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Consideration on better tokenization practices and regulations concerning investor protection

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Welcome to edition 51 of the Capco Institute Journal of Financial Transformation.

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Thank you to all our contributors and thank you for reading.

Lance Levy, **Capco CEO**

CONSIDERATION ON BETTER TOKENIZATION PRACTICES AND REGULATIONS CONCERNING INVESTOR PROTECTION

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ABSTRACT

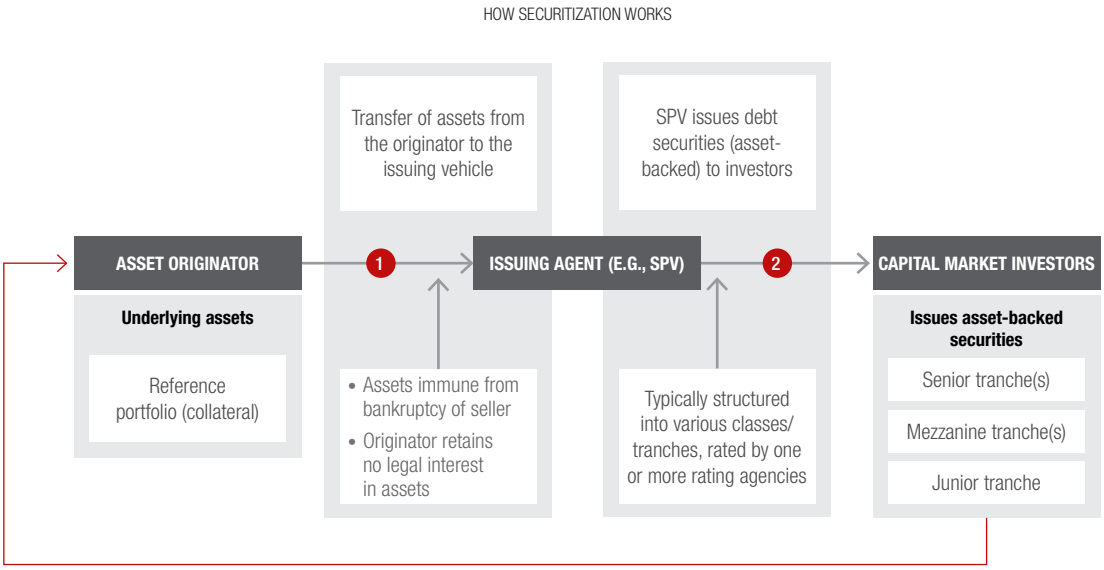
Tokenization is expected to improve the way people trade various types of assets by using technologies, such as blockchain and smart contracts. However, it is important to understand how it is similar to, and different from, traditional securitization mechanisms in order to evaluate tokenization as an asset mobilization mechanism. This paper establishes evaluation criteria, such as bankruptcy remote, legal certainty of transactions, transparency, liquidity, and finality, and applies them to both securitization and tokenization. We find several areas where tokenization could improve securitization as well as areas in which tokenization itself needs improving. While tokenization could increase certain aspects of transparency, such as traceability, enhanced liquidity, and reduced settlement risks, in certain cases investor protection is not enough. We discuss the ways in which practices of tokenization could be enhanced in order to ensure investor protection, especially focusing on bankruptcy remote, perfection of transactions against third parties, disclosure, ratings, and finality. These additional practices could increase costs and complexities of tokenization, but they are necessary to ensure that there are adequate levels of investor protection, which is a prerequisite for an asset mobilization mechanism.

1. INTRODUCTION

Asset tokenization, which generally refers to a set of mechanisms that allows various (real and virtual) assets to be traded on blockchain, has become quite popular among finance professionals in recent years,[2] with many believing that it could transform the way people trade assets globally.[3] While we don't dispute its potential,[4] we do find several issues regarding investor protection in the current asset tokenization practices that require deeper scrutiny.

[1] The opinions presented in this paper are solely those of the authors and do not in any way represent those of the organizations to which the authors belong. We are grateful to William Baxter and Naoki Taniguchi of MUFG as well as team members from PwC Consulting LLC for their helpful comments on the earlier drafts.
[2] Laurent, P., T. Chollet, M. Burke, and T. Seers, 2018, "The tokenization of assets is disrupting the financial industry. Are you ready?" Deloitte, https://bit.ly/35tYfRg
[3] Id.
[4] Cameron-Huff, A., 2017, "How tokenization is putting real-world assets on blockchains," NASDAQ, https://bit.ly/35mTyZC, and Ho, A., 2018, "How does tokenization work, anyway? Not everything will be tokenized, but those that can be will be," https://bit.ly/2Qpre4x

Figure 1: Securitization process



Jobst (2008)

Ever since securitization became part of the financial landscape, financial market participants and regulators have attempted to develop practices and regulatory treatments that can help ensure market integrity and protect investors.[5] Despite these efforts, there are still issues with securitization in the areas of transparency, liquidity, and settlement risks.

In this paper, we cover both securitization and tokenization and discuss how we can improve tokenization practices and regulations from an investor protection perspective.

2. SECURITIZATION AND TOKENIZATION

In this paper, we will discuss two different asset mobilization mechanisms – asset securitization and tokenization – and explain that while they are quite similar conceptually there are important differences between them.

2.1 Asset securitization

Since the 1970s, when U.S. government-backed agencies started to pool and securitize home mortgages, securitization has been used to mobilize real world assets.[6] The U.S. Office of Comptroller of Currency (OCC) explains that "Asset securitization is the structured process whereby interests in loans and other receivables are packaged, underwritten, and sold in the form of asset-backed securities."[7] Originators (those who own the assets that are securitized) could have several reasons for securitizing their assets, such as access to relatively cheaper financing and transfer of credit risks from their own balance sheets.[8] Investors, on the other hand, want to take credit risks only from underlying assets, and not from the parties involved in the securitization process. In the securitization process, this is achieved through a mechanism called bankruptcy remote, which will be discussed further below.

The process involves two steps, as shown in Figure 1. In the first step, the originator collects the assets or loans that are to be securitized, called the reference portfolio, and sells them to an issuer, such as a "special purpose vehicle" (SPV). The SPV then issues securities backed by the assets in the reference portfolio to investors.[9] In many cases, the reference portfolio is separated into several pools, called tranches, which have different risk levels, and the SPV sells them separately.[10]

[5] For example, mechanisms such as bankruptcy remote is developed to protect investors. This will be discussed further below.
[6] Jobst, A., 2008, "What is securitization?" Finance & Development, September, https://bit.ly/2sOCcYg
[7] OCC, 1997, "Asset securitization comptroller's handbook," Office of the Comptroller of the Currency, https://bit.ly/2Fqi4P6
[8] Jobst. supra note 6.
[9] Id.
[10] Id.

Table 1: Types of tokens and their definition proposed by FCA (2019)

TYPES OF TOKENS	DEFINITIONS
EXCHANGE TOKENS	Exchange tokens (like Bitcoin, Litecoin, etc.) are not issued or backed by any central authority and can be used directly as a means of exchange. These tokens can enable the buying and selling of goods and services without the need for traditional intermediaries, such as central or commercial banks (e.g., on a peer-to-peer basis)… These exchange tokens can be used independently of a platform and are not limited to use within a specific network or only for goods and services offered by a specific issuer. (Para 3.31) Exchange tokens typically do not grant the holder any of the rights associated with the Specified Investments within our perimeter. This is because they tend to be decentralized, with no central issuer obliged to honor those contractual rights – if any existed. (para 3.35)
SECURITY TOKENS	Security tokens are those tokens that meet the definition of a Specified Investment as set out in the RAO, and possibly also a Financial Instrument under MiFID II. For example, these tokens have characteristics which mean they are the same as or akin to traditional instruments like shares, debentures or units in a collective investment scheme. (para 3.43) Security tokens include tokens that grant holders some, or all, of the rights conferred on shareholders or debt-holders, as well as those tokens that give rights to other tokens that are themselves Specified Investments. (para 3.44) We consider a security to refer broadly to an instrument (i.e. a record, whether written or not) that indicates an ownership position in an entity, a creditor relationship with an entity, or other rights to ownership or profit. Security tokens are securities because they grant certain rights associated with traditional securities. (para 3.45)
UTILITY TOKENS	Utility tokens provide consumers with access to a current or prospective service or product and often grant rights similar to pre-payment vouchers. In some instances, they might have similarities with, or be the same as, rewards-based crowdfunding. Here, participants contribute funds to a project in exchange, usually, for some reward, for example access to products or services at a discount. (para 3.51) Much like exchange tokens, utility tokens can usually be traded on the secondary markets and be used for speculative investment purposes. This does not mean these tokens constitute Specified Investments. (para 3.52)

2.2 Asset tokenization

Another asset mobilization mechanism we will discuss in this paper is asset tokenization. Given that asset tokenization is a very new concept, it has different connotations for different people. In this paper, we first define "token" and then discuss asset tokenization.

In recent years, some regulators have proposed definitions of different types of tokens.[11] One of the examples is the consultation paper of guidance on cryptoassets proposed by the FCA.[12] In its consultation paper, FCA classifies tokens into three categories: exchange tokens, security tokens, and utility tokens (Table 1). For the purposes of simplicity, we will follow FCA's definitions and mainly focus on security tokens.

In this paper, we refer to asset tokenization as a set of mechanisms used for issuing security tokens and allowing investors to trade them on a blockchain. Theoretically, we can assume two different types of asset tokenization, one of which has underlying assets and one that doesn't. This paper focuses on the former type of asset tokenization as described in Table 2.

As far as we are aware, unlike securitization, there are no widely accepted standard methods to tokenize underlying assets. However, in the simplest cases, originators places real assets in a safe vault[13] or bank account[14] as a custodian and issues digital tokens backed by these assets on a blockchain.

3. EVALUATION CRITERIA FOR ASSET MOBILIZATION MECHANISMS

Each asset mobilization mechanism has its own strengths and weaknesses. To compare them objectively, we have set several key evaluation criteria and apply them in the following.

[11] For example, the UK Financial Conduct Authority (FCA) and the Swiss Financial Market Supervisory Authority (FINMA) issued the definitions and classifications of tokens in slightly different wording. See. FINMA, 2018, "ICO guidelines," https://bit.ly/2FnajJN and FCA, 2019, "CP19/3: guidance on cryptoassets," https://bit.ly/35shTxc

[12] Id at Chapter 3.

[13] For example, Digix tokenizes gold on Ethereum by putting gold into trusted vault, which is audited. See, DigiX, 2016, "Digix's whitepaper: the Gold standard in cryptoassets," https://digix.global/whitepaper.pdf.

[14] For example, Tether tokenizes fiat currency on the Bitcoin blockchain by putting USD into bank accounts. See, Tether, 2016, "Tether: fiat currencies on the bitcoin blockchain," https://bit.ly/2QIDQm86

Table 2: Types of tokens and asset tokenization mechanisms

	WITH UNDERLYING ASSETS	WITHOUT UNDERLYING ASSETS
EXCHANGE TOKENS		Bitcoin, etc.
SECURITY TOKENS	Asset-backed security tokens	Corporate bond/equity issued/traded on blockchain
UTILITY TOKENS		Some of the ICOs are defined a utility tokens by issuers

NB: the red box denotes the focus of this paper.

3.1 Criteria and evaluation

3.1.1 CRITERIA 1: BANKRUPTCY REMOTE

The first criterion is whether investors are protected from the bankruptcy of the originator or any other parties involved in the process of asset mobilization and how it is assured. As mentioned in the above, this mechanism is called bankruptcy remote[15]. Without bankruptcy remote, when those involved in the process go bankrupt the court could intervene to seize underlying assets of a token or security and include them in the bankruptcy proceedings, which would harm investors. Thus, investors should be protected from such risks, or at least informed about them so that they can accurately calculate risks and appropriate price.

Table 3: Types of legal systems and jurisdictions that adopted the trust form[16]

TYPE OF LEGAL SYSTEM	JURISDICTIONS THAT ADOPTED THE TRUST FORM
COMMON LAW	U.S., U.K., and other Commonwealth nations
MIXED-LAW	Louisiana, Quebec, and Scotland
CIVIL LAW	Japan, China, Lichtenstein, Israel, and several South American countries

Bankruptcy remote is dependent on the legal framework governing issuance and the underlying assets. In the case of securitization, it usually involves several key steps. As the first step, the originator needs to transfer the underlying assets from originator to the SPV. This transfer needs to be "true sale", which means that any legal or equitable interests in the underlying assets are eliminated from the originator and that the SPV is structured in such a way that the courts will not consolidate the underlying assets to the pool of assets within a bankruptcy proceeding.[17] Through true sale, the investors are protected from credit risks of the originator. In some countries, such as the U.S. and the U.K.,[18] the true sale is basically ensured by practices and common law,[19] while in other countries, such as Japan and China[19], it can be ensured by certain statutory provisions in the civil laws.[20] From a cross-jurisdictional perspective, "important efforts are underway to promote recognition by nontrust jurisdictions of trusts formed in other countries."[22] One of the efforts in this regard is the Hague Convention on the Law Applicable to Trusts and on their Recognition, concluded July 1, 1985 (Hague Conference on Private International Law, providing conflicts of law rules by which non-trust countries can recognize foreign trusts). As of April 19, 2017, that Convention has been ratified by Australia, Canada, China (only with respect to Hong Kong), Cyprus, France, Italy, Luxembourg, Malta, Netherlands, Switzerland, U.K., and the U.S.[23]

Other than the true sale, the SPV should also be protected from

[15] JCR, 2011, "General methodology," https://bit.ly/39HHIII
[16] Hansmann, H., and U. Mattei, 1998, "The functions of trust law: a comparative legal and economic analysis," New York University Law Review 73:1, 434-479
[17] The Committee on Bankruptcy and Corporate Reorganization of The Association of the Bar of the City of New York, 1995, "Structured financing techniques," The Business Lawyer 50:2, 527-606
[18] Schwarcz, S. L., 2003, "Commercial trusts as business organizations: an invitation to comparatists," Duke Journal of Comparative & International Law, Herbert Bernstein Memorial Issue
[19] ICLG (2018). USA: Securitization 2018. https://iclg.com/practice-areas/securitisation-laws-and-regulations/usa at question 4.9
[20] Schwarcz, supra note 18 at 323.
[21] In Japan, trusts are legally recognized and when a trust is used as the SPV, transfer of assets to a trust is regarded as true sale and not consolidated to the pool of assets for the bankruptcy proceeding. See, ICLG, 2018, Japan: Securitization 2018, https://bit.ly/2QSiL8S at question 5.6 and Ueno, H., and H. Zenke, 2016, "Structured finance and securitisation in Japan: overview," Nishimura, and Asahi, https://tmsnrt.rs/2ZSDRYU
[22] Hansmann et al. supra note 16
[23] See https://bit.ly/2FAo6gd

its own bankruptcy (voluntary and involuntary) by structural and contractual setups.[24] How the SPVs are set up have been discussed for a long time and practices are relatively well established.[25]

3.1.1.1 EVALUATIONS

Securitization: practices around true sale and bankruptcy remote SPV was originally developed and used for securitization. In fact, the Committee on Bankruptcy and Corporate Reorganization of the Association of the Bar of the City of New York specifically mentions that "The sine qua non of structured financing is the effort to separate, as a legal matter, the credit quality of the assets being securitized from credit risk of any entity (other than credit enhancers) involved in the financing."[26] Of course, depending on the legal framework and circumstances of each case, the degree of certainty that such arrangements provide on bankruptcy remote would be different. However, it is worth noting that stakeholders working on securitization have made considerable efforts to ensure bankruptcy remote and it has a relatively long history within the marketplace.[27]

Tokenization: it is actually not easy to make general statements about tokenization given that it is still quite new and that there are no standardized structures. Despite this, we have seen examples of tokenization that employ neither true sale nor bankruptcy remote SPV in their projects. For example, Tether specifically mentions that "users must trust Tether Limited and our corresponding legacy banking institution to be the custodian of the reserve assets. However, almost all exchanges and wallets (assuming they hold USD/fiats) are subject to the same weaknesses.[28]" On the other hand, there are certain tokenization projects that have indicated that they use SPVs for legal reasons[29]. Thus, it is fair to say that not all tokenization projects take bankruptcy remote measures.

3.1.2 CRITERIA 2: LEGAL ISSUES ASSOCIATED WITH HOLDING AND TRANSFERRING OF SECURITIES/TOKENS

In asset mobilization mechanisms, physical assets and right(s) are separated and only the right(s) is/are traded in the financial markets in the form of securities/tokens. However, it is not always the case that the right(s) is legally acknowledged.[30] This is dependent on the jurisdictions in which the token offering took place and whether local authorities recognize the security/token offering. Who can claim legal rights to the assets is also subject to regulatory and legal considerations and only certain types of rights to the underlying assets can be legally perfected.[31] For example, it is possible that the court does not recognize any rights of the security/token holders in the underlying assets, even when they holds tokens that are securitized/tokenized of the underlying asset. If the legal effect is unclear, investors may unexpectedly suffer losses. Thus, evaluations of the legal rights associated with securities/tokens is important.

3.1.2.1 EVALUATIONS

Securitization: in the case of securitization, security interest in the underlying assets legally belongs to security holders, based on governing laws. For example, in the U.S., a "true sale" is conducted to transfer assets from a seller such that the assets will no longer legally belong to the seller's estate. This is achieved by receiving a legal opinion that a "true sale" has taken place and the seller no longer has claim to a security interest in the underlying assets. Additionally, the U.S. Article 9 of the Uniform Commercial Code (U.C.C.) sets out guidelines for transfers of financial assets and establishing rules for legally enforceable perfection and priority of the transfer of covered financial assets.[32] The trustee of a securitization will also take proper measures to ensure the underlying assets are perfected. Perfection is generally achieved by filing a UCC-1 financing statement under the applicable jurisdiction in the U.S.[33] In Japan, civil law and specific laws for asset

[24] The Committee on Bankruptcy and Corporate Reorganization of The Association of the Bar of the City of New York. supra note 17 at 533.
[25] Id at pp. 554.
[26] Id at pp. 533.
[27] Id at 537.
[28] Tether, supra note 14 at 10.
[29] For example, Maecenas mentions legal issues and use of SPV as their product structure in their white paper. See. Maecenas, "The decentralized art gallery," https://www.maecenas.co/ at 10.
[30] Malasevschi, 2018, "Asset tokenization and legal implications," https://bit.ly/2QrCtcR
[31] For example, in the U.S., Uniform Commercial Code (U.C.C.) defines the way to perfect security interests in various financial instruments. For instance, it allows security interests in certain instruments to be perfected by filing. See. U.C.C. § 9-312(a). See also Schwarcz, S. L., 2006, "The impact on securitization of revised UCC Article 9," Chicago-Kent Law Review 74, 947-962
[32] Schwarcz, supra note 31.
[33] Generally, an SPV will perfect its interest in assets by filing a U.C.C.-1 financial statement to evidence the sale of assets. See. Moser, E. K., and J. E. Fish, 2011, Structured lending and securitisation in the United States: overview," Milbank, Tweed, Hadley & McCloy LLP, https://bit.ly/2sPXvJ6.

mobilization also set out legal requirements for perfection.[34] As long as the party engaging in securitization follows such laws and regulations, security interests in underlying assets are legally perfected with associated rights to them. Holders of the associated securities issued by the bankruptcy remote vehicle will have security interests in the underlying assets. When it comes to transfer of securities in the secondary markets, if the parties involved in the transactions take appropriate measures to perfect the security interest, through standard market practices of trading securities, the beneficiary of the security will have a security interest in the underlying asset.[35] In this way, the securitization mechanism allows parties and regulators to make considerable efforts to clear the legal issues associated with asset mobilization.

Tokenization: in the case of tokenization, it is not clear if parties involved in the tokenization process and investment transactions actually take such measures to legally perfect tokenized assets. For example, just putting gold in the secured vault and issuing tokens on the blockchain with that originator's "promise" to exchange tokens for associated underlying gold might not be enough to allow investors to legally claim a security interest in the gold tokenized in the case of bankruptcy of the originator. In the future, it may be possible for parties to record their interests and rights to underlying assets onto the blockchain and by legally acknowledging a filing for perfection. However, at this moment, the legal rights of the investors in underlying assets may not be assured unless parties involved in the tokenization and investment transactions follow applicable laws and regulations for perfections based on traditional asset securitization.

3.1.3 CRITERIA 3: TRANSPARENCY

Another aspect of investor protection is transparency and disclosure. Investors in the natural setting could face asymmetric information issues[36] and need to gain enough information to make appropriate investment decisions. Thus, issuers of securities are required by law to disclose relevant information to the public.[37] In addition to disclosure, ratings from rating agencies could provide additional information to investors.

From a broader perspective, traceability through the history of origination, issuance, and circulation in the market would also be important. As asset mobilization mechanisms could cut the risks into small pieces and spread them out to the larger market, it is important to have enough traceability of the said security/tokens.[38] How much information is available to investors would be an important evaluation criterion.

3.1.3.1 EVALUATION

Securitization: within securitization, an issuer needs to follow disclosure requirements of securities issuers. In addition to general disclosure requirements, some countries impose specific disclosure requirements on securitization activities of originators and other stakeholders.[39] Furthermore, investors can also gain information from rating agencies. It should be said that while issues concerning the ratings of securitized products were found during the last financial crisis,[40] regulators and rating agencies have taken steps to remedy them.[41] Hence analytical frameworks and information provided by rating agencies could be a useful resource.

Securitization mechanisms could also lack traceability of the underlying assets, since the entire history of the underlying assets are not usually available. Steps are being taken by participants and regulators to improve traceability of securitization markets.[42]

Tokenization: while an issuer of a security token needs to abide by the same disclosure requirements, there could be several issues given the nature of the tokenization. For example, current disclosure requirements are tailored to deal with traditional securities and may not mandate that the issuer of the token reveal any tokenization specific risks, such as

[34] Ueno, H., M. Kawato, 2009, "Country Q&A Japan," Nishimura, and Asahi, https://bit.ly/2tBnioA

[35] In the U.S., for example, parties involved in the transaction usually conduct filings following U.C.C. or other laws to perfect the security interest in underlying assets within specific dates after the effective date of transaction. See. Bjerke, B., and S. Fleischmann, 2019, "Securitisation," https://bit.ly/2QP10HH, 29.

[36] Cunningham, S., 2011, Understanding market failures in an economic development context, Mesopartner

[37] For example, in the U.S., the Securities and Exchange Commission (SEC) explains that "A primary means of accomplishing these goals is the disclosure of important financial information through the registration of securities. This information enables investors, not the government, to make informed judgments about whether to purchase a company's securities." and Securities Act of 1933 requires that investors receive financial and other significant information concerning securities being offered for public sale. See. SEC, "The laws that govern the securities industry," Securities and Exchange Commission, https://bit.ly/2tus7zY.

[38] Lack of traceability was one of the problems we saw in the financial crisis. See. Jobst. supra note 6.

[39] For example, in Europe, European Securities and Markets Authority (ESMA) publishes disclosure requirements as part of securitization regulations. See. ESMA, Securitization, https://bit.ly/35tqsYH

[40] Paligorova, T., 2009, "Agency conflicts in the process of securitization," Bank of Canada Review, Autumn, https://bit.ly/36wCDFe, at 40.

[41] Paligorova discusses various regulatory approaches related to rating problems. See. Id at 41.

[42] For example, in Japan, regulator amended supervisory guideline to improve traceability of underlying assets of securitization. See, JFSA, 2008, "FSA publishes the partial amendment of the Guidelines for Financial Instruments Business Supervision," Financial Services Agency, https://bit.ly/2ZYOj15

those associated with the quality and structure of computer code used for the smart contract or the technical specifications related to the underlying blockchain technology.[43] The global nature of token issuance is also another issue that needs to be taken into consideration, since disclosure requirements and supervisory actions are mandated by each jurisdiction.[44] As for the ratings, as far as we are aware, there are currently no widely accepted ratings for asset-backed tokens, which could make it difficult for investors to make appropriate investment decisions.

On the other hand, depending on the technical specifications, blockchain could improve transparency and traceability, since most of the blockchain networks provide the transactional histories.[45] This information is provided as part of the normal course of operation of the underlying blockchain network and no extra effort is needed.[46] If all the necessary information is recorded on the blockchain, it could be seen as immutable disclosure, although regulators do not currently recognize such information as fulfillment of disclosure requirements.

3.1.4 CRITERIA 4: LIQUIDITY IN THE MARKET

One of the important benefits of asset mobilization is to increase the liquidity of the underlying assets by using certain mechanisms such as securitization.[47] Thus, the degree to which they help increase the liquidity of the underlying asset is an important criterion. There could be countless factors that could affect liquidity in the market, however, in this paper, we will focus on information available to investors[48] and minimum trading units,[49] as these can be considered major differences between securitization and tokenization. The more we have limitations on these factors, the less liquidity we can enjoy in the market. Thus, when we evaluate asset mobilization mechanisms from the perspective of liquidity in the market, we should check how many limitations they impose on these factors.

> *"Despite such benefits, issuers of asset-backed tokens need to learn from securitization in order to improve investor protection."*

3.1.4.1 EVALUATION

Securitization: with regards to securitization, these two factors have certain limitations. In terms of information available to investors, as we saw in the financial crisis, originators and issuers of securitized products developed complex and nontransparent products[50] and investors faced difficulties in assessing their true risks. In addressing this issue, regulators are promoting transparent securitized products.[51] With regards to trading units, originators and other parties involved could face difficulties in cutting the underlying assets into very small pieces of securities. This is due to the fact that even if the securities are small, the parties involved still need to undertake all of the documentation work, calculate cash flows, and manage any other issues that require human interventions, which is a non-negligible number of costs per security per investor.[52] Although securitization mechanisms in general could increase liquidity of the underlying assets by cutting them into small pieces of securities, these limitations could negatively impact their liquidity in securitized product markets.

Tokenization: blockchain and smart contracts that are used for tokenization could mitigate some of the limitations we have observed with traditional securitization. On one hand, tokenization could be less transparent than securitization, due to complicated technical risks and lack of ratings. On the other hand, the blockchain technology could increase traceability and transparency. Consequently, it is difficult to compare

[43] Dilendorf, M., R. Khurdayan, and G. Zaslavsky, 2019, "Another year in review: current state of Reg A+ tokenized offerings," Dilendorf and Khurdayan, https://bit.ly/2SUKvws
[44] Maume, P., 2019, "Initial coin offerings and EU prospectus regulation," European Business Law Review
[45] For example, anyone who participates in the bitcoin network can know what happened in the network, unless someone intentionally hides transactional information. See. S. Nakamoto, S., 2008, Bitcoin: a peer-to-peer electronic cash system, https://bitcoin.org/bitcoin.pdf.
[46] Id.
[47] Loutskina, E., 2010, "The role of securitization in bank liquidity and funding management," Journal of Financial Economics 100:3, 663-684
[48] Lester, B., A. Postlewaite, and R. Wright, 2011, "Information and liquidity," Journal of Money, Credit and Banking 43:7, 355-377
[49] The smaller the minimum trading units, the larger the investor base and thus larger market liquidity. See, Amihud, Y., H. Mendelson, and J. Uno, 1999 "Number of shareholders and stock prices: evidence from Japan," Journal of Finance 54:3, 1169-1184, at 1172.
[50] Segoviano, M., B. Jones, P. Lindner, and J. Blankenheim, 2015, "Securitization: the road ahead," IMF Discussion Note SDN/15/01, https://bit.ly/2ttKCEx, at 11.
[51] FSB, 2016, "Revisions to the securitization framework," Financial Stability Board, https://bit.ly/39EXQ1L
[52] For example, just managing cash flows from the underlying assets and distributing them to investors incurs costs that increase proportionally to the number of investors. Thus, issuers of securitized assets face limitations on minimum trading units.

tokenization with securitization with regards to transparency. Automated and timely records of transaction data on the blockchain, however, could support liquidity. As for the trading units, given that blockchain-based smart contracts could automate certain parts of the tokenization lifecycle, such as cash flow management, the parties involved in tokenization could issue smaller tokens, at a lower cost to securitization, which could help attract investors. In this way, the blockchain technology behind tokenization could improve liquidity by eliminating (part of) the limitations on factors affecting liquidity, while new opaqueness on technical risks and lack of ratings could negatively affect liquidity.

3.1.5 CRITERIA 5: SETTLEMENT RISKS

The parties involved in the settlement of securities transactions could face several risks, including counterparty default and breach of agreement.[53] When one of the parties defaults, their counterparts could face significant risks, such as principal risk,[54] replacement cost risk,[55] and liquidity risk.[56] The longer the time between payment and delivery of securities or tokens, the bigger the risk of the default.[57] Hence, it is important to evaluate this timing gap to assess risks associated with the settlement.

Settlement finality is also an issue that needs to be considered. The settlement should be final, and investors should not need to worry that it can be revoked. However, depending on the mechanism, this settlement finality could be a problem. Thus, the level of certainty of the settlement finality would be a criterion.

3.1.5.1 EVALUATION

Securitization: in the case of securitization, many of the security transactions settle by a payment process finalized two to three days after the payment trades are made (T+2-3)[58]. This is a considerably large timing gap and participants of the transaction could face non-negligible settlement risks. On the other hand, once settled with perfection against third party, it is final, and participants do not need to worry about involuntary revocation of transactions.

Tokenization: in the case of tokenization, the payment could happen off-chain or on-chain. When the payment is made in fiat currency, it would happen off-chain, and if the payment is made in crypto assets, it would happen on-chain. Such a difference would affect the efficiency and cost of transactions, as well as settlement risks. In the case of on-chain payment, it would be technically possible to implement the DVP (delivery versus payment) mechanism on the blockchain,[58] which would eliminate any settlement risks. Even in the case of off-chain payment, it is relatively easy to send tokens on the blockchain in a matter of few minutes to few hours after the payment is confirmed, which greatly reduces settlement risks as compared to the traditional T+2-3 days settlement of securitization products.

When we consider the finality, we should distinguish between finality from the legal standpoint and finality from the data on blockchain standpoint.

From the legal standpoint, it is possible that finality is ensured when the investor perfects the move of legal right against the third party. Thus, as discussed in criteria 2, there could be two different scenarios; 1) the data on the blockchain itself could work as legally recognizable record of move of legal right and ensures perfection against third parties and 2) investors need to recourse to an off-chain record of move of legal right to ensure perfection.

In terms of finality from the standpoint of blockchain record, we also need to consider two different categories of blockchains 1) that could provide finality of the data recorded and 2) that could not provide finality of the data recorded. For example, some of the blockchains, such as certain type of permissioned blockchains, could provide finality[60] and thus belong to the first category. However, most of the public blockchains would fall into the second category, as they can only provide probabilistic finality of the data recorded.[61] Given that data recorded on the blockchain could be involuntarily revoked in some rare cases, investors could be harmed. Although it would be difficult to forcefully change the record on the blockchain after several

[53] BIS, 1992, "Delivery versus payment in securities settlement systems," Bank for International Settlements, https://bit.ly/37FsRAQ at para. 2.7.
[54] Id at para. 2.9.
[55] Id at para. 2.8.
[56] Id at para. 2.10.
[57] SEC, 2004, "About settling trades in three days: introducing T+3," Securities and Exchange Commission, https://bit.ly/2MXJaBl
[58] For example, in 2017, the financial industry working with regulators and financial market infrastructures implement a shortened settlement cycle from T+3 (trade date plus three days) to T+2. The scope includes a certain type of securitization products. See, T+2 Product Scope Working Group, "The list of in-scope cash products," https://bit.ly/2N05HgE.
[59] For example, if the crypto assets used for payment and tokenized assets are on the same blockchain, they can be traded in the form of DVP in a relatively simple manner. We see many projects working on decentralized exchanges that enable atomic swap between different tokens. See. Agarwal, H., 2018, "9 best decentralized exchanges that you can use to trade NOW," https://bit.ly/2ZULIFr
[60] Consensus mechanism affect finality of the blockchain. See, Hyperledger, 2017, "Hyperledger architecture, volume 1," https://bit.ly/2uixP8d, at 6-7.
[61] Samparsky, 2018, "Blockchain finality - proof of work and proof of stake," Medium, https://bit.ly/2MYptt6.

Table 4: Issues around finality of token transactions

	PERFECTION BY BLOCKCHAIN DATA	PERFECTION BY OFF-CHAIN RECORD
BLOCKCHAIN WITH FINALITY	Blockchain data alone could ensure finality of transactions of tokens.	Investors need to rely on off-chain records for perfection but don't need to worry about inconsistencies between the off-chain record and data on the blockchain.
BLOCKCHAIN WITHOUT FINALITY	In rare cases, investors could suffer involuntary revocation of transactional data on the blockchain and might not be able to perfect against a third party.	Investors can perfect against a third party, but, in rare cases, off-chain records and data on the blockchain could be inconsistent, which could cause confusion and harm investor protection.

confirmations[62] of blocks, if, for example, someone controls more than 51 percent of hash rate within the network, they can revoke the data recorded in the blocks.[63]

Table 4 summarizes four theoretically possible categories. In considering the issues of finality, we need to give careful consideration to the risks that can arise from both sides.

3.2 Conclusion of this chapter

Table 5 is a summary of the pros and cons of each mechanism.

4. BETTER TOKENIZATION PRACTICES AND RELATED REGULATIONS

Although tokenization could improve liquidity and traceability, as well as help reduce settlement risks, it may lack some of the investor protections that come with securitization, such as bankruptcy remote, legal certainty, transparency, and finality of the transactions. In this section, we will discuss the issues associated with investor protection, while highlighting the other benefits of tokenization.

4.1 Bankruptcy remote

First, and foremost, the originator of an asset-backed token should setup a bankruptcy remote SPV, or use a trustee, execute a true sale of underlying asset, and transfer them to the SPV for bankruptcy remote. Not all of the originators of asset-backed tokens currently follow this practice, which means that investors could face unintended counterparty risks. While this practice would add complications to the origination process, and consequently increase costs, which could prevent small startups from originating asset-backed tokens, bankruptcy remote should not be abandoned, nonetheless.[64]

Table 5: Summary of evaluation results

EVALUATION CRITERIA	SECURITIZATION	TOKENIZATION
BANKRUPTCY REMOTE	(+) Well established practice	(-) No established practice
LEGAL ISSUES	(+) Well established practice to ensure legally binding perfection	(-) No clear practices
TRANSPARENCY	(+) Follow the disclosure requirements and ratings available for securities (-) Traceability is low	(-) Follow the disclosure requirement for securities but the requirement may not reveal all the risks associated with technology, and not enough ratings are available (+) Could provide on-chain data that increase traceability
LIQUIDITY IN THE MARKET	(-) Nontransparent products and limitation on minimum trading units	(+) Additional and timely data available on blockchain to investors, and less restrictive minimum trading units (-) Opaqueness on technical risks and lack of ratings
SETTLEMENT RISKS	(-) Need two to three days for security settlement (T+2-3) (+) Ensure finality of the settlement	(+) Could achieve DVP or at least T+ few hours (-) Depending on the legal treatment and blockchain design, investors could suffer involuntary revocation of transactions. There could also be a mismatch between legal status and data recorded on blockchain

[62] Nakamoto. supra note 46 at 6.
[63] Id.
[64] Simon, J., 2019, "Special purpose vehicles: at the intersection of blockchain and law," Medium, https://bit.ly/2QRQboe

Alternatively, originators could disclose the counterparty risks that investors might face in an easy-to-understand manner, so that they can take them into consideration when making investment decisions. In this case, investors should be well informed to understand the risks, which might come at the expense of retail investors.

In our opinion, bankruptcy remote is preferable to disclosure, since without bankruptcy remote counterparty risks could be spread out to the larger financial system in the case of a large-scale financial crisis.

In the future, it might be possible that certain technologies could be used to recognize bankruptcy remote. Smart contracts could be created that evaluate the financial circumstances of the parties involved in tokenization and automatically start the liquidation process of the underlying assets before they become insolvent. However, such technologies seem some way off.

4.2 Legal certainty

To ensure legal rights of the underlying assets, and the cash flows from them, it is important for parties involved in the transaction to take appropriate legal measures. In some cases, keeping a record of the transactions on the blockchain could be enough for perfection in some countries and under certain regulations. For example, in Japan, move of interest in trust can be perfected by keeping record of the beneficiary of trust and it could be possible that the record on the blockchain can be recognized as a record of beneficiary of trust. In this case, parties the involved don't need to take additional legal measures to ensure perfections.[65] However, it could also be the case that they need to take certain legal measures, such as keeping off-chain records or filing certain information to public registry following specific regulations.

An important issue that needs to be kept in mind is that different jurisdictions have different legal requirements and regulations for ensuring perfection, which makes selling and trading of asset-backed tokens globally rather complicated. That is why, when it comes to issuing asset-backed tokens across borders, issuers must pay special attention to defining the governing laws, jurisdictions, and arbitration processes involved to avoid complicated cross-border disputes. In the future, depending on the development of the markets, regulators may wish to consider harmonizing laws, regulations, and/or practices for perfection.

4.3 Transparency and liquidity

Meeting disclosure requirements may, however, not be enough, as investors need to understand the risks associated with the technology behind the tokenization, which could be beyond the scope of disclosure requirements. In considering appropriate disclosures, it is important to pay particular attention to the fact that tokenization on blockchains with smart contracts would, to some extent, shift the trust from being between the entities involved to mathematics and computer codes. Regulators may consider establishing additional disclosure requirements that focus on the specific risks associated with tokenization, including technical issues.

On the other hand, blockchains could open up the possibility that the information necessary is automatically recorded on the chain, which could cause duplication between on-chain data and off-chain disclosures. To our knowledge, there are currently no globally applicable standards regarding the information recorded on the blockchain vis-à-vis tokenization. However, as the industry develops such standards or best practices, regulators could, in the future, allow originators and issuers to omit off-chain disclosures by replacing them with on-chain records.

Regarding ratings, there are a few startup companies that are focusing on asset-backed tokens,[66] though they are at the very early stages of development. It might be beneficial for originators and issuers to talk with more traditional rating agencies to explore the possibilities of developing rating services for asset-backed tokens.

Given that blockchains could inherently provide additional and timely records of transactions automatically, once the concerns regarding transparency of tokenization have been addressed, they could become more liquid than traditional securitization.

4.4 Finality

As Table 4 illustrates, if tokens are issued and traded on a blockchain without finality of data recorded, regardless of whether investors take legal measures off-chain or not, it is technically difficult to perfectly eliminate issues associated with perfection. It is important for originators and issuers to understand this risk before deciding which blockchain technology to employ to issue their asset-backed tokens.

[65] For example, the Japanese Trust Act stipulates that information of beneficiary of trust has been stated or recorded in the beneficial interest registry, as requirements for the perfection of an assignment of a beneficial interest in a trust, with certificate of beneficial interest, and defines electromagnetic records as one of the ways for creating such records. Keeping records on the blockchain is considered to be one of the ways for keeping records by electromagnetics. See, Japanese Trust Act Article 195 and Regulation for Enforcement of the Trust Act Article 31 and 32.

[66] For example, STO RATING and ICORATING provides rating for tokens. See, https://www.storating.com/ and https://icorating.com/ respectively.

> *Although tokenization could improve liquidity and traceability, as well as help reduce settlement risks, it could lack some of the investor protections that come with securitization.*

One practical solution is to employ a blockchain that provides credible finality of the data recorded in order to mitigate such risks.

While the issue of finality of the record on the blockchain might be solved at some point in the future, if originators and issuers decide to employ a blockchain that provides only probabilistic finality, they need to publish guidelines that define how they treat chain reorganizations, which could affect investor protection.

4.5 Further consideration

While the above practices could increase the costs and complications of tokenization, it is still very important to ensure that there is the same level of investor protection as that of traditional securitization. Despite that, it is also important to make the tokenization cost effective. This could be achieved by taking advantage of the programmability of tokenization, which could make it possible to replace the processes that require human intervention. To fully enjoy the benefits of programmability, the industry needs to request modifications in regulations to recognize technical developments. In this way, the tokenization industry could ensure security and safety of the technology they employ and allow the regulators to fully grasp the technical complexities.

In addition to working with domestic regulators, the industry also needs to engage with foreign and international regulatory bodies in order to get more regulatory harmonization across national borders.

5. CONCLUSION

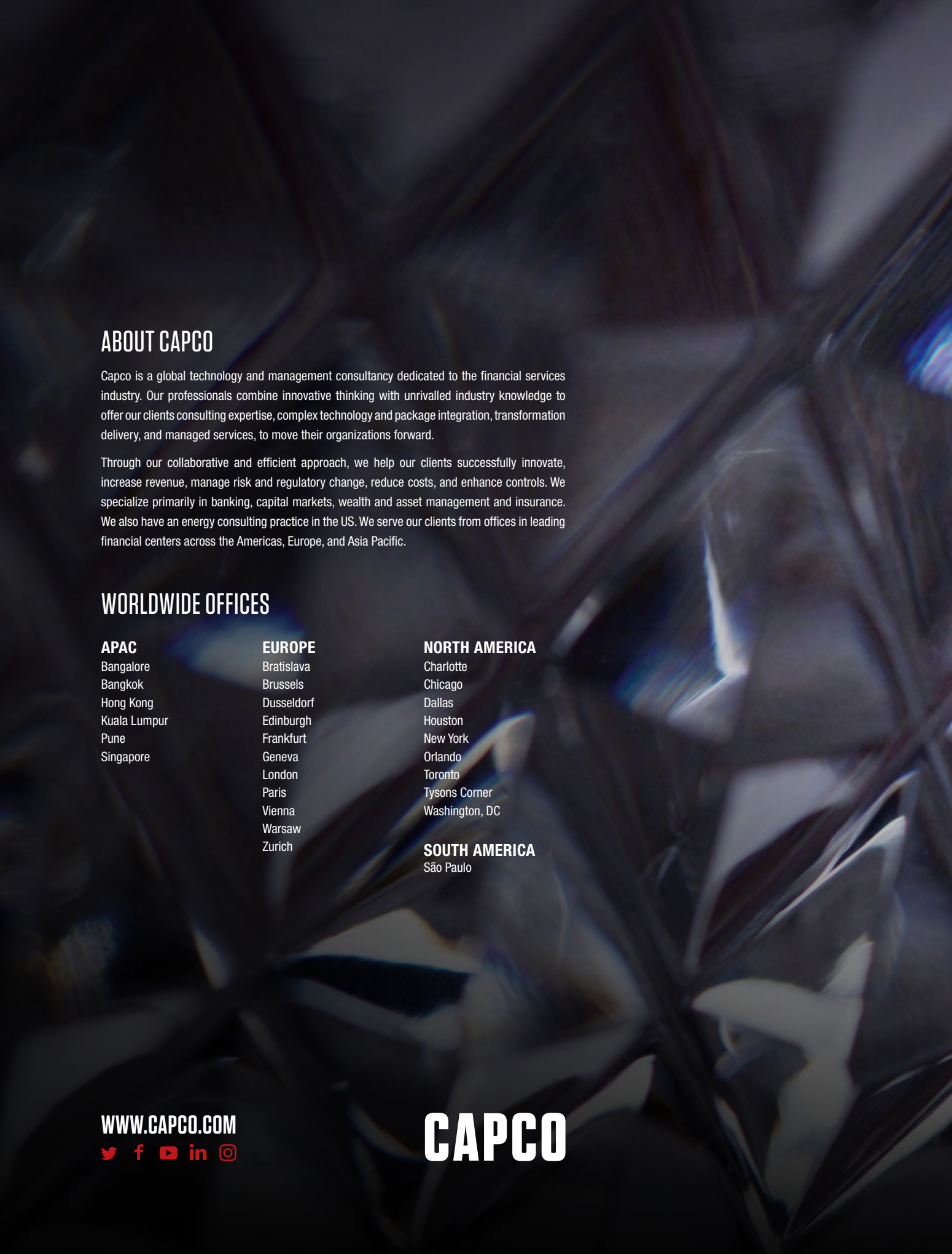
Thanks to the technical developments of blockchain and smart contracts we now have tokenization as an asset mobilization mechanism, which could be an alternative to traditional securitization. Tokenization is, of course, in its infancy and its potential to change the way people trade asset-backed securities is still debatable. However, as was discussed in this article, blockchain and smart contract mechanisms could improve asset mobilization processes by increasing traceability, improving liquidity, and reducing settlement risks, as compared to traditional securitization. Thus, it would be beneficial to explore ways in which they could be utilized across financial markets.

Despite such benefits, issuers of asset-backed tokens need to learn from securitization in order to improve investor protection. This paper revealed several points of concern with regards to investor protection, such as lack of bankruptcy remote, certainty of their legal status, transparency, and finality. We explained that these concerns could be addressed by following practices developed for securitization or by a combination of new technologies and new regulatory frameworks. However, these steps are not without costs, and complexities, though essential.

To make the discussion practical, this paper focuses mainly on currently available and applicable solutions to improve investor protection. However, it should be borne in mind that more sophisticated technology-based solutions that could mitigate burdens and costs as well as improve efficiency are not too far off.

Regulators also need to look for ways to help this industry develop, and should consider developing new regulations or amending existing ones.

Asset tokenization could transform how assets are traded, but needs greater focus on investor protection to achieve its goals.



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