cryptocurrencies as securities, they have been expanding their jurisdictions over activities connected to this type of digital assets, such as the offering of investments settled with cryptocurrencies, the establishment of platforms supporting their transfer, or the extension of loans secured with such tokens.

For instance, in the United States, the CFTC explained that cryptocurrencies are considered “like many other intangible commodities that the Commission has recognized over the course of its existence,” adding that “since their inception, virtual currency structures were proposed as digital alternatives to gold and other precious metals.”⁷⁷ As a result, some loans secured with such digital assets, if they qualify as commodity contracts under the Commodity Exchange Act, are subject to the jurisdictions of the CFTC. As discussed in section 7.4, this means that platforms providing services that are connected to this type of loan must comply with specific regulatory requirements under the supervision of the CFTC. Moreover, gathering payment tokens from the public with the promise of a return based on the activity of the promoter meets the criteria established under the U.S. law for securities regulation (see table 6.1) and therefore is an activity subject to the jurisdiction of the Securities Exchange Commission.⁷⁸

SECURITY AND INVESTMENT TOKENS

Security and investment tokens are digital assets generally representing other financial assets,⁷⁹ such as a debt or an equity claim on the issuer. In any respect, they provide their holders with rights such as repayment of a sum of money, ownership, or a share in future earnings of a company.⁸⁰ By granting rights of ownership (through dividends and capital contribution) and control (through voting rights), security and investment tokens resemble financial instruments because they convey a predominantly investment-related or speculative element.⁸¹ As a consequence, they constitute the main type of digital asset that falls within the regulatory perimeter. In an effort to determine whether a digital asset might constitute a security, both the Securities Exchange Commission and the European Banking Authority have stressed that “form should be disregarded for substance” and that the focus must be on the “economic realities underlying a transaction, and not on the name appended thereto it.”⁸²

Regulators have developed different approaches to determine whether a given financial product falls into the definition of securities and therefore should be subject to specific regulatory requirements.⁸³ These approaches are also applied to determine whether the issuance and circulation of a token should be subject to disclosure and licensing requirements. (See table 6.1.) In general, the problems with the classification of digital assets as securities (for example, under U.S. law) or as financial instruments (for example, under EU law) are only partially due to the novelty of such assets. The primary issue is, instead, known discrepancies and ambiguities in the definitions and methods to define and regulate securities, a problem identified before the advent of DLT,⁸⁴ which has now become more evident.⁸⁵

Table 6.1: Digital Assets as Securities

| Jurisdiction | Characterization | Qualification | Legal Basis |
|----------------|--|---|---|
| United States | Security and investment tokens | Investment contracts | Howey Test ⁸⁶ |
| | Four parts of the test to determine a qualifying regulated activity: (i) An investment of money (ii) In a common enterprise (iii) With a reasonable expectation of profits (iv) The expectation of profits is based upon the entrepreneurial efforts of others | | |
| European Union | Investment tokens | Financial instruments/ transferable securities | MiFID II (2014/65/EU) |
| | The applicability of EU securities law to digital assets remains limited to tokens that (i) Have an attachment of profit; and (ii) Are representations of assets and liabilities. | | |
| United Kingdom | Security tokens | Specified investments | FSMA 2000 - Regulated Activities Order (RAO) |
| | Indicative qualifying regulated activities (Part III, Section 22, RAO): (i) Deposits (ii) Shares (iii) Debentures, loan stock, bonds, and so forth (iv) Warrants, options, futures, contracts for differences, and so on | | |

UTILITY TOKENS

Utility tokens give access to a digital application or service.⁸⁷ Depending on their functions, they might be similar to vouchers, chips, or keys that can be redeemed for services.⁸⁸ In contrast to payment tokens, utility tokens provide some utility function other than payment or exchange for goods and services. Moreover, unlike security and investment tokens, utility tokens grant holders access to a current or future product, but they do not grant holders rights similar to those granted by other investment products, such as voting rights or ownership. As a consequence, utility tokens tend not to be regarded as securities and thus generally fall outside the regulatory perimeters. However, ambiguities concerning the applicable regulatory regime might emerge when utility tokens also perform an investment function.

Notwithstanding the functional differences between utility tokens and payment and security and investment tokens, utility tokens might have some or all the features of securities. In the United States, in order to prevent the use of utility tokens merely to circumvent regulatory requirements, the Securities Exchange Commission indicated that whether utility tokens are subject to securities law depends on their economic substance rather than the label given by the issuer stating the mere existence of a utility function.⁸⁹

HYBRID TOKENS

Hybrid tokens fit multiple regulatory definitions. They are typically considered to be both methods of payment and financial instruments, a case often represented by tokens created on the Ethereum platform. Depending on the jurisdiction and the core features of the tokens, the regulatory treatment of hybrid tokens could be either cumulative—that is, both securities law and payment services law would be applied—or hierarchical—either securities law or payment services law would prevail.

From the above it emerges that the regulatory classification determines whether the issuance and the distribution of a token is subject to specific regulatory requirements. Considering the different techniques for creating tokens (for example, pre-mine, continuous mining, and hybrid) and a variety of methods for distributing tokens (for example, pre-token sale, ICOs, mining, Airdrop, Fork), issuing digital assets might vary significantly from case to case and from one jurisdiction to another. To date, the majority of regulatory authorities have focused on the regulatory treatment of ICOs, largely based on the definition of securities—whereas private placements are generally falling outside the regulatory perimeter. In any respect, whenever the distribution and circulation of a digital asset is regulated—either through bespoke regime or a technology-neutral approach apply (see box 6.1)—the ability of that asset to serve as collateral is bound to its compliance with applicable regulatory standards.

Box 6.1: Examples of Regulatory Regimes for Digital Assets

Jurisdiction

Malta

As the applicability of EU law on digital assets is limited (see table 4.1), member states have been developing different regulatory regimes that extend the applicability of existing rules or establishing bespoke regimes. Malta offers an example of a jurisdiction implementing a bespoke regulatory approach that is concerned with DLT. In July 2018, the Malta Digital Innovation Authority Act, the Innovative Technology Arrangements and Services Act, and the Virtual Financial Asset Act entered into force. The approach sets up a special regulatory framework for innovative technologies, introducing, among other things, a test to determine whether a given digital asset (i) falls within the scope of the existing regulatory framework, (ii) falls within the new regime established by the Virtual Financial Asset Act, or (iii) rests outside the regulatory framework. Pursuant to the new regulatory regime, the issuers of virtual financial assets and the service providers are subject to AML/CFT regulation. In addition, licensing requirements are established for DLT-related activities.

Bermuda

Bermuda has enacted a set of special rules, although their scope is more limited than legislation implemented in Malta. In particular, the Bermuda Digital Asset Business Act 2018 regulates such activities as issuing, selling, or redeeming digital assets or providing payment services using digital assets, electronic exchanges, or custodial wallet services. Persons carrying on digital-asset businesses are required to obtain licenses based on certain minimum fitness and propriety criteria and are subject to business-conduct, reporting, and other requirements. Amendments to the Companies Act have been enacted to regulate ICOs. Under its provisions, ICOs require the consent of the Ministry of Finance, and issuers need to fulfill some disclosure requirements. Activities falling within the scope of digital-asset businesses are subject to AML/CFT regulation. Mining is specifically exempted.

Hong Kong

Unlike Malta and Bermuda, Hong Kong has no bespoke regime for digital assets. However, the Hong Kong Monetary Authority, the Securities and Futures Commission, and the newly established Insurance Authority are operating sandbox programs allowing for voluntary live testing of financial products and technologies in a limited regulatory environment before their formal launch. With regard to ICOs, the Commission has issued a statement that provides information on their regulatory treatment. Where the digital tokens involved in an ICO fall under the definition of securities, dealing in or advising on the digital tokens or managing or marketing a fund investing in such digital tokens constitutes a regulated activity and a license must be obtained. In a similar vein, digital-asset portfolio managers and digital-asset fund distributors require a license and are supervised by the Securities and Futures Commission. In November 2019, in a position paper on the regulation of virtual assets trading platforms, the Commission indicated that some types of centralized platforms that trade security and non-security tokens are suitable to be regulated under the existing framework. Given that the Commission has no power to grant a license and supervise platforms dealing only in non-security tokens, operators who want to apply for a license and be subject to the new regulatory regime must intend to offer at least one security token on their platform.

6.2 STABLECOINS

Stablecoins are digital assets with a pegged value that limits their volatility. Stablecoins can be (i) asset backed, whereby traditional assets (financial or non-financial) are used as reserves or as collateral and kept in custody, typically by an entity designated by the issuer, or (ii) algorithmic, whereby smart contracts are implemented to regulate the issuance and redemption of the token, thus controlling the prices of the token. The promise of a relatively stable value and the possible integrations with the mainstream financial and banking system make stablecoins particularly relevant for DLT-STCR purposes. Algorithmic stablecoins generally follow the regulatory regimes applied for other digital assets. Hence, if they are used as part of an investment-like activity, they are likely to be subject to relevant securities regulation.

In principle, stablecoins would meet the regulatory criteria for collateral if their value is stable and established in liquid markets.⁹⁰ If they were to be accepted as medium of exchange for other goods, stablecoins would also perform money-like functions, operating in a fashion that is similar to existing electronic payment systems and electronic money. Hence, they should be subject to the same regulatory requirements. However, practical applications are currently at the proof-of-concept stage, and the stability attached to most stablecoins currently traded in secondary markets is only relative to the volatility of other cryptocurrencies. More generally, the actual ability of a stablecoin to be used as a payment system, as a collateral, or as an alternative to paper money depends largely on political, policy, and regulatory considerations, as the case of Tether and the Libra project have indicated. Internationally concerted initiatives have been taken, following the requests advanced by both the Group of Seven and the Group of Twenty. Additionally, the Financial Stability Board has been tasked to address regulatory, supervisory and oversight challenges related to “global stablecoin” arrangements. In April 2020, 10 high-level recommendations have been published for consultation and in the accompanying report the Financial Stability Board noted the importance of developing “appropriate regulatory approach within jurisdictions across sectors and borders” in respect to stablecoins.^{90-A}

In light of the ongoing developments and possible impact on DLT-STCR outputs, it is worth examining the key features of existing and proposed applications of stablecoins. Current applications include tokens that are pegged to fiat currencies (for example, the U.S. dollar), commodities (for instance, gold and oil), baskets of digital assets (such as Bitcoin and Ether), and commercial bank money. In the latter case, the economic structure of stablecoins is very similar to those of bank deposits, as each token is backed by an asset portfolio of a particular issuing bank and is subject to the bank’s insolvency risk. The versatility of stablecoins emerges also from Libra, which, by leveraging a very large customer base provided by a popular social network, proposed to establish an international system for mobile money based on a permissioned blockchain.⁹¹ As illustrated in table 6.2, the proposal differs from other payment tokens, such as Bitcoins, as well as from other stablecoins, inasmuch as its governance is centralized and its value is tied to a basket of major fiat currencies and highly liquid bonds issued by various governments. Arguably, the most remarkable aspect of this proposal is reflected in the immediate reactions, prompting the Group of Seven to set up a working group on stablecoins that indicated that initiatives in this field “must meet the highest standards and be subject to prudent supervision and oversight, and that possible regulatory gaps should, as a matter of priority, be assessed and addressed.”⁹²

Table 6.2: Stablecoins Features

| Digital asset | <i>Payment token</i> | <i>Stablecoins</i> | | |
|---------------------|---|---|--|---|
| | <i>Cryptocurrency</i> | <i>Fiat-backed</i> | <i>Deposit-backed</i> | <i>Payment token and deposit-backed</i> |
| | Bitcoin | Tether | JPM coin | Libra |
| Pegged | Not pegged Value is intrinsic to the token | Reserves held at a bank and composed of fiat currency and cash equivalents Pegged to fiat currency | 1:1 redeemable in fiat currency held by J.P. Morgan | Backed by a pool of multi-jurisdiction low-volatility assets (Libra Reserve) Redeemable in fiat currencies |
| DLT platform | Permissionless (public) Decentralized blockchain | Permissionless (public) Decentralized blockchain | Permissioned Centralized blockchain built by J.P. Morgan and other partners | Permissioned Not a blockchain; data are recorded in sequence without distinction in blocks |
| Users | Primarily retail Limited wholesale investor base | Retail Limited wholesale investor base | Exclusively for institutional customers passing KYC requirements | Digital wallet for individual users, as a means of payment for goods or services or as value transfer |

The regulatory regime applicable to stablecoins varies depending on the design of the system and the jurisdictions in which it operates. However, in line with the general approach established by the Group of Seven Working Group on Stablecoins, international and domestic regulatory regimes are emerging. In a similar vein, alignment to the regulatory initiatives put forward by the Financial Stability Board is expected. For instance, the Swiss Financial Market Supervisory Authority published a supplement to its ICO guidelines outlining the regulatory treatment for stablecoins.⁹³ In particular, the guidelines noted that a project like Libra would be considered market infrastructure and would thus require a license for payment systems, compliance with AML/CFT rules, and the implementation of prudential requirements to curb credit, market, and operational risk.⁹⁴

More generally, the guidelines clarified the regulatory treatment for different types of stablecoins. Tokens pegged to a fiat currency, a pool of currencies, or precious metals, depending on the structure of the claim, could qualify as deposits under Swiss banking law, requiring a banking license.⁹⁵ Given the lack of actual cases, the regulatory implications of taking such digital assets as collateral remain hypothetical. What is evident is that, depending on the legal system, if such digital assets are held in accounts that qualify as deposit accounts, then the rules for perfecting and enforcing security rights in deposit accounts would be applicable, similar to what has been noted where digital assets are qualified as securities. (See Section 5, box 5.1.)

As the foregoing discussion indicated, whenever a digital asset is treated as a regulated activity, be it a financial instrument or a bank deposit, its creation, distribution, and exchange are subject to regulatory regimes. Hence, the establishment of a security right over such assets cannot—and should not—prescind from regulatory requirements that need to be met for these assets to circulate.

6.3 CAPITAL REQUIREMENTS FOR TRANSACTIONS SECURED WITH DIGITAL ASSETS

The regulatory definition of a digital asset affects the classification of the corresponding exposures. This is to say that, for instance, if a digital asset represents a debt or an equity claim, financial institutions investing in it would have a debt or an equity exposure toward the issuer. In addition to considering key financial risks—represented by credit, liquidity, and market risk associated with digital assets—capital charges must consider relevant non-financial risks,⁹⁶ the most relevant being operational and legal risk. (See box 6.2.) In the case of natively digital tokens and, more generally, whenever a token does not represent any financial claim, the qualification of digital exposures results in further complexities, and as illustrated in section 4.2, caution has been advised by the BCBS and domestic regulators. Such an approach is reflected in the prudential treatment for transactions collateralized with digital assets.

Box 6.2: Exposure to Digital Assets: Non-financial Risks

Operational risk: Banks with direct or indirect exposures to digital assets are prone to risks associated with technological vulnerabilities, including the risk of cyber attacks (cyber risk), governance issues related to the network, or the unexpected developments affecting the diffusion of untested technologies.

Compliance risk: Banks with exposures to digital assets, including when digital assets serve as collateral, must ensure compliance with relevant regulatory provisions regulating financial services and activities, bespoke regimes, and international AML/CFT standards. Failure to ensure compliance with applicable requirements hinders the ability of digital assets to serve as collateral.

Legal risk: Depending on the jurisdiction, banks face uncertainties in the legal categorization and treatment of various digital assets. In particular, uncertain treatment under domestic secured-transactions and insolvency law might undermine the ability of digital assets to offer valid credit protections. (See DLT-STCR Law and Registry Note.)

Under the Third Basel Capital Accord, using natively digital assets as collateral in order to curb credit risk and, thus, reduce capital charges is not possible. The accord provides for a general category—referred to as “other assets”—to include all assets that do not fall into any of the specific categories.⁹⁷ However, the Third Basel Capital Accord envisages the possibility for domestic authorities to recognize only “the credit risk mitigating effect of certain other physical collateral”⁹⁸ (emphasis added). Even if a jurisdiction decides to extend the notion of “other collateral” to include digital assets, provided that they do not belong to any existing class of assets, a specific set of conditions must be met. First, a bank must seek and obtain authorization from domestic regulators to use the internal methods—known as internal rating-based methodologies.⁹⁹ However, the BCBS discourages the use of “complex internally-modelled approaches” to calculate regulatory requirements for digital assets.¹⁰⁰ Thus, for the applicability of internal rating-based methodologies, domestic regulators should indicate what approach qualifies as “complex” and whether such a limit applies to every digital asset, including those representing underlying financial claims.

Second, banks must demonstrate the existence of a liquid secondary market where prices are publicly available in order to ensure the expeditious and cost-effective disposal of the digital assets taken as collateral.¹⁰¹ In addition to these requirements, legal certainty of the credit protection must be demonstrated, ensuring that the bank enjoys first priority and the claim is legally enforceable in all relevant jurisdictions.¹⁰² Some regulators, in applying a cautionary approach, excluded the possibility of digital assets that do not represent any financial obligation serving as collateral. Notably, the ECB indicated that an exposure to a digital asset that does not represent any financial claim or liability should be treated as a loss,¹⁰³ excluding the possibility of using them as eligible collateral.

Hence, from a regulatory standpoint, it is unlikely that natively digital assets in their current form could (or should) qualify as eligible collateral for the calculation of capital charges. A similar conclusion is reached from a risk-management perspective; given its high volatility, lack of legal certainty, and operational risk, this class of assets does not appear suitable to curb credit risk. Largely in line with the ECB approach, the BCBS suggests qualifying those assets as “high risk crypto-assets,” as they are not issued by any identifiable entity, have no intrinsic value, are not linked to or backed by assets with a value, and holding them does not generate any obligation between the holder and an identified issuer.¹⁰⁴ The ensuing treatment is a full deduction from regulatory capital for bank exposure in high-risk crypto-assets—thus requiring banks to recapitalize with an amount equal to exposure under consideration—and the impossibility for such assets to qualify as eligible financial collateral.

Although the prudential regime for natively digital assets is consolidating, the treatment of other digital assets might vary considerably. In principle, digital assets representing a claim or a liability, depending on the economic nature and risk, could be treated as eligible financial collateral, provided that financial and non-financial risk are properly assessed and calculated. Finally, a different set of considerations should be advanced in respect to digital assets that are directly supported by public authorities. Yet, as illustrated below, the relevance of these new types of digital assets for DLT-STCR purposes rests primarily on their general impact on commercial lending, rather than on their use as collateral.

6.4 CENTRAL BANK DIGITAL CURRENCIES AND THE CREATION OF CREDIT

In particular, the possibility of creating private payment systems and stablecoins has revived the debate over central bank digital currencies (CBDCs)—that is, cryptocurrencies issued by a central bank. CBDCs differ from stablecoins, at least as intended today, as they are central bank money, rather than tokens whose value is linked to fiat currencies. They are central bank liabilities denominated in an existing unit of account, which serves both as a medium of exchange and a store of value. In other words, CBDCs function like regular money, whereby once a central bank issues a CBDC, this would circulate between banks, non-financial firms, and possibly retail consumers. In broad terms, two types CBDC are emerging, depending on whether CBDCs are designed for wholesale payments or for general purposes.

The potential benefits of introducing CBDCs are significant. First, CBDCs could simplify trading and payment systems in various ways. Even if new cross-ledger solutions have been tested,¹⁰⁵ the implementation of a global network of currencies backed and issued by central banks would offer a new backbone for international payment and reshape the international monetary system, as the Governor of the Bank of England noted in a speech at the Jackson Hole Symposium in 2019.¹⁰⁶ For instance, with Project Inthanon-Lion Rock—launched in September 2019 and bearing the first positive results in early

2020—the Hong Kong Monetary Authority and Bank of Thailand established a CBDC network allowing for 10 participating banks based in Hong Kong and Thailand to transfer funds cross-border and conduct foreign-exchange transactions on a peer-to-peer basis.¹⁰⁷ In light of both efficiency gains and positive results, further research will be conducted with the intent of enlarging the network of participating financial institutions and currencies.

Second, CBDCs could provide for a safe central bank instrument, supporting current efforts for a cashless system to reduce the reliance on informal economic activities. (See box 6.3.) Finally, as for any other electronic payment system, CBDCs could be designed to facilitate the implementation of AML/CFT regimes. For instance, with the aim of improving financial inclusion and compliance with KYC rules, the Central Bank of the Bahamas and the Central Bank of the Eastern Caribbean have launched projects for general-purpose CBDCs. In the Bahamas, Project Sand Dollar envisages a system where the holder of a digital currency would have a direct claim on the central bank.¹⁰⁸ The Eastern Caribbean Central Bank launched a pilot to issue, redeem, and verify digital tokens that are treated as digital cash.¹⁰⁹ The system relies on established financial institutions to circulate the tokens and provide services directly to wallet holders and to non-bank financial institutions.

Box 6.3: Central Bank Digital Currencies and Cashless Society

Sveriges Riksbank, the Central Bank of Sweden, has started the development of the e-krona in response to the decline in the use of coins and bank notes. The process involves a dialogue with domestic legislators in order to reconsider the concept of legal tender under Swedish law. The realization of a new payment platform is scheduled for 2020, with the adoption of new legislation by 2021, based on the result of current testing.

Banco Central del Uruguay, the Central Bank of Uruguay, completed a pilot project to adopt a digital currency. The project coordinates with a wider program, begun in 2011, to promote financial inclusion and comprising significant legal reforms. As electronic means of payment have been established and financial-services penetration has increased, the availability of cash-dispensing mechanisms has grown, but cash withdrawals stagnated and cash in circulation ultimately decreased. To respond to this challenge, Banco Central de Uruguay launched a pilot project in 2017 that involved the issuance of 20 million e-pesos and was successfully completed in 2018. Domestic authorities are evaluating the results of the pilot before conducting further trials.

In view of these potential benefits, a number of central banks—Bank of Canada, the ECB, Bank of Japan, the Monetary Authority of Singapore, and the People’s Bank of China—have been studying the effects of introducing CBDCs in their economies.¹¹⁰ Although interest is ubiquitous, the likelihood of implementing CBDCs effectively is higher in emerging and developing economies as part of financial-inclusion policies and in jurisdictions that are poised to abandon paper money,¹¹¹ as evidenced by the pilot projects launched by the Central Bank of Sweden¹¹² and Central Bank of Uruguay.¹¹³

One of the key issues of implementing CBDCs is the impact that they could have on the credit system and on banking activities. Each time a loan is extended, a corresponding deposit is created; thus, loans create deposits that, in turn, represent purchasing power for any given economy.¹¹⁴ In a two-tier banking system—whereby the central bank supplies money to commercial banks and commercial banks, in turn, supply money through deposits—a CBDC could disrupt the role of commercial banks. Retail customers would have, in fact, direct access to central bank money, and no deposits with commercial banks would be required. In this regard, following a study on CBDCs recently completed by the Bank of Japan,¹¹⁵ the deputy governor explained why Japan is not planning to introduce a digital currency in the near future, noting that “[n]o matter how safe and reliable CBDC is as a payment instrument, the benefits derived from the two-tiered system would be lost if private money were to be replaced by CBDC on a considerable scale.”¹¹⁶

The design of CBDCs could avert the negative impact on modern credit-creation mechanisms in larger economies by integrating with the two-tier banking system. The People’s Bank of China, for instance, is planning to launch a state-backed cryptocurrency inspired by Libra and integrated with the Chinese two-tier banking system. In this scheme, the central bank would issue and redeem its CBDC solely through commercial banks, which would in turn distribute tokens to the general public.¹¹⁷ As a result, paper money is substituted, full control of the money supply is achieved, and the two-tier system is

maintained.

Although it is too soon to anticipate the implications for secured-transactions and asset-based lending, given CBDCs' potential impact on lending markets, further assessments are necessary. In particular, if the intent is to provide a synergetic integration of CBDCs and secured-transactions frameworks, the following aspects should be considered:

1. The design of CBDCs in respect to the structure of the domestic banking systems.
2. The structure of local credit markets and the impact of cashless policies.
3. The legal definitions of “legal tender,” “money,” and “bank account”.

Addressing uncertainties that affect these aspects would foster coordination between projects designed to implement CBDCs and existing policies to promote an inclusive access to credit through movable-asset lending.

7 SECONDARY MARKETS IN THE DLT-STCR CONTEXT

The establishment of a transparent and liquid secondary market is essential for the development of a sound credit ecosystem. In the context of secured-transactions law reforms and access to credit policies in particular, secondary markets perform two key functions. First, they allow parties to a security agreement to estimate the value of collateral, thus determining the level of credit protection offered. Second, they ensure that collateral can be sold, thus providing for an effective method to ensure the satisfaction of the secured obligation in a timely fashion.

The integration of DLT in this context can occur in various fashions. Distributed ledgers can be used to facilitate the traceability of tangible assets and the disposal of digital assets taken as collateral. Depending on the assets, the type of platform, and its governance, as well as the jurisdiction in which it operates, different regulatory requirements might apply. In light of their regulatory implications and relevance for STCR purposes, this section focuses primarily on secondary-market platforms for digital assets that represent intangible assets, such as receivables and warehouse receipts, as well as other tokens.

This section starts with a brief overview of the role of traditional marketplaces and platforms supporting secured lending. Section 7.2 offers an overview of a possible implementation of DLT to facilitate the formation of secondary markets. Section 7.3 examines key issues concerning the design, governance, safekeeping, and finality and settlement of DLT-based secondary markets for digital assets. In light of these considerations, section 7.4 focuses on key regulatory issues affecting this category of DLT-STCR outputs.

7.1 SECONDARY MARKETS IN THE STCR CONTEXT

In the STCR context, two broad categories of marketplaces are particularly useful to support lending practices secured with movable assets. The first is epitomized by auction-type mechanisms for tangible assets, such as motor vehicles and equipment. These marketplaces may operate as electronic platforms, such as eBay Motors, which sells repossessed motor vehicles. A second category of marketplaces encompasses various platforms for intangible assets, such as accounts receivable, electronic invoices, and electronic warehouse receipts. The legal effect of the transactions entered into on these platforms depends on both the legal recognition of electronic representations of assets—such as electronic warehouse receipts—and the existence of an efficient and transparent set of rules to govern security rights in such assets.

The prudent management of credit risk, market integrity, and the protection of customers are of paramount importance to ensure confidence in such platforms and, thus, their viability. This requires coordination with regulatory frameworks governing banking, securities, and capital-markets activities. As illustrated in section 6.3, banks are required to demonstrate the existence of a liquid secondary market where prices are reliable and publicly available in order to consider tangible assets as eligible collateral for the calculation of capital requirements.¹¹⁸ In addition, secondary-market platforms might be subject to mandatory licensing requirements and AML/CTF standards. (See box 7.1.)

Box 7.1: Receivables Trading and Regulation

Technology, primarily digitization, significantly simplifies the trading process, bypasses traditional forms of intermediation, and increases transparency of platforms for receivables, which operate similar to securities exchanges for the trading of shares. Adherence to existing regulatory standards, based on securities law and trading, is playing an important role in attracting a larger pool of investors and ensuring the sustainability of these platforms. In this respect, receivables-trading platforms might implement KYC rules, assign an International Securities Identification Number to traded receivables, and require a credit rating from recognized agencies. A case in point is Arex, a receivables-trading platform based in Ireland through which businesses can raise working capital by directly selling their receivables.

Depending on the jurisdiction, receivables-trading platforms might seek and obtain a license from securities regulators. In Hong Kong, for instance, the Securities and Futures Commission in December 2018 granted a Type 1 license to Velotrade, a digital platform for account receivables. In accordance with the Securities and Futures Ordinance (Cap. 571), a Type 1 license authorizes a licensee to “deal in securities,” which includes trading, placing, and underwriting securities for clients.

Inclusion within the regulatory perimeter of platforms to trade intangible assets yields significant benefits, even in the absence of specific licensing requirements. In fact, compliance with established regulatory standards is key to ensuring transparency and, ultimately, fostering the liquidity of a secondary market. Once a trading platform operates under a defined regulatory regime, the participation of a broader pool of investors is facilitated. Regulated financial institutions and institutional investors might not be allowed to invest in nonregulated markets or, if permitted, they might be subject to stringent regulatory requirements. Hence, seeking and obtaining a license as a financial institution is part of a business strategy to increase liquidity in secondary markets.

The integration of DLT in secondary markets is primed to have larger regulatory implications. The general purpose of DLT-based platforms remains to unite buyers and sellers through infrastructure that displays information, matches orders, executes them, and provides transaction data in a fashion that resembles online trading platforms. However, as illustrated in detail in this section, when traditional collateral (tangible or intangible) is tokenized, or when natively digital assets are taken as collateral, in addition to private law legal issues,¹¹⁹ specific policy concerns emerge relative to the protection of investors and maintenance of market integrity.

7.2 DLT APPLICATIONS IN SECONDARY MARKETS

In the STCR context, a system based on a distributed ledger could support the development of secondary markets in different manners. In this respect, it is crucial to distinguish platforms where a distributed ledger is used to facilitate the transfer of non-natively digital assets—thus, DLT is implemented in the trading process—from those that are used to transfer natively digital assets—allowing parties to trade in DLT-based assets. Moving from such a distinction, it emerges that DLT can integrate with market platforms in three main ways, resulting in the following three types of DLT-STCR outputs for secondary markets:

1. Traditional types of collateral, tangible or intangible assets, are integrated with a DLT-based platform to record the dealings involving the asset taken as collateral. This process does not involve the creation of a new form of (digital) assets, and DLT is implemented in the trading, with the objective of fostering price transparency and reducing transaction costs.
2. The digital representation of traditional types of collateral, tangibles or intangibles, is integrated with a DLT-based system through a process of asset tokenization. The DLT system serves as a secondary market for these (newly created) non-natively digital assets. In such platforms, different types of asset-backed tokens might be exchanged for fiat currencies or other assets.
3. Natively digital assets could be taken as collateral and liquidated in secondary-market platforms. These marketplaces are established to trade such assets in exchange for fiat currencies or other digital assets (natively or non-natively digital). From a user’s standpoint, they resemble other stock exchange that allow trade in commodities or other financial products.

This broad classification of how DLT-based systems integrate with the secondary markets for collateral is provided to navigate a complex environment where technological advancement and new business models are developed or refined at a fast pace. Presently, secondary markets based on DLT have been emerging within industry-specific initiatives. (See box 7.2 for a few examples.) In this context, DLT-based systems are implemented primarily to improve the accuracy of data on assets, minimize the cost of valuation, streamline operations, and govern transactions among system participants.

Box 7.2: DLT and Secondary Markets

Used cars

In the automotive industry, DLT-based platforms have been progressively implemented to stimulate efficient and transparent secondary markets. DLT is used to store and authenticate the history reports for used cars and to allow potential buyers and sellers to calculate values (for example, carVertical, which operates in several jurisdictions). Other DLT-based platforms help to match supply and demand—for instance, by connecting sellers with car dealers participating in the system. Car dealer, in turn, can retrieve relevant information from official records (for example, Lotblok, which is based in the United States). In a similar vein, U.S.-based Automotive eXchange Platform implemented a blockchain-based platform to list cars for sale and provide access to finance transactions for dealers' customers.

Trade finance

In 2018, the Commodities Intelligence Centre launched Singapore's first physical business-to-business commodity e-trading platform, which is built on blockchain technology. The platform supports traders' access to services such as transaction matching, customs clearance, and payment term selection.

Stock exchange

Stock exchanges represent a point of reference in the context of secondary markets deploying DLT-based solutions. The Australian Securities Exchange, the Japan Exchange Group, Moscow Exchange, NASDAQ, and Santiago Exchange are some of the most notable entities that have implemented or developed DLT-based solutions for secondary-market operations. Most recently, SIX Swiss Exchange in February 2019 started testing a blockchain trading platform in parallel to the existing system. The aim is twofold: to migrate the existing stock exchange to a blockchain platform and to expand the range of assets admitted to trading to include digital assets.

Secondary-market platforms might be implemented to facilitate the transfer of tokens that are digital representations of assets that exist in the real world. The process is known as “asset tokenization” and occurs when the digital representation of assets that are preexisting in the real world is added to a distributed ledger, such as a blockchain.¹²⁰ Through this process, the economic value or rights of the underlying (off-chain) assets is linked or associated with a newly created digital tokens that can be transferred on chain. The economic advantage sought with this process is that assets that are otherwise illiquid can be transferred. Whether these newly created digital assets are apt to serve as collateral, however, is a question that should be addressed cautiously. In this regard, a number of factors should be considered, including the nature of the asset to be put on chain, the economic needs that the process intends to address, the governance structure of the secondary market where tokenized assets are to be transferred, and the legal and economic features of the jurisdiction(s) where tokenization is intended to occur.¹²¹ Tokenizing tangible or intangible assets and then using them as collateral poses a number of significant legal issues explored in a separate guidance note,¹²² in addition to the regulatory implications explored in this work.

The tokenization of financial obligations is an emerging phenomenon that has attracted regulatory attention. For instance, the possibility of tokenizing the entire balance sheet of a banking institution—in principle, allowing for (tokenized) deposits to be used as collateral—has been tested in Switzerland recently. The Swiss Financial Market Supervisory Authority will have the final word on authorizing and supervising this new model of financial institution. Furthermore, the issuance and trading of a debt instrument on a distributed ledger is becoming a reality; in May 2019, the World Bank's new blockchain-operated debt instrument (bond-i) successfully completed a secondary transaction.¹²³ These developments indicate that a debt instrument could be “created, allocated, transferred and managed through its life cycle using distributed ledger technology,” fostering operational efficiency and enhancing regulatory oversight.¹²⁴ In a similar vein, DLT has been implemented in the context of receivables-trading platforms. (See box 7.3.)

Box 7.3: DLT Receivables Platforms

DLTs are increasingly being used as the core infrastructure of receivables finance platforms (DLT receivables platforms). DLT receivables platforms match potential borrowers and lenders and guarantee the security of transactional data by relying on the immutability of DLTs. One example of a DLT receivables platform is Finturi, a Dutch startup. Finturi uses both public permissionless DLT and private permissioned DLT; the latter is used for its operation, while the former is used for settlement of transactions. In Finturi, invoices are converted into tokens for transfer, recording, and storage purposes. In 2019, the company submitted an application for regulatory exemption to the Netherlands Authority for the Financial Markets.

Other examples of DLT platforms supporting receivable financing:

- Acudeen (Philippines) enables banks and other investors to buy accounts receivable from small and medium-size enterprises at a discount. The implementing DLT-based system has been closely monitored by the domestic regulator Bangko Sentral ng Pilipinas.

- INVIOU (Israel) is a platform built on blockchain for open-account financing (HyperLedger). Invoices are inserted in the distributed ledger, allowing for verification and sharing of financial information among the participants of the DLT network. As the primary role of the platform is to facilitate information sharing, the firm ensures compliance with the European General Data Protection Regulation.

Coordination between legal and regulatory provisions is key to establish a conducive environment where a meaningful tokenization process could occur. First, the creation and transfer of legal rights attached to the circulation of their digital representation must have legal grounds. The amendment of existing law might be needed. For instance, in 2019, the Civil Code of the Russian Federation was modified to allow for rights and obligations to be represented in digital forms, in an effort to favor the process of tokenization.¹²⁵ In a similar vein, the State of Illinois in 2020 enacted the Blockchain Technology Act, which grants legal effects to transactions concluded through distributed ledger.¹²⁶ Depending on the legal system, the recognition of rights in digital form might not be sufficient to support the tokenization process; further changes might be needed—for instance, to reduce formalities or coordinate with notarial deeds. Second, as the issuance of tokens representing existing assets or rights might fall within the regulatory perimeter set for financial services (see section 6), secondary markets for the transfer of such assets, including their disposal when used as collateral, should be designed with specific governance requisites and regulatory requirements in view. Only after these aspects are properly taken into account can tokenized assets be used as collateral, and tokenization can integrate with access to credit policies.

7.3 DESIGN AND GOVERNANCE OF SECONDARY MARKET FOR DIGITAL ASSETS

In general, taking digital assets as collateral implies the existence of secondary markets where these assets can be priced and liquidated as they are exchanged for other fiat currencies.

Specific considerations and best practices have been developed to facilitate the emergence of marketplaces where collateral can be liquidated. Wherever tokenized assets are exchanged on secondary markets—either for fiat currencies or for other digital assets—technology-specific considerations should be advanced in order to address design and governance issues.

As illustrated in table 7.1, a DLT secondary market could be designed to allow for the disposal of tokenized assets, to operate tokenless (for instance, to record relevant information on collateral and to facilitate negotiations between buyers and sellers), or to liquidate natively digital assets, such as Bitcoins, which in turn are an integral part of the DLT-based system. Moreover, as the technology stands, DLT may or may not execute all the trading phases, which include receiving information, matching orders, clearing instructions, and settling obligations. On platforms that trade digital assets, for instance, the interaction with DLT has been limited to the moment when transactions are permanently recorded on the ledger.¹²⁷ Even though the World Bank's bond-i deployed DLT throughout the process, settlement occurred off chain, via the SWIFT network.

Table 7.1: DLT Implementation in Secondary Markets for Collateral

| <i>Asset class</i> | <i>Collateral</i> | <i>Architecture</i> | <i>Applications</i> | <i>Progress</i> |
|-------------------------|--|-----------------------|---|------------------|
| Tangible | - Commodities - Consumer goods - Equipment | Tokenization | - Illiquid assets | Uncertain |
| | | | - High-value assets | Proof of concept |
| | | Tokenless | - Supply-chain trade - Business-to-business commerce - Used car | In use |
| Intangible | - Account receivable - Financial assets - Invoices | Tokenization | - Financial instrument | In use |
| | | | - Balance sheet | Beta test |
| | | Tokenless | - Trading receivable | Test |
| | | | - Stock exchange | Test phase |
| Natively digital | - Bitcoin | Tokenization (native) | - Expansion of borrowing base | In use |
| | | | - Payment | Tested |

Depending on the type of secondary market and on the level of integration between collateral and DLT architecture, specific design and governance issues should be taken into account. Of particular relevance are secondary markets where tokens, be they natively or non-natively digital, are transferred and, thus, could serve as collateral. In general terms, these systems pose two fundamental risks: liquidity risk, inasmuch as investors might experience delays in converting their digital assets into cash or cash-equivalent instruments, and the loss of the funds invested in digital assets, which might be treated as unsecured liabilities in the case of insolvency of the platforms.¹²⁸ Moreover, if such platforms are implemented with the participation of regulated financial institutions in view, key aspects concerning the safekeeping and custody of digital assets and the settlement finality of transactions should also be addressed. These aspects are considered below, with specific reference to tokenized DLT architectures.

DESIGN ISSUES

For regulatory purposes, centralized exchanges display significant similarities to traditional (regulated) exchange platforms for financial instruments. The operator of the exchange—often referred to as a crypto-exchange—performs a key role in receiving and matching the orders of buyers and sellers, as well as in transmitting instructions (for clearing) and discharging related obligations (settlement). Furthermore, the exchange operator may act as an intermediary either by introducing buyers and sellers or by actively matching them. It might act as a central counterparty when for each buyer there is only one seller and for each seller there is only one buyer. In centralized structures, without a proper regulatory regime, the risk of conflict of interest is particularly acute. In fact, the platform might trade on its own account or for its clients without disclosing this practice.

Decentralized platforms to trade digital assets work in a different fashion. All the trading phases are performed through the underlying DLT. In other words, the DLT is the exchange. Third parties, like financial intermediaries, are not required, as the entire trading process occurs on chain. Risk toward a central counterparty is, therefore, nonexistent, as the code, per se, represents the trading platform. However, even though the technology is developing at a fast pace, in most secondary markets the time to record multiple transactions is relatively lengthy compared to existing platforms. In addition, because there is no central server, the liquidity and functioning of decentralized secondary market largely depends on the existence of active users.

GOVERNANCE CONSIDERATION

As secondary markets for transfers of assets are implemented to promote sound and inclusive access to credit, the existence of reliable governance is of primary importance. In the context of DLT-based marketplaces, regardless of their level of centralization and irrespective of the assets traded therein, fundamental issues should be addressed. Specifically, the governance structure should do the following: establish clear criteria for admitting sellers and buyers to the platform; define the rules on different trading phases, including the resolution of conflicts; and allocate monitoring responsibilities and functions to detect manipulative practices and illicit activities.¹²⁹

The rules concerning admittance, the trading process, and the prevention of manipulative practices presupposes the existence of a reliable governance framework as well as a certain degree of centralization. For instance, rules defining admission to the platform are critical to bolster investors' confidence, as they ensure that digital assets and underlying obligations (if any) satisfy minimum standards. In a similar vein, a solid governance structure, together with technological solutions, is key to detecting and sanctioning practices aimed at manipulating prices in secondary markets. (See annex B for an illustration of typical manipulation practices that might emerge in unregulated markets.)

The governance structure for trading platforms sustaining secondary markets should clearly allocate roles and responsibilities related to managing the platform. In addition to this general principle, design-specific issues should be addressed. For instance, in centralized trading platforms, given the position of the central counterparty, rules governing conflicts of interest, cyber-risk management, account segregation, and service unbundling are required to promote confidence and liquidity in such markets. With respect to decentralized platforms enabling on-chain trading, the immutability of the distributed ledger renders even more urgent the necessity of centralized oversight and external mechanisms to correct the code without compromising the integrity of the system.

SAFEKEEPING AND RECORDKEEPING

Safekeeping and recordkeeping functions for financial instruments are traditionally performed by a variety of entities—including custodians, registrars, notaries, and central securities depositories. Although the rules vary depending on the jurisdiction, regulated financial institutions and asset managers are typically required to use third-party custodians to safekeep their assets. Hence, those investors might be allowed to invest in digital assets only if (i) the code, per se, is considered a viable substitute for those traditional entities and (ii) the manner in which ownership of digital assets is recorded is considered in line with the regulatory standards defined for financial instruments.¹³⁰ Otherwise, the control over private keys would require the involvement of third parties.

SETTLEMENT FINALITY

In the context of secondary markets for transferring digital assets, post-trade processing is critical for their reliability. To this purpose, a series of essential requirements have been identified by the industry.¹³¹ Among them, the notion of settlement finality deserves special consideration, as it epitomizes the risk related to the introduction of a DLT-based secondary market. Settlement finality is a concept of particular importance for secondary markets, and it is enshrined in international standards elaborated by the International Organization of Securities Commissioners.¹³² Legally defined, settlement finality is the moment at which the transfer of an asset or financial instrument or the discharge of an obligation is irrevocable and unconditional and not susceptible to being unwound following the insolvency or default of the participant.

DLT arrangements are based on a probabilistic settlement achieved over time and dependent on the consensus reached by network participants, rather than on the legally defined concept. In other words, DLT-based settlements imply that, however small, there is always a chance that a transaction will be reversed by the participants, provided that they reach the consensus to change the previously agreed settlement. As a result, the applicable legal framework may not consider the settlement as final. The problem has been noted in European Union, where the applicability of Directive 98/26/EC, known as Settlement Finality Directive, has been doubted.¹³³

Unless there is reasonable certainty that settlement finality can be achieved under the relevant legal and regulatory regimes or through enforceable contractual arrangements, a full integration of DLT in financial transaction is problematic. A possible solution to the problem, absent specific legal rules, could be provided by the governance of the DLT. Network rules, applied and enforced among participants, can identify a single point in time as when the payment or transfer from one party to

another becomes legally effective, in spite of the fact that, from a technological standpoint, settlement via consensus may take place over a period of time.

7.4 THE REGULATORY PERIMETER OF DLT-BASED SECONDARY MARKETS

In the STCR context, whether a DLT-based platform must comply with the regulatory standards depends on three factors. First, as noted with respect to receivables-trading platforms, it should be ascertained whether specific regulatory regimes might apply to digitalized platforms for secondary markets, irrespective of the implementation of DLT. Then the key question is whether the implementation of a distributed ledger system changes the nature of the platform so much that the applicable regulatory regime differs substantially from the one normally applied for secondary markets in that given jurisdiction. (See box 5.5 for an example.)

Second, the rules applicable to secondary-market platforms tend to be intimately related to the regulatory qualification of digital assets provided by domestic authorities. For instance, specific regulatory regimes must be applied when digital assets are classified as “securities” (U.S. Securities Exchange Act), “commodities” (U.S. Commodity Exchange Act), or “financial instruments” (Directive 2014/65/EU, better known as MiFID II). See box 7.4. In such circumstances, dealing in certain types of digital assets might be subject to the same regulatory treatment applicable to dealing in the corresponding type of asset, such as securities.

Finally, the third step is assessing whether a bespoke regulatory regime applies to DLT-based platforms. In jurisdictions implementing a special regulatory regime for DLT-based activities, secondary markets based on distributed ledgers are typically subject to such a regime. In addition, regulators are concerned with the design and governance of secondary markets for digital assets. Centralized exchanges resemble, to a large extent, existing securities exchanges, and their regulation is likely to be based on models already applied in capital markets. Conversely, for decentralized exchanges, specific regulatory approaches might be needed and further developed if the phenomenon grows.

Box 7.4: Regulating the Secondary Market for Digital Assets

European Union

Under EU law, a trading platform (venue) for digital assets that are “financial instruments” under Directive 2014/65/EU (MiFID II) could be classified as (i) a regulated market, (ii) a multilateral trading facility, or (iii) an organized trading facility. In all cases, whether trading venues are registered as regulated markets or multilateral or organized trading facilities, regulatory obligations related to the conduct of business, the monitoring of compliance with market-abuse legislation, capital requirements, organizational requirements, and internal controls apply.

United States

In the United States, the Securities Exchange Commission also adopts a functional approach to crypto-exchanges. The Exchange Act Rule 3b-16 provides a functional test for assessing whether any entity meets the definition of an exchange under section 3(a)(1). An entity that meets the definition of an exchange must register with the commission, unless exempted from registration or subject to a different regulatory regime.

Transactions secured with digital assets are classified as commodity contracts under the Commodity Exchange Act. Thus, the CFTC is tasked with the oversight of online lending platforms that directly offer loans that are backed by digital assets and match and facilitate transactions between borrowers and lenders.

Jurisdictions might opt to extend securities regulation to platforms that serve as secondary markets for digital assets that are not qualified as securities. For instance, this is the case of Hong Kong, where the Securities and Futures Commission issued a detailed policy paper establishing a regulatory regime (and licensing standards) for platforms that do not trade in security tokens. (See box 6.1.)¹³⁴ Interestingly, the commission maintained the separation between securities and non-securities tokens, confirming that it has jurisdiction only on the activities related to former. However, it constructed a regulatory framework—requiring minimal legislative modifications—whereby centralized platforms are subject to licensing and supervisory regimes as long as they trade at least one security token. Fundamental licensing conditions are that the platform (i) offers its services only to professional investors with sufficient knowledge of digital assets, (ii) adopts stringent criteria for the inclusion of digital assets, (iii) implements an external surveillance system to minimize operational risk and detect illicit activities; and (iv) ensures that the risk associated with the custody of virtual assets are covered by an insurance policy.

Such an approach is generally welcomed by the industry. In fact, as noted for a receivables-trading platform in general (see box 7.1), a robust regulatory regime that provides for a clear licensing criteria addresses the adverse-selection issue, whereby operators that want to conduct legitimate business are discouraged by a preponderance of illegitimate activities that are encouraged by lax or nonexistent compliance requirements.

All in all, the coordination of technical design, regulatory regime, and DLT-STCR output engenders specific complexities. An illustration is provided by a recent enforcement case in the United States. Online platforms matching retail borrowers and lenders for purposes of entering into loans backed by digital assets have been found to be in violation of the Commodity Exchange Act, since such activities were conducted by the platform without a license and no exception in the act applied to those transactions.¹³⁵ The exception considered by the CFTC relates to a contract of sale that results in the actual delivery of the commodity within 28 days of executing the contract. The CFTC considered this exception inapplicable in this case, and a license was required. (See box 7.5.)

Box 7.5: CFTC Exception and Platforms for Loans Backed by Digital Assets

In a margin transaction where the borrower deposits a percentage of the value of the digital asset at the platform and the remaining percentage is borrowed from a lender, the platform purchases the digital asset from the market. The purchased digital asset (that is, its private key) remains under the platform's control to secure the repayment of the loan or until a relevant event triggers the automatic liquidation of the collateral. Since the private key to access the collateral is controlled by the platform, the actual delivery exception is inapplicable because the actual delivery exception requires the transfer of possession or control.

The fact that the platform records the purchaser (that is, the borrower) as the owner is insufficient, since this recording is tantamount to constructive delivery only. Even though the platform treats the transaction as a secured loan, the substance is considerably similar to a contract for future delivery regulated by the CFTC, as the borrower does not receive delivery of its digital asset.



8 CONCLUSION

An effective implementation of DLT-STCR outputs requires coordination with a variety of regulatory requirements. Applicable regimes encompass rules aimed at promoting market integrity—protecting customers and ensuring the fair functioning of markets—as well as prudential regulation aimed at preserving the safety and soundness of financial markets. In addition, when digital assets qualify as financial instruments (or securities), their transfer, custody, and intermediation are subject to domestic capital-markets laws. Consequently, secondary-market platforms used to transfer digital assets might also be regulated as other trading venues.

Digital assets that do not fall into the domestic definition of securities might be subject to different regulatory standards. Platforms facilitating or offering loans backed by natively digital assets—such as Bitcoin (commonly not qualified as securities)—might be subject to commodities-trading rules. Activities related to offering and trading stablecoins might be subject to other rules, such as those governing payment systems for banking activities. More generally, bespoke regulatory regimes might apply whenever DLT is implemented in financial activities.

Financial regulation intersects with the development of DLT-STCR by regulating how creditors should deal with digital assets. When regulated financial institutions take a digital asset as collateral or interact with DLT platforms to dispose of such an asset, compliance with disclosure requirements and prudential requirements must be ensured. Digital assets, especially if subject to erratic price fluctuation or when traded in unregulated markets, do not represent an eligible credit protection for the calculation of capital requirements. Hence, the use of digital assets as collateral and the participation in DLT-based platforms is not necessarily incentivized.

The existing regulatory framework should not be intended or approached as an impediment to the development of DLT-STCR outputs. By and large, the cautionary approach encountered, as new products have been developed, is more related to the uses (and misuses) of novel technological advancements than the technology, per se. Hence, the emergence of a sound regulatory environment governing nascent technology is an essential condition for the integration of digital assets and DLT in the financial system and, thus, their use for STCR purposes.

Structuring digital assets in a fashion that addresses their inherent risks is primed to open new avenues for financial-inclusion policies. A case in point is offered by digital currencies offered by central banks, which are poised to change substantial elements of existing credit ecosystems and thus affect DLT-STCR outputs. In the current regulatory and legal landscape, coordination with regulatory approaches might be achieved in different fashions. Secondary-market platforms and lenders implementing distributed ledgers might coordinate with regulatory initiatives implementing DLT to facilitate regulatory-compliance, risk-management, and monitoring functions. More broadly, technological advancements should be understood as a keystone to further the ongoing efforts that promote inclusive access to credit in a safe and sound financial system.

ANNEX A

TOKEN CREATION AND DISTRIBUTION METHODS

Airdrop

An airdrop is a distribution of a token to numerous wallet addresses. It might occur for free, or it might be linked to a distribution event, such as a fork or an ICO. Using airdrops for free distributions is considered an effective and common marketing strategy devised to gain attention and new followers. The result, in fact, is a larger user base and a wide disbursement of token.

Forks

A fork (or forking) refers to the update of a DLT protocol or code. A fork can be hard or soft. Any protocol change or software upgrade that makes old rules obsolete and uses the new code base as the driving force is called a hard fork. A hard fork is permanent and requires all nodes and users to upgrade to the latest version of the protocol software/wallets. Soft forks are backward-compatible changes in the protocol in which old nodes recognize the new node as valid. These forks require the majority of users to upgrade in order to enforce the new rules.

Forking can be used to generate a new token, also referred to as forked coin. In these cases, a new copy of the existing ledgers is made, allowing developers to make changes and create a new digital asset. Hard forks generate a new token that is incompatible with the original one, while a soft fork generates a version compatible with the existing token.

Initial coin offering

An initial coin offering is often compared to an initial public offering, as it is intended to raise funds to support various entrepreneurial endeavors. Interested investors buy in to the offering, either with fiat currency or with preexisting digital tokens. In exchange for their support, investors receive a token specific to the ICO. Investors might purchase tokens with the expectation of a profit.

Presale

A presale, or pre-ICO, refers to the process that allows investors to buy tokens before an ICO has been launched. It generally targets larger investors, such as angel investors supporting start-up businesses. The investors that participate in the presale typically receive discounts as well as additional bonuses, such as free access to the service offered by the issuer.

Mining

The miner delivers the processing power to create new blocks of content in the ledger. Each time a transaction is made, a miner is responsible for ensuring the authenticity of information in the transaction and updating the ledger with the transaction. Tokens represent an incentive, or a reward, to perform such tasks, which, in turn, ensure the reliability of the ledger.

ANNEX B

MARKET MANIPULATION AND SECONDARY MARKETS

Anonymity, low liquidity, and the lack of regulation render platforms supporting the trading of digital assets particularly prone to manipulation practices. For instance, concentration of ownership might easily emerge when a new crypto-asset is distributed or starts to be traded in a secondary market. In this context, investors retaining large amounts of crypto-assets—often referred to as whales—are in the position of controlling their prices. If these issues are not addressed, the ability of financial institutions to accept digital assets as collateral would be undermined. In fact, as prices become unreliable, confidence in the secondary markets would be limited. The risk-mitigation effect sought by collateral could not be achieved.

As regulatory solutions might be implemented, to a different extent, in different jurisdictions, more and more governance approaches and technological solutions have been developed to instill confidence in secondary markets. These approaches are typically designed to address manipulative practices that have been common in stock exchanges and other trading venues (see box B.1) and have been observed in unregulated secondary markets for digital assets.

Box B.1: Market-Manipulation Practices

Front-running (or tailgating): Buying or selling an asset based on the non-public knowledge that a large trade will influence the price of the traded asset.

Pump-and-dump: Creating a sudden price rise to provoke outsiders to invest and then exiting with a profit

Shilling: Artificially generating false hype and excitement for a given financial product.

Spoofing: Setting large buy or sell orders that one does not intend to fill in order to affect market sentiment

Wash trading (or daisy-chain): Executing buy-and-sell orders among affiliates to give the illusion of market activity to attract more investors.

These practices are prohibited in regulated stock exchanges or, in general, when trading in financial instruments. However, absent an adequate regulatory regime and a reliable governance structure, the adoption of surveillance mechanisms able to detect manipulation practices is required to develop reliable secondary markets for digital assets.

REFERENCES

- 1 In this respect, the United Nations Commission on International Trade Law (UNCITRAL) has devoted a notable chapter to the connection between secured-transactions law and prudential regulation in its practice guide on the Model Law on Secured Transactions. See chapter 3 of Practice Guide to the UNCITRAL Model Law on Secured Transactions (UNCITRAL, 2019). The background study supporting that document is provided in Giuliano G. Castellano and Marek Dubovec, *Global Regulatory Standards and Secured Transactions Law Reforms: At the Crossroad between Access to Credit and Financial Stability*, 41 *FORDHAM INT'L LJ* 531 (2018) [hereinafter Castellano and Dubovec, *Global Regulatory Standards and Secured Transactions Law Reforms*].
- 2 *Secured Transactions, Collateral Registries and Movable Asset-Based Financing* (IFC, 2019) [hereinafter *STCR Knowledge Guide*], available at <http://documents.worldbank.org/curated/pt/193261570112901451/pdf/Secured-Transactions-Collateral-Registries-and-Movable-Asset-Based-Financing.pdf>
- 3 A detailed analysis of the legal implication of taking digital assets as collateral and the integration of DLT in collateral registry is provided in Marek Dubovec, *Collateral Registry, Secured Transactions Law and Practice* (IFC, 2020) [hereinafter *DLT-STCR Law and Registry Note*]. For a primer on the underlying technology, see Andrea Tosato, *Distributed Ledger Technology and Secured Transactions Framework* (IFC, 2020) [hereinafter *DLT-STCR Technology Note*].
- 4 *DLT-STCR Law and Registry Note*, supra note 3, at 7–17.
- 5 The applicability of existing regulatory regimes for digital assets depends largely on definitions adopted for various regulated activities, such as securities, financial instruments, and investments. Yet these definitions are fluid and vary depending on the jurisdiction considered; see Giuliano G. Castellano, *Towards a General Framework for a Common Definition of “Securities”*: *Financial Markets Regulation in Multilingual Contexts*, 17 *UNIFORM LAW REVIEW* (2012) [hereinafter Castellano, *Towards a General Framework for a Definition of Securities*].
- 6 On the coordination with other laws, see *DLT-STCR Law and Registry Note*, supra note 3, at 18–40. Details on the connection with financial regulation are offered in this document.
- 7 *Group of Twenty (G20) Osaka Leaders’ Declaration*, (June 28–29, 2019), available at <https://g20.org/en/g20/Documents/2019-Japan-G20%20Osaka%20Leaders%20Declaration.pdf>
- 8 Concerns over the systemic risks posed by stablecoins were expressed by a working group established by the Group of Seven (G7); see *Investigating the Impact of Global Stablecoins*, G7 Working Group on Stablecoins (October 2019) [hereinafter *G7 Working Group on Stablecoins*, October 2019], available at <https://www.bis.org/cpmi/publ/d187.pdf>. See also *Addressing the Regulatory, Supervisory and Oversight Challenges Raised by “Global Stablecoin” Arrangements: Consultative Document* (Financial Stability Board, April 2020), available at <https://www.fsb.org/2020/04/addressing-the-regulatory-supervisory-and-oversight-challenges-raised-by-global-stablecoin-arrangements-consultative-document/>
- 9 *Decentralised Financial Technologies: Report on Financial Stability, Regulatory and Governance Implications* (Financial Stability Board [FSB], June 2019) [hereinafter as *FSB Report*, June 2019], available at <https://www.fsb.org/wp-content/uploads/P060619.pdf>; and *Crypto-assets: Work Underway, Regulatory Approaches and Potential Gaps* (FSB, May 2019), available at <https://www.fsb.org/wp-content/uploads/P310519.pdf>.
- 10 See *Discussion Paper on Designing a Prudential Treatment for Crypto-assets* (Basel Committee on Banking Supervision [BCBS], December 2019) [hereinafter *BCBS Discussion Paper on Crypto-assets*], available at <https://www.bis.org/bcbs/publ/d490.pdf>. Such a document is intended to open a wider public consultation on the prudential treatment of digital assets; it reflects the general approach developed by the BCBS in this area, as sketched in the *Statement on Crypto-assets* (BCBS, March 13, 2019) [hereinafter *BCBS Statement on Crypto-assets*], available at https://www.bis.org/publ/bcbs_n121.htm
- 11 *Bali Fintech Agenda* (International Monetary Fund and the World Bank Group, October 2018), available at <https://www.imf.org/en/News/Articles/2018/10/11/pr18388-the-bali-fintech-agenda>
- 12 *FSB Report*, June 2019, supra note 9, at 11.
- 13 *Joint Research Project on Distributed Ledger Technologies: Synchronised Cross-border Payments* (European Central Bank [ECB] and Bank of Japan, June 4, 2019), available at https://www.ecb.europa.eu/paym/intro/publications/pdf/ecb.miptopical190604_1_en.pdf?19a53d7118406fc74c32d7ab2565052d
- 14 *Central Bank Digital Currencies* (Bank for International Settlements [BIS], Committee on Payments and Market Infrastructures and Markets Committee, March 2018), available at <https://www.bis.org/cpmi/publ/d174.pdf>.
- 15 See, for example, *Bali Fintech Agenda*, supra note 11, at 25.
- 16 The history of finance is characterized by a series of financial innovations consisting of new products, organizational structures, and processes that improve the allocation of capital and the management of risk; see E. Avgouleas, “Regulating Financial Innovation” in *The Oxford Handbook of Financial Regulation* (N. Moloney et al., eds, 2015).
- 17 Promoting the development of socially beneficial activities while addressing new potential risk is a primary function of virtually any regulatory regime. In the context of FinTech and financial regulation, the tension between technology, financial innovation, and regulatory rules is particularly salient; see Chris Brummer and Yesha Yadav, “Fintech and the Innovation Trilemma,” 107 *GEORGETOWN LAW JOURNAL* 235, 264 (2019), and Rory Van Loo “Making Innovation More Competitive: The Case of Fintech,” 65 *UCLA L. Rev.* 232 (2018).
- 18 *Distributed Ledger Technology and Digital Assets: Policy and Regulatory Challenges in Asia* (Asian Development Bank, June 2019) [hereinafter *ADB Report*], available at <http://dx.doi.org/10.22617/TCS190205-2>.
- 19 For an analysis of key regulatory challenges associated with ICOs, see Dirk A. Zetsche, Ross P. Buckley, Douglas W. Arner, and Linus Föhr, “The ICO Gold Rush: It’s a Scam, It’s a Bubble, It’s a Super Challenge for Regulators,” 60 *HARVARD INTERNATIONAL LAW REVIEW* 267 (2019).
- 20 The intersection between DLT-STCR outputs and regulatory regimes concerned with AML and CFT are considered in greater detail in section 3.1.
- 21 See *Guidance for a Risk-Based Approach to Virtual Assets and Virtual Asset Service Providers* (Financial Action Task Force [FATF], 2019).
- 22 On the system-wide risk of new technologies in finance, see Saule T. Omarova, “New Tech v. New Deal: Fintech as a Systemic Phenomenon,” 36

YALE JOURNAL ON REG., 735 (2019), and Doulgas W. Arner, Janos Barberis, and Ross P. Buckley, “The Evolution of FinTech: A New Post-Crisis Paradigm?” 47 GEO. J. INT’L L. 1271 (2016).

23 On stablecoins, see section 6.2 *infra*.

24 As the governor of the Bank of England noted, “Libra, if it achieves its ambitions, would be systemically important. As such it would have to meet the highest standards of prudential regulation and consumer protection.” Mark Carney, *Enable, Empower, Ensure: A New Finance for the New Economy* (speech, June 20, 2019), available at <https://www.bankofengland.co.uk/-/media/boe/files/speech/2019/enable-empower-ensure-a-new-finance-for-the-new-economy-speech-by-mark-carney>. On the inability of current regulatory frameworks (domestic and international) to govern digital currencies such as Libra, see Katharina Pistor, “Written Statement of Proposed Testimony for the Hearing Entitled ‘Examining Facebook’s Proposed Cryptocurrency and Its Impact on Consumers, Investors, and the American Financial System’ before the Committee on Financial Services, U.S. House of Representatives, 17 July 2019,” available at

<https://financialservices.house.gov/uploadedfiles/hhrg-116-ba00-wstate-pistork-20190717.pdf>

25 The connection between Bitcoin and illicit activities emerges vividly from the Europol report *Drugs and the Darknet: Perspectives for Enforcement, Research and Policy* (Europol, 2017), available at <https://www.europol.europa.eu/publications-documents/drugs-and-darknet-perspectives-for-enforcement-research-and-policy>.

26 On September 4, 2017, seven Chinese central government regulators—the People’s Bank of China, Cyberspace Administration of China, Ministry of Industry and Information Technology, State Administration for Industry and Commerce, China Banking Regulatory Commission, China Securities Regulatory Commission, and China Insurance Regulatory Commission—jointly issued the “Announcement on Preventing Financial Risks from Initial Coin Offerings (ICO Rules).”

27 Risk-Based and Technology-Neutral: The HKMA’s Supervisory Approach to Financial Technology (Fintech) (Hong Kong Monetary Authority [HKMA], March 21, 2016). For a comprehensive comparative analysis of different regulatory approaches adopted in key Asian jurisdictions, see ADB Report, *supra* note 18.

29 See Royal Decree on the Digital Asset Businesses B.E. 2561. English translation is available at https://www.sec.or.th/EN/Documents/EnforcementIntroduction/digitalasset_decree_2561_EN.pdf

29 ADB Report, *supra* note 18, at 28.

30 Advice on Initial Coin Offerings and Crypto-Assets (European Securities and Markets Authority [ESMA], January 9, 2019) [hereinafter ESMA Advice], available at https://www.esma.europa.eu/sites/default/files/library/esma50-157-1391_crypto_advice.pdf, and Report with Advice for the European Commission on Crypto-assets (European Banking Authority [EBA], January 9, 2019) [hereinafter EBA Report], available at <https://eba.europa.eu/sites/default/documents/files/documents/10180/2545547/67493daa-85a8-4429-aa91-e9a5ed880684/EBA%20Report%20on%20crypto%20assets.pdf?retry=1>

31 Full disclosure of information and the principle of acting in the client’s best interest are bedrocks of modern financial regulation. With reference to securities regulation in particular, these principles are enshrined in the International Organization of Securities Commissions’ *Objectives and Principles of Securities Regulation* (May 2017).

32 Ross Cranston et al., *Principles of Banking Law* 30 (3rd ed. 2018).

33 Castellano and Dubovec, *Global Regulatory Standards and Secured Transactions Law Reforms*, *supra* note 1 at 565, indicating that, unlike secured-transactions law, which aims at facilitating private negotiations, prudential regulation is concerned with the regulating banks “from ‘within’ in order to limit the level of risk taken by a particular bank as well as the risk accumulated in the entire banking system.”

34 The Third Basel Accord (Basel III) was finalized in 2017 and has been progressively implemented across the world.

35 On the prudential regulatory treatment of DLT-STCR outputs, see section 4 *infra*.

36 The G20 Osaka Leaders’ Declaration indicated that risks in relation to digital assets should be monitored closely and committed to application of AML/CFT standards to a broad range of assets, referred to as “virtual assets” and related activities (for the definition of virtual assets, see note 47 *infra* and accompanying text); G20 Osaka Leaders’ Declaration, *supra* note 7, at paragraph 17.

37 Early Lessons on Regulatory Innovations to Enable Inclusive FinTech: Innovation Offices, Regulatory Sandboxes, and RegTech (United Nations Secretary-General’s Special Advocate for Inclusive Finance for Development Fintech Working Group and Cambridge Centre for Alternative Finance, 2019), available at https://www.unsgsa.org/files/2915/5016/4448/Early_Lessons_on_Regulatory_Innovations_to_Enable_Inclusive_FinTech.pdf.

38 Giuliano G. Castellano and Marek Dubovec, “Bridging the Gap: The Regulatory Dimension of Secured Transactions Law Reforms,” 22 UNIF LAW REV 663–692, 685–692 (2017) [hereinafter Castellano and Dubovec, *Bridging the Gap*].

39 For a complete analysis of this issues, see Maria Teresa Chimienti, Urszula Kochanska, and Andrea Pinna, “Understanding the Crypto-asset Phenomenon, Its Risks and Measurement Issues,” ECB ECONOMIC BULLETIN, Issue 5/2019 (August 2019), available at https://www.ecb.europa.eu/pub/economic-bulletin/articles/2019/html/ecb.ebart201905_03~c83aeaa44c.en.html#toc1

40 International Standards on Combating Money Laundering and the Financing of Terrorism and Proliferation: The FATF Recommendations (FATF, Paris, France, 2012–19) [hereinafter FATF Recommendations], available at

<https://www.fatf-gafi.org/media/fatf/documents/recommendations/pdfs/FATF%20Recommendations%202012.pdf>

41 *Id.* at 126.

42 *Id.* at 127.

43 Bank Secrecy Act Regulations, 31 CFR § 1010.100(ff)(5)(i)(A).

44 Application of FinCEN’s Regulations to Certain Business Models Involving Convertible Virtual Currencies, Guidance FIN-2019-G001 (Financial Crimes Enforcement Network, May 9, 2019), available at <https://www.fincen.gov/sites/default/files/2019-05/FinCEN%20Guidance%20CVC%20FINAL%20508.pdf>

45 FATF defines financial institution “as any natural or legal person who conducts as a business one or more of several specified activities or operations for or on behalf of a customer,” including lending, extending financial leases, and taking deposits; see FATF Recommendations, *supra* note 40, at 119.

46 DLT-STCR Law and Registry Note, *supra* note 3, at 7.

47 Guidance for a Risk-Based Approach to Virtual Assets and Virtual Asset Service Providers (FATF, 2019), available at <https://www.fatf-gafi.org/media/fatf/documents/recommendations/RBA-VA-VASPs.pdf>

48 For an example of this mechanism, see Marek Dobovec, “UCC Article 9 Registration System for Latin America,” 28 Arizona Journal of

International and Comparative Law (2011).

49 For an overview of different regimes attributing public-policy functions to registries and perfection rules, see Giuliano G. Castellano, “Reforming Non-Possessory Secured Transactions Laws: A New Strategy?” 78 *THE MODERN LAW REVIEW* (2015).

50 *Id.* at 14.

51 See FSB Report, June 2019, *supra* note 9, at 6.

52 *Id.* at 8.

53 See, generally, BCBS Discussion Paper on Crypto-assets, *supra* note 10, reflecting the ongoing work of the BCBS as indicated in the BCBS Statement on Crypto-assets, *supra* note 10.

54 The BCBS indicates that crypto-assets are characterized by a virtual or digital nature, the deployment of cryptography, and the use of DLT; see BCBS Discussion Paper on Crypto-assets, *supra* note 10, at 5.

55 Identifying core features and economic functions of digital assets is common to any regulatory regime; on the regulatory classification of digital assets, see section 6.1 *infra*.

56 These assets are known as stablecoins; see section 6.2.

57 BCBS Discussion Paper on Crypto-assets, *supra* note 10, at 8.

58 *Id.*

59 *Id.*

60 See EBA Report, *supra* note 30, at paragraph 63.

61 “Dear CEO” Letter (Prudential Regulation Authority, June 2018), available at <https://www.bankofengland.co.uk/-/media/boe/files/prudential-regulation/letter/2018/existing-or-planned-exposure-to-crypto-assets.pdf>.

62 “Crypto-Assets: Implications for Financial Stability, Monetary Policy, and Payments and Market Infrastructures” (ECB) at 24, available at <https://www.ecb.europa.eu/pub/pdf/scpops/ecb.op223~3ce14e986c.en.pdf>.

63 *Id.* at 23.

64 *Id.* at 25.

65 For a comparison of definitions provided under domestic laws and international standards, see Castellano, Towards a General Framework for a Definition of Securities, *supra* note 5, at 477–79.

66 Permissionless DLT-based systems do not require a gatekeeper to regulate access to the network. Hence, absent any trusted relationships between parties, tokens represent an incentive, or a reward, for creating the public record, and they ensure the reliability of the ledger.

67 ECB Crypto Assets, *supra* note at 7. For a comparative analysis of how different crypto-assets are classified in different jurisdictions, see Apolline Blandin, Ann Sofie Cloots, Hatim Hussain, Michel Rauchs, Rasheed Saleuddin, Jason Grant Allen, Bryan Zhang, and Katherine Cloud, Global Cryptoasset Regulatory Landscape Study (Cambridge Centre for Alternative Finance, April 16, 2019) [hereinafter Global Crypto-Asset Study] at 35.

68 In respect to the regime applicable for collateralized transactions under the Basel Capital Accords and related prudential concerns, see Castellano and Dubovec, Global Regulatory Standards and Secured Transactions Law Reforms, *supra* note 1, at 567.

69 According to amended Section 224, electronic networks and databases, including “distributed electronic networks or databases” are admissible in evidence and shall be accepted for all other purposes “to the same extent as an original paper record of the same information would have been,” provided that the information can be converted into clearly legible paper form within a reasonable time upon request of any person entitled to conduct inspections; see 8 Del. C. 1953, § 224.

70 Raphael Auer, Embedded Supervision: How to Build Regulation into Blockchain Finance, BIS Working Papers No. 811 (BIS, September 16, 2019), available at <https://www.bis.org/publ/work811.pdf>.

71 See, in particular, the Bali Fintech Agenda, *supra* note 11.

72 See STCR Knowledge Guide, *supra* note 2, at 30 *et seq.*; see also Castellano and Dubovec, Global Regulatory Standards and Secured Transactions Law Reforms, *supra* note 1, at 539–40.

73 Digital and Digitized Assets: Federal and State Jurisdictional Issues (American Bar Association, 2019), at 24–26 [hereinafter ABA Report on Digital Assets], available at

https://www.americanbar.org/content/dam/aba/administrative/business_law/buslaw/committees/CL620000pub/digital_assets.pdf

74 A classification across EU jurisdictions is provided in the ESMA Advice, *supra* note 30, at annex 1.

75 See DLT-STCR Technology Note, *supra* note 3, at 5.

76 Guidelines for Enquiries Regarding the Regulatory Framework for Initial Coin Offerings (ICOs) (Financial Market Supervisory Authority [FINMA], 2018) [hereinafter FINMA Guidelines], at 3, available at <https://www.finma.ch/en/news/2018/02/20180216-mm-ico-wegleitung/>.

77 Retail Commodity Transactions Involving Virtual Currency, 82 Fed. Reg. 60, 337-338 (proposed Dec. 15, 2017) (interpreting 17 C.F.R. pt. 1).

78 See, for example, SEC v. Shavers, No. 4:13-CV-416, 2014 WL 4652121.

79 See DLT-STCR Technology Note, *supra* note 3, at 23.

80 Cryptoassets Taskforce: Final Report (HM Treasury, Financial Conduct Authority, and Bank of England, October 2018), available at https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/752070/cryptoassets_taskforce_final_report_final_web.pdf

81 FINMA Guidelines, *supra* note 76, at 3.

82 Report of Investigation Pursuant to Section 21(A) of the Securities Exchange Act of 1934: The DAO, Securities Act Release No. 81207 (Securities and Exchange Commission, 2017), at 11, available at <https://www.sec.gov/litigation/investreport/34-81207.pdf>; EBA Report *supra* note 30, at 12.

83 See Castellano, Towards a General Framework for a Definition of Securities, *supra* note 5, at 461 *et seq.*

84 *Id.* at 480–81.

85 The European Securities and Markets Authority noted that member states define the term financial instrument differently, thus creating regulatory challenges for digital assets; ESMA Advice, *supra* note 30, at 5.

86 The test takes its name from a landmark case in the United States: *Securities and Exchange Commission v. W. J. Howey Co.*, 328 U.S. 293 (1946).

87 For a description of the functioning of these assets, see DLT-STCR Technology Note, *supra* note 3, at 22–25.

88 FINMA Guidelines, *supra* note 76, at 3.

89 For a comment on this position, see James J Park, When Are Tokens Securities? Some Questions from the Perplexed, Law-Econ Research Paper

No. 18-13 (UCLA School of Law, December 10, 2018).

90 See section 6.3 *infra*.

90-A Recommendations on global Stablecoins will be finalized once the consultation process has been completed. On the initiatives in this context see *supra* note 8.

91 See Dirk A. Zetzsche, Ross P. Buckley, and Douglas W. Arner, “Regulating LIBRA: The Transformative Potential of Facebook’s Cryptocurrency and Possible Regulatory Responses,” UNIVERSITY OF NEW SOUTH WALES LAW RESEARCH SERIES at 6 (July 11, 2019) (noting the similarity with Kenya’s M-Pesa).

92 G7 Working Group on Stablecoins, October 2019, *supra* note 8, at 2.

93 Supplement to the Guidelines for Enquiries Regarding the Regulatory Framework for Initial Coin Offerings (ICOs) (FINMA, September 11, 2019), available at <https://www.finma.ch/en/news/2019/09/20190911-mm-stable-coins/>.

94 *Id.* at 3.

95 In addition, regulation on collective investment schemes could apply; see *id.* at 6.

96 See *supra* section 4.2 on credit, liquidity, and market risk for digital assets. For an illustration on how capital charges are calculated, see Castellano and Dubovec, Bridging the Gap, *supra* note 38, at 671–73.

97 Basel III, paragraph 95.

98 Basel III, paragraph 295.

99 Castellano and Dubovec, Bridging the Gap, *supra* note 38, at 690.

100 BCBS Discussion Paper on Crypto-assets, *supra* note 10, at 5.

101 Basel III, paragraph 295.

102 Basel III, paragraph 296.

103 See, generally, *supra* note 62 and accompanying text.

104 BCBS Discussion Paper on Crypto-assets, *supra* note 10, at 11.

105 See, for example, Project Stella, *supra* note 13.

106 Mark Carney, The Growing Challenges for Monetary Policy in the Current International Monetary and Financial System (speech, August 23, 2019), available at <https://www.bankofengland.co.uk/-/media/boe/files/speech/2019/the-growing-challenges-for-monetary-policy-speech-by-mark-carney.pdf>.

107 Inthanon-LionRock: Leveraging Distributed Ledger Technology to Increase Efficiency in Cross-Border Payments (Bank of Thailand and Hong Kong Market Authority, January 2020), available at

https://www.hkma.gov.hk/media/eng/doc/key-functions/financial-infrastructure/Report_on_Project_Inthanon-LionRock.pdf

108 A digital version of the Bahamian dollar was introduced in December 2019; see Project Sand Dollar: A Bahamas Payments System Modernisation Initiative (Central Bank of the Bahamas, December 24, 2019), available at

<https://www.centralbankbahamas.com/download/022598600.pdf>

109 “ECCB to Issue World’s First Blockchain-based Digital Currency” (Eastern Caribbean Central Bank, March 2019), available at

<https://www.eccb-centralbank.org/news/view/eccb-to-issue-worlds-first-blockchain-based-digital-currency>

110 For an overview of current projects and existing challenges, see Christian Barontini and Henry Holden, Proceeding with Caution: A Survey on Central Bank Digital Currency, BIS Working Papers No. 101 (BIS, January 2019), available at <https://www.bis.org/publ/bppdf/bispap101.pdf>.

111 According to a BIS survey, emerging economies appears to be keener to issue a general-purpose CBDC than advanced economies; see Codruta Boar, Henry Holden, and Amber Wadsworth, Impending Arrival: A Sequel to the Survey on Central Bank Digital Currency, BIS Working Papers No. 107 (BIS, January 2020), available at <https://www.bis.org/publ/bppdf/bispap107.pdf>. For an overview of CBDCs see *supra* note 14; see also Raphael Auer and Rainer Boehme, The Technology of Retail Central Bank Digital Currency, BIS Quarterly Review (BIS, March 2020), available at https://www.bis.org/publ/qtrpdf/r_qt2003j.htm

112 The Riksbank’s E-krona Project: Report 2 (Sveriges Riksbank, October 2018), available at

<https://www.riksbank.se/globalassets/media/rapporter/e-krona/2018/the-riksbanks-e-krona-project-report-2.pdf>

113 El BCU presentó un plan piloto para la emisión de billetes digitales (press release, November 3, 2017), available at https://www.bcu.gub.uy/Comunicaciones/Paginas/Billete_Digital_Piloto.aspx.

114 For an analysis of this established understanding of money creation in the context of capital regulation, see Castellano and Dubovec, Giuliano G. Castellano & Marek Dubovec, Credit Creation: Reconciling Legal and Regulatory Incentives, 81 Law and Contemporary Problems 63-85 (2018).

115 For a summary in English, see Report of the Study Group on Legal Issues Regarding Central Bank Digital Currency (Study Group on Legal Issues Regarding Central Bank Digital Currency, Bank of Japan, September 27, 2019), available at

http://www.boj.or.jp/en/announcements/release_2019/re190927b.pdf

116 M. Amamiya, Should the Bank of Japan Issue a Digital Currency? (speech at a Reuters Newsmaker Event in Tokyo, July 5, 2019), at 9; transcript translation available at <https://www.bis.org/review/r190712h.pdf>.

117 Mu Changchun, deputy director of the Payment and Settlement Department, People’s Bank of China, The Practice of Central Bank Legal Digital Currency (speech at China Finance 40 Yichun Forum, August 2019, in Chinese), available at

<https://www.chainnews.com/articles/761536251153.htm> Also, see Reuters, “China’s Sovereign Digital Currency Is ‘Almost Ready’: PBOC Official” (August 2019), available at

<https://www.reuters.com/article/us-china-cryptocurrency-cenbank/chinas-sovereign-digital-currency-is-almost-ready-pboc-official-idUSKCN1V20RD>

118 Basel III, paragraph 295.

119 DLT-STCR Law and Registry Note, *supra* note 3.

120 In principle, almost any asset can be tokenized; see Garrick Hileman and Michel Rauchs, Global Blockchain Benchmarking Study (Cambridge Centre for Alternative Finance, 2017), 64.

121 It has been noted that a meaningful application of DLT-enabled solutions requires a “solid business rationale” for the implementation of DLT to solve specific business issues; a “technical feasibility assessment” proving the advantages posed by DLT compared to other technological solutions; and an “economic rationale” that justifies the transition to a tokenized system; see The Tokenisation of Assets and Potential Implications for Financial

Markets (Organisation for Economic Co-operation and Development, 2020) at 21–22.

122 See DLT-STCR Law and Registry Note, *supra* note 3. Given that tokenized assets are only a digital representation of an asset that is off chain, it is sufficient to note that legal rights might not be created or transferred by the DLT, *per se*.

123 “World Bank and CBA Partner to Enable Secondary Bond Trading Recorded on Blockchain” (press release, World Bank Group, May 15, 2019), available at <https://www.worldbank.org/en/news/press-release/2019/05/15/world-bank-and-cba-partner-to-enable-secondary-bond-trading-recorded-on-blockchain>.

124 *Id.*

125 See Federal Law of March 18, 2019, No. 34-ΦЗ, “On Amendments to Parts One, Two and Article 1124 of Part Three of the Civil Code of the Russian Federation,” introducing the concept of “digital right” as a keystone of a larger package of reforms to support the Russian digital economy.

126 Public Act 101-0514, Blockchain Technology Act. Similar acts have been enacted in United States; their scope and applications might vary. On Delaware, see *supra* note 69 and accompanying text.

127 As illustrated below, the legal settlement of the transactions and its record in the distributed ledger might not be the same moment; see settlement finality *infra*.

128 On the issues related to digital assets and insolvency, see DLT-STCR Law and Registry Note, *supra* note 3, section 2.13. See also Dan Awrey and Kristin van Zwieten, “The Shadow Payment System,” 43 *J. Corp. L.* 775, 798.

129 These principles are particularly relevant in the context of secondary markets for cryptocurrencies and precisely noted in Syren Johnstone, *Requisites for Development of a Regulated Secondary Market in Digital Assets*, Working Paper No. 33 (Asian Institute of International Financial Law, 2019).

130 In this regard, it has been noted that to overcome mandatory intermediation and implement a truly disintermediated approach, a regulatory intervention is needed. Such an intervention should take into account the risks (as well as the benefits) of a disintermediated structure; see Charles W. Mooney, “Global Standards for Securities Holding Infrastructures: A Soft Law/Fintech Model For Reform,” 40 *Mich. J. Int. Law* 531 (2019).

131 Guiding Principles for the Post-Trade Processing of Tokenized Securities (Depository Trust and Clearing Corporation, March 2019), available at <http://www.dtcc.com/news/2019/march/13/dtcc-outlines-guiding-principles-for-post-trade-processing-of-tokenized-securities>.

132 Principles for Financial Market Infrastructures (BIS and International Organization of Securities Commissions, April 2012), available at <https://www.bis.org/cpmi/publ/d101a.pdf>.

133 ESMA Advice, *supra* note 30, at 33.

134 Position Paper: Regulation of Virtual Asset Trading Platforms (Securities and Futures Commission, November 6, 2019).

135 *In re BFXNA INC. d/b/a BITFINEX*, CFTC Docket No. 16-19 (June 2, 2016).



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