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ARTICLES

TOWARD A COHERENT INTERNATIONAL FRAMEWORK FOR TRADITIONAL AND CRYPTO SECURITIES

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ARTICLES

TOWARD A COHERENT INTERNATIONAL FRAMEWORK FOR TRADITIONAL AND CRYPTO SECURITIES

Thomas Keijser[*] *and Matthias Lehmann*[**]

ABSTRACT

This Article explores the extent to which the international legal frameworks for traditional finance ("tradfi") securities and crypto securities can be aligned. We demonstrate that this is feasible in many instances, such as in the context of investor protection, corporate actions processing, attachment, enforcement of rights, and insolvency. This ties in with the regulatory paradigm of "same activities, same risk, same regulation/regulatory outcomes." In some scenarios, however, differences in the underlying technology need to be taken into account, for example in respect of the finality of transactions. Convergence of the legal landscape for tradfi and crypto securities would reduce complexity and cost and thus enable the securities markets to operate more smoothly.

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I. INTRODUCTION

Over the past few decades, investment securities have appeared in different guises. Initially, they took the form of paper certificates and/or entries in issuer registers ("directly held" or "non-intermediated" securities). However, in the wake of the "paperwork crisis" of the 1960s, they commonly became immobilized within central securities depositories, with the interests of investors represented by book entries on accounts with one or more financial intermediaries.[1] Such "indirectly held" or "intermediated securities" currently constitute the predominant model, though, these days, digital ("blockchain" or "crypto") securities recorded on a blockchain or comparable distributed ledger are becoming increasingly popular.[2]

The private law framework for these securities is fragmented and depends, to a large extent, on the technology used to represent or record them. To give just one example, the transfer of a security held with a central securities depository often follows rules that differ from those for the transfer of a security recorded on a blockchain. Even international regulations aimed at legal harmony or uniformity often provide different rules. These may concern the conditions for a transfer, its finality, or the creation and enforcement of collateral. The result is a multi-faceted picture, which is characterized by frequent tensions, frictions, and contradictions. By way of illustration, just imagine a company whose shares are recorded partly in traditional book-entry accounts and partly on the blockchain. Is the investor to be identified differently, or are there some common principles?

There may be good reasons to support divergent treatment, especially where securities are inexorably connected to the underlying technology. After all, an electronic register is not the same as a piece of paper. Sometimes, however, the divergent treatment serves no useful purpose and results in unnecessary complexity. This Article aims to further the discussion of the international legal framework for investment securities with a view to making it more harmonious and coherent. We will primarily juxtapose intermediated securities with blockchain securities, given their practical

[1] *See, e.g.*, Charles W. Mooney, Jr. & Sandra M. Rocks, *Final Report on the Work of the Task Force on Securities Holding Infrastructure: Part One*, 79 BUS. LAW. 343, 347–51 (2024).

[2] *See id.*

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importance.[3] To this end, we will chart and compare the available legal frameworks for these different manifestations of investment securities, examine the extent to which there are good reasons for any differentiation between the applicable rules (such as the underlying technology or market features), and identify areas where there are no such reasons and where it may thus be better to apply similar rather than different rules per asset type.

The discussion will cover the rights of account holders and the corresponding obligations of intermediaries (Section II), finality (Section III), collateral transactions (Section IV), corporate actions processing (Section V), investor protection mechanisms (Section VI), attachment (Section VII), insolvency (Section VIII), regulatory aspects (Section IX), and the debate on appropriate conflict-of-laws rules (Section X).

A. Non-intermediated, Intermediated, and Digital Securities

The term "securities" covers shares, bonds, and similar financial instruments, such as certain derivatives.[4] These help firms and governments either to raise capital—with a corresponding offer to the investor of a financial return in the future, for example, in the form of part of the profits made or an interest payment—or to manage risks and allow speculation. Crucially, the characterization of these securities should not depend on how these instruments are recorded, whether that is on paper or in a company's share register (non-intermediated securities), in a central electronic register and on the books of financial intermediaries (intermediated securities), or on a distributed ledger based on blockchain or comparable technology (digital or crypto securities).[5] The function of these securities is more important than

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[3] The legal framework for digital securities is in its infancy. On the importance of its further development, see, for example, Matthias Lehmann, *National Blockchain Laws as a Threat to Capital Markets Integration*, 26 UNIF. L. REV. 148, 171–79 (2021) (arguing for international harmonization rather than fragmentation per jurisdiction). *See also* VALUEEXCHANGE, *ECB DLT Trials: An Industry Debrief*, 14(2025), https://thevx.io/wp-content/uploads/2025/01/ECB-DLT-trials_Nov-2024_Key-findings 20250110.pdf (stating that insufficient legal rules are "a massive obstacle to scale").

[4] Some derivatives have the attributes of securities, while others are simply contractual arrangements. *See* KANDA ET AL., OFFICIAL COMMENTARY ON THE UNIDROIT CONVENTION ON SUBSTANTIVE RULES FOR INTERMEDIATED SECURITIES 15–16 (2012).

[5] For a classification, along roughly the same lines, of physical/certificated, dematerialized/uncertificated/electronic/register, intermediated, and digital/crypto securities, see Hans Kuhn & Klaus Löber, *Crypto Securities and Other Digital Assets: Aspects of Substantive and Regulatory Law*, *in* TRANSNATIONAL SECURITIES LAW 301, 307–08 (Thomas Keijser ed., 2d ed. 2022).

form. Securities can therefore also be "blockchain" or "digital" assets. But we will limit our analysis to those that serve to provide capital to, or invest in, an issuer. Examples are tokenized shares, tokenized bonds, and tokenized derivatives as well as securities tokens and investment tokens. We will not address other digital assets such as cryptocurrencies, utility tokens, or stablecoins.

We will juxtapose those digital securities with traditional finance ("tradfi") securities. The overwhelming majority of tradfi securities today are held with intermediaries such as banks or other financial institutions. Tradfi securities bear a strong similarity with digital securities, many of which are held with crypto custodians.[6] Both tradfi-intermediated securities and custodied digital securities are typically held and traded with the help of one or more third parties, e.g., a bank or a crypto service provider. Intermediation creates a number of legal problems for both types of securities, which need to be explored. That is why intermediation will be the crux of our investigation.

It is true that some securities are still held directly by investors and are therefore non-intermediated. One example is securities that are issued as individual papers or certificates, but these are increasingly rare.[7] A modern form of non-intermediated securities could arise where these are issued on the blockchain.[8] Indeed, digital assets may be held directly by the investor on a hard drive or USB key, for example, or in a non-custodial wallet, though this is rare too. Most investors use custodians to maintain their digital assets for ease of access and as a safeguard against loss. That is why we will address non-intermediated securities only in passing.

Digital securities are becoming increasingly popular. By way of illustration, in Germany, there have been no fewer than 185 different

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[6] INT'L INST. FOR THE UNIF. OF PRIV. L. [UNIDROIT], *UNIDROIT Principles on Digital Assets and Private Law*, at princ. 10 (2023), https://www.unidroit.org/wp-content/uploads/2024/01/Principles-on-Digital-Assets-and-Private-Law-linked-1.pdf [hereinafter *Digital Assets Principles*] (offering a way to delineate between digital securities that are held by an investor personally ("self-custody") or with the help of a custodian). On the merits of this approach, *see infra* Section VI, which discusses investor asset protection.

[7] *See* U.N. COMM'N ON INT'L TRADE L. [UNCITRAL], UNCITRAL MODEL LAW ON SECURED TRANSACTIONS, U.N. Sales No. E.17.V.1 (2019). *See also* Michel Deschamps, *The Best Rules for Non-Intermediated Securities*, *in* TRANSNATIONAL SECURITIES LAW 1, 1 (Thomas Keijser ed., 2d ed. 2022).

[8] *See* Satoshi Nakamoto, *Bitcoin: A Peer-to-Peer Electronic Cash System*, BITCOIN 1 (2008), https://bitcoin.org/bitcoin.pdf (describing the Bitcoin network as allowing payments to be sent directly from one party to another "without the burdens of going through a financial institution").

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issuances of bonds, shares, and investment participations since a specific legal framework, the Electronic Securities Act (eWpG), was introduced in 2020.[9] Issuers often contract specific service providers to assist them with the technological, legal, and financial aspects of the issuance. Sometimes these service providers use existing infrastructure, such as the Ethereum blockchain, to issue tokens representing securities;[10] others have their own dedicated infrastructure on which they register securities.[11] In France, common blockchain platforms exist, such as Blockpulse and Axiocap (part of the Infogreffe group). In 2023 alone, the Axiocap platform was used by approximately 50,000 issuers and 70,000 shareholders, representing over 100 billion euros raised through the platform's private blockchain.[12] In China, Fusang operates with a license as a traditional stock exchange but focuses on digital securities.[13] Fusang provides services to issuers, brokers, and institutional investors. In the United States, the legal and regulatory framework for crypto assets is undergoing profound change, with one core policy goal being the creation of a favorable landscape for issuing and trading in crypto securities.[14]

Each of these different intermediaries uses different technologies and often a dedicated ledger. The result is a proliferation of different blockchains in various countries, which risks fragmenting the market and rendering investments complicated. New intermediaries have emerged that bridge these variations and allow trading across different asset classes and infrastructures.[15] In addition to their function as trading platforms, they may also provide custody services, thus replicating the role of custodians in the

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[9] *See Kryptowertpapierliste nach eWpG [Crypto securities list according to eWpG]*, BUNDESANSTALT FÜR FINANZDIENSTLEISTUNGSAUFSICHT [FEDERAL FINANCIAL SUPERVISORY AUTHORITY], https://www.bafin.de/DE/PublikationenDaten/Datenbanken/Kryptowertpapiere/kryptowerte_node.html (last visited May 9, 2025).

[10] An example is e-Sec. *See* E-SEC, https://e-sec.io/en/ (last visited May 9, 2025).

[11] An example is Cashlink, which uses the Cashlink connect system. *See* CASHLINK, https://cashlink.de/en/ (last visited May 9, 2025).

[12] We are grateful to Hubert de Vauplane for this information on the French market.

[13] *See* FUSANG, https://fusang.co (last visited June 4, 2025).

[14] *See generally* U.C.C. art. 12 (AM. L. INST. & UNIF. L. COMM'N 2022). *See also US Financial Regulators Chart New Path Forward for the Crypto Industry*, BAKER & HOSTETLER (May 22, 2025), https://www.bakerlaw.com/insights/us-financial-regulators-chart-new-path-forward-for-the-crypto-industry/.

[15] *See, e.g.*, FINEXITY, https://finexity.com/ (last visited May 9, 2025) (discussing the regulatory developments for new technologies, including digital assets).

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traditional world of intermediated securities.[16] Yet the new intermediaries will have to cope with the variety of legal rules, which differ from country to country and from asset class to asset class.

B. Corpus of International Legal Instruments

International or transnational law may be an answer to this problem. This Article primarily focuses on international instruments concerning intermediated and digital securities. With a few exceptions, we largely abstain from discussing regional and national legal frameworks for investment securities.[17]

The first step toward the formation of an international legal framework for *intermediated securities* was the 2002/2006 Convention on the Law Applicable to Certain Rights in Respect of Securities Held with an Intermediary ("Hague Securities Convention").[18] The conflict-of-laws rules

[16] For an overview of the different functions performed by crypto platforms, see Marco Dell'Erba, *Crypto-Trading Platforms as Exchanges*, 1 MICH. ST. L. REV. 1, 50–56 (2024).

[17] Developed markets usually have well established legal frameworks for intermediated securities, although the lack of such rules in certain developing markets was one of the reasons behind the Geneva Securities Convention and the Legislative Guide on Intermediated Securities. *See* UNIDROIT, *UNIDROIT Convention on Substantive Rules for Intermediated Securities*, Oct. 9, 2009, https://www.unidroit.org/english/conventions/2009intermediatedsecurities/convention.pdf [hereinafter Geneva Securities Convention]; UNIDROIT, *UNIDROIT Legislative Guide on Intermediated Securities* (2017), https://www.unidroit.org/wp-content/uploads/2021/06/LEGISLATIVE-GUIDE-English.pdf [hereinafter *Legislative Guide*]. *See also* Kuhn & Löber, *supra* note 5, at 309, 322 (describing the nascent framework for digital securities in a range of jurisdictions). For more recent developments regarding digital assets in the U.S., the EU, and the U.K., see BAKER & HOSTETLER, *supra* note 14; Regulation (EU) 2023/1114 of the European Parliament and of the Council of 31 May 2023 on markets in crypto-assets and amending Regulations (EU) No. 1093/2010 and (EU) No. 1095/2010 and Directives 2013/36/EU and (EU) 2019/1937, 2023 O.J. (L 150) 40 [hereinafter MiCAR]; U.K. LAW COMMISSION, DIGITAL ASSETS: FINAL REPORT (2023).

[18] Convention on the Law Applicable to Certain Rights in Respect of Securities Held with an Intermediary, July 5, 2006, S. TREATY DOC. No. 112-6, 46 I.L.M. 649. The treaty was adopted in 2002 and concluded in 2006. On this (now abandoned) distinction, see Herbert Kronke, *Brüsseler Springprozession: Die Harmonisierung des Rechts zentralverwahrter Finanzinstrumente als Lehrstück über Privatautonomie, Regulierung, Lobbyismus und Verwaltung [Brussels Jumping Procession: The Harmonization of the Law on Centrally Held Financial Instruments as a Lesson on Private Autonomy, Regulation, Lobbying and Administration]*, *in* PRIVATRECHT, WIRTSCHAFTSRECHT, VERFASSUNGSRECHT: PRIVATINITIATIVE UND GEMEINWOHLHORIZONTE IN DER EUROPÄISCHEN INTEGRATION [PRIVATE LAW, COMMERCIAL LAW, CONSTITUTIONAL LAW: PRIVATE INITIATIVE AND COMMON GOOD HORIZONS IN EUROPEAN INTEGRATION] 759, 762 (Cordula Stumpf, Friedmann Kainer & Christian Baldus eds., 2015). The treaty is currently in force based on three ratifications; *see* Convention of 5 July 2006 on the Law Applicable to Certain Rights in Respect of Securities held with an Intermediary,

in this instrument were subsequently complemented by the substantive rules for intermediated systems in the 2009 UNIDROIT Convention on Substantive Rules for Intermediated Securities ("Geneva Securities Convention").[19] Although the latter treaty is not in force, its ideas are also reflected in two soft-law instruments: the 2013 Principles on the Operation of Close-Out Netting Provisions ("Close-Out Netting Principles") address the specific issue of close-out netting,[20] while the 2017 UNIDROIT Legislative Guide on Intermediated Securities provides a range of building blocks for States that wish to ensure a coherent framework for intermediated securities.[21] In the wake of the global financial crisis of 2007/2008, an abundance of related regulatory guidance was issued by bodies such as the Financial Stability Board ("FSB").[22]

Aspects of *digital assets* are addressed in several international instruments relating to private law, namely the 2021 Global Code of Digital Enforcement,[23] the 2022 European Law Institute's (ELI) Principles on the Use of Digital Assets as Security ("ELI Principles 2022"),[24] the 2023 UNIDROIT Principles on Digital Assets and Private Law ("Digital Assets Principles"),[25] and the 2025 ELI Principles and Guidance for Enforcement Against Digital Assets ("ELI Principles 2025").[26] Turmoil in the crypto markets in 2022 (but also before and after that) resulted in regulatory guidance by the FSB and the Board of the International Organization of

July 5, 2006, T.I.A.S. No. 17-401 (entered into force Apr. 1, 2017). *See also Hague Convention on the Law Applicable to Certain Rights in Respect of Securities Held with an Intermediary: Status Table*, Hague Conf. on Priv. Int'l L. (Dec. 15, 2016), https://www.hcch.net/en/instruments/conventions/status-table/?cid=72.

[19] *See* Geneva Securities Convention, *supra* note 17.

[20] *Principles on the Operation of Close-Out Netting Provisions*, UNIDROIT (2013), https://www.unidroit.org/english/principles/netting/netting-principles2013-e.pdf [hereinafter *Close-Out Netting Principles*].

[21] *Legislative Guide*, *supra* note 17.

[22] *See* Klaus Löber, *Regulation, Supervision, and Oversight*, *in* TRANSNATIONAL SECURITIES LAW 254 (Thomas Keijser ed., 2d ed. 2022).

[23] INT'L UNION OF JUD. OFFS. [UIHJ], GLOBAL CODE OF DIGITAL ENFORCEMENT (Marc Schmitz ed., 2021).

[24] EUR. L. INST. [ELI], ELI PRINCIPLES ON THE USE OF DIGITAL ASSETS AS SECURITY [hereinafter *ELI Principles 2022*] (2022), https://www.europeanlawinstitute.eu/fileadmin/user_upload/p_eli/Publications/ELI_Principles_on_the_Use_of_Digital_Assets_as_Security.pdf.

[25] *See Digital Assets Principles*, *supra* note 6.

[26] ELI, ELI PRINCIPLES AND GUIDANCE FOR ENFORCEMENT AGAINST DIGITAL ASSETS [hereinafter *ELI Principles 2025*] (2025), https://www.europeanlawinstitute.eu/fileadmin/user_upload/p_eli/Projects/Access_to_Digital_Assets/ELI_Principles_and_Guidance_for_Enforcement_Against_Digital_Assets.pdf.

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Securities Commissions (IOSCO), including the *FSB Global Regulatory Framework for Crypto-Asset Activities: Umbrella public note to accompany final framework* (July 2023), the FSB's *High-level Recommendations for the Regulation, Supervision and Oversight of Crypto-Asset Activities and Markets: Final report* (July 2023), and IOSCO's *Policy Recommendations for Crypto and Digital Asset Markets: Final Report* (November 2023) ("IOSCO Crypto Recommendations").[27] The Hague Conference on Private International Law is currently working on several interrelated projects regarding conflict-of-laws aspects of the digital ecosystem, including the impact of digital developments in securities markets on the Hague Securities Convention.[28]

The instruments mentioned concern a broad range of assets, such as cryptocurrencies, stablecoins, and non-fungible tokens. Yet they also include digital representations of securities. It is true that the Digital Assets Principles do not deal specifically with securities which they regard as "linked assets."[29] However, this strict separation is not entirely convincing: a share remains a share whether it is printed on paper, recorded electronically centrally, or on a blockchain. Moreover, such a separation may mean that different legal regimes apply to the record on the blockchain and the "linked" rights against the issuer. Moreover, even if one accepts this approach, there is not a shadow of a doubt that the Principles cover the token representing such securities, (e.g., a tokenized share or bond). This token meets all the criteria of a digital asset and is therefore subject to the suggestions by UNIDROIT. As a result, its transfer, custody, and use as collateral follow the national law implementing the Principles. While certain aspects of securities law (e.g., corporate management and organization) are a different matter, the rules governing digital assets may therefore be of vital importance for the identification of the shareholder or bondholder. After all, that is the prime

[27] *See, e.g.*, BD. OF GOVERNORS OF THE FED. RSRV. SYS., FED. DEPOSIT INS. CORP., AND OFF. OF THE COMPTROLLER OF THE CURRENCY, JOINT STATEMENT ON CRYPTO-ASSET RISKS TO BANKING ORGANIZATIONS (Jan. 3, 2023); Ilya Kokorin, *Crypto Insolvencies and the Limits of a Contract and Contract Law*, 6 EUR. REV. PRIV. L. 1245 (2023); Carla L. Reyes, *Law's Detrimental Reliance on Intermediaries*, 92 GEO. WASH. L. REV. 1343 (2024).

[28] Hague Conference on Private International Law, Council on General Affairs and Policy (CGAP) 2006 Securities Convention and Digital Developments in respect of Securities Markets: Update (Mar. 2025), https://assets.hcch.net/docs/14c88052-0a7c-43cc-a96d-841defeec518.pdf. The Digital Assets Principles and the ELI instruments also contain conflict-of-laws rules that are relevant to digital assets.

[29] *Digital Assets Principles*, *supra* note 6, at cmts. 4.1, 4.3, 4.21.

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reason why shares and bonds are tokenized—to transfer title to them through a transfer on the blockchain.

Moreover, there are different practical arguments in favor of maximizing convergence of the legal frameworks for tradfi and digital securities. For example, an entity may issue investment securities in different installments in different forms (e.g., intermediated, digital); different types of investment securities may be part of a single portfolio that is provided as collateral; different types of securities may be covered by the same master agreement for financial transactions; digital securities may be linked to a portfolio of tradfi securities; and it may not always be clear whether an instrument qualifies as an intermediated security or a digital asset. Careful consideration should therefore be given to where the legal frameworks for intermediated and digital securities can be aligned.

Our investigation concerns both private and regulatory law.[30] The dividing line between these categories is not always clear cut. This ambiguity becomes apparent when one takes a closer look at the instruments regarding intermediated securities. Whereas the Geneva Securities Convention deals primarily with issues of private law,[31] the Close-Out Netting Principles and the Legislative Guide on Intermediated Securities pay attention to issues of both private law and related regulatory law as a result of the global financial crisis.[32] Furthermore, even if the Digital Assets Principles aim to avoid regulatory aspects, it is not always easy to draw the line between private law and regulation.[33] As thoughtfully phrased by Luc Thévenoz, "certain points dealt with as part of regulatory law [are] in fact points of private law."[34] We have heeded his advice "to take a broad approach and go beyond labels such as 'private law' or 'regulatory law' to look instead at the merits."[35]

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[30] On their interrelation, see Josef Wittmann, *Financial Market Regulation and Private Law: A New Frontier of Transnational Commercial Law*, 28 UNIF. L. REV. 349 (2023).

[31] Geneva Securities Convention, *supra* note 17, at Preamble; KANDA ET AL., *supra* note 4, at 11–12.

[32] On regulation, see *Close-Out Netting Principles*, *supra* note 20, at princ. 8; *Legislative Guide*, *supra* note 17, at paras. 78, 263, 272, 276–77, 280–82, 288, 312–17, 320–21.

[33] *Digital Assets Principles*, *supra* note 6, at cmt. 0.9.

[34] UNIDROIT, *Digital Assets and Priv. L. Working Grp.*, Study LXXXII—W.G.1—Doc. 4, at para. 11 (2021).

[35] *Id.*

C. Note on Terminology

The terms "account holder" and "intermediary" are commonly used in relation to intermediated securities, whereas "client" and "custodian" are often used for digital assets. Likewise, intermediaries are often said to "hold" intermediated securities, while custodians "maintain" digital assets. We will largely follow this practice when referring to intermediated or digital securities specifically, but where we mean either type of security, we will use these terms rather loosely.

II. CLIENT RIGHTS AND CORRESPONDING INTERMEDIARY OBLIGATIONS

A cornerstone of the legal framework for intermediation is the set of rights for clients and corresponding obligations for their custodians. For example, Article 9 of the Geneva Securities Convention relates to the rights of an account holder, while Article 10 spells out the corresponding duties of the account holder's intermediary.[36] Likewise, Principle 11 of the Digital Assets Principles concerns the client-custodian relationship, although it frames this matter primarily from the viewpoint of the custodian.[37] Common elements in these provisions are dispositions, corporate actions, and mechanisms to safeguard securities.

One of the principal rights of an account holder against their intermediary is the holder's right to dispose of their securities. The intermediary's corresponding duty is to enable the account holder to exercise this right and to give instructions to effect a disposition, while the intermediary should also not dispose of an account holder's securities without authorization.[38] Likewise, Principle 11(1)(b) of the Digital Assets Principles relates to a custodian's obligation to comply with an instruction given by a client to transfer a digital asset, while Principle 11(1)(a) determines that a custodian is not authorized to transfer a client's digital

[36] Geneva Securities Convention, *supra* note 17, arts. 9, 10.

[37] *Digital Assets Principles*, *supra* note 6, at princ. 11.

[38] *See* Geneva Securities Convention, *supra* note 17, at arts. 9(1)(b), 10(1), 10(2)(c)–(d), 15, 23; *Legislative Guide*, *supra* note 17, at paras. 82, 102, 114–17.

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asset, or use the asset for its own benefit, except to the extent permitted by the client and by other laws.[39]

Another key aspect of the investor-intermediary relationship is the processing of corporate actions such as voting instructions, income payments (e.g., dividends or interest payments), and information flows (e.g., corporate information provided by an issuer or elections by investors). Corporate actions may be processed "down" the chain from issuer to intermediary to investor or, vice versa, "up" through that chain. The Geneva Securities Convention and the Legislative Guide on Intermediated Securities spell out the different types of corporate actions, and their processing "up" and "down" the intermediated chain, in relative detail.[40] Principle 11(3)(e) of the Digital Assets Principles is more rudimentary.[41] It contains no positive obligation to process corporate actions but merely states that a custodian "may be" required to pass the "benefits" arising from digital assets to its client. This formulation only covers the passing of corporate actions from custodian to investor, but not from investor to custodian. We elaborate on corporate actions in Section V.

In addition, it is crucial that custodians are holding investor assets safely. To this end, the Geneva Securities Convention and the Legislative Guide on Intermediated Securities require intermediaries to hold sufficient securities and to allocate such securities to account holders (notably by way of segregation), while these instruments also provide loss-sharing rules should a shortfall nonetheless occur.[42] As in the case of corporate actions, the protection mechanisms in the context of digital assets, as set out in Principle 11(1)(c) and 11(3)(a)-(d) of the Digital Assets Principles, are largely optional, while the loss-sharing rules envisaged in Principle 13 are somewhat different from those for intermediated securities.[43] These topics are discussed further in Section VI.

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[39] On the topic of dispositions, *see also* Thomas Keijser, *From Intermediated Securities to Digital Assets: Aspects of Client Protection*, *in* ROUTLEDGE HANDBOOK ON TRANSNATIONAL COMMERCIAL LAW 417, 419–20 (Bruno Zeller & Camilla Baasch Andersen eds., 2025).

[40] *See* Geneva Securities Convention, *supra* note 17, arts. 9(1)(a), 10(1), 10(2)(e)–(f); *Legislative Guide*, *supra* note 17, at paras. 72, 78, 82, 102, 110–13, 246–50, 322.

[41] *See also Digital Assets Principles*, *supra* note 6, at cmt. 11.14.

[42] *See* Geneva Securities Convention, *supra* note 17, at arts. 10(2)(a)–(b), 24–26; *Legislative Guide*, *supra* note 17, at paras. 209–19, 259–61, 264–66.

[43] *Digital Assets Principles*, *supra* note 6, at princs. 11(1)(c), 11(3)(a)–(d), 13.

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III. FINALITY OF DISPOSITIONS

An aspect that is critical for dispositions is their finality. Finality has been defined as an "irrevocable and unconditional transfer of an asset or financial instrument."[44] Simply phrased, finality means that a transfer can no longer be legally questioned. In most jurisdictions, this is tantamount to saying that the "title has passed" from the transferor to the transferee. This does not necessarily have to be a proprietary right; finality also exists in the payment sector, where it is relevant, *inter alia*, for the discharge of obligations.[45] Crucial for understanding finality is its effect against third parties: the recipient is recognized as having acquired title against the whole world (*erga omnes*).

Finality is of the utmost importance. It captures the static distribution of assets: the "mine" and "thine." This is decisive for the accuracy of balance sheets, audit statements, corporate equity, and own funds of banks. Finality determines a person's wealth, solvency, and liquidity. Where finality is questioned, doubts about title, property, and creditworthiness quickly arise, which may spiral out of control and into financial crises. That is why exceptions to finality, such as avoidance in insolvency or through the *actio pauliana*, must remain a rarity and not become a rule in the financial markets. In an otherwise dynamic world, finality is the linchpin of stability.

Given its broad implications, regulators have a keen interest in finality. Yet, legal certainty cannot be achieved by supervisory measures alone; it requires a stable private law framework. In the European Union, this framework is provided by the Finality Directive and the Financial Collateral Directive along with implementing national laws.[46]

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[44] COMMITTEE ON PAYMENT AND SETTLEMENT SYSTEMS [CPSS] & INT'L ORGANIZATION OF SECURITIES COMMISSIONS [IOSCO], PRINCIPLES FOR FINANCIAL MARKET INFRASTRUCTURES 64 (2012).

[45] *See id.*

[46] *See* Directive 98/26/EC of the European Parliament and of the Council of 19 May 1998 on Settlement Finality in Payment and Securities Settlement Systems, 1998 O.J. (L 166) 45 [hereinafter Finality Directive]; Directive 2002/47/EC of the European Parliament and of the Council of 6 June 2002 on Financial Collateral Arrangements, 2002 O.J. (L 168) 43 [hereinafter Financial Collateral Directive]. *See also* Regulation 909/2014 of the European Parliament and of the Council of 23 July 2014 on Improving Securities Settlement in the European Union and on Central Securities Depositories and Amending Directives 98/26/EC and 2014/65/EU and Regulation 236/2012, arts. 39–40, 2014 O.J. (L 257) 1 [hereinafter CSDR].

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The moment of transfer finality is marked differently depending on the nature of the asset, the supporting technology, and the legal tradition.[47] For tangible movable goods, such as paper securities, finality is assumed at the moment of the conclusion of a sales contract, or the transfer of possession, for example, or in accordance with the parties' intentions.[48]

For intermediated securities, a different approach has been necessary. The conditions for transfers of custodied securities have always been primarily defined in relation to the intermediary level.[49] In general terms, this approach is sometimes referred to as the "tier-by-tier" approach.[50] The Geneva Securities Convention (the "Convention") regards book entries, such as a credit, to the account of the holder as decisive.[51] For example, the Convention provides that the credit to a securities account confers on the account holder the "right to receive and exercise any rights attached to the securities" and the right to dispose of them.[52] These rights are also protected in insolvency proceedings.[53] However, the Convention does not define whether the client has acquired property or another title with regard to securities themselves and how such title may be exercised against the issuer.

This is a different matter, which may depend on the existence of sufficient securities on other levels of the intermediary chain.[54] To illustrate, where the intermediary does not hold sufficient securities in its own portfolio or with other intermediaries, the shortfall must be borne by its clients; the "title" that the account holder acquires at the intermediary level, even if it is "final," may be of little or no worth when exercised against upper-tier intermediaries or the issuer.[55] The Geneva Securities Convention merely protects the account holder against competing acquirers and other creditors

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[47] *See, e.g.*, Code civil [C. civ.] [Civil Code] art. 1196 (Fr.) (transfer takes place with conclusion of contract); C.C. art. 1462 (Spain) (stating that the thing is deemed to have been delivered at time of transfer of possession to buyer); Sale of Goods Act 1979, c. 54, § 17 (U.K.) (making transfer of property dependent on parties' intention).

[48] Code civil [C. civ.] [Civil Code] art. 1196 (Fr.); Sale of Goods Act 1979, c. 54, § 17 (U.K.).

[49] *Legislative Guide*, *supra* note 17, at 305.

[50] *Id.* at 304.

[51] Geneva Securities Convention, *supra* note 17, at arts. 11(1) (acquisition by way of a credit) and 27 (referring to the rules of the relevant clearing or settlement system concerning the finality of both instructions and resulting book entries).

[52] *Id.* at arts. 9(1)(a) & (b).

[53] *Id.* at arts. 9(1), 14.

[54] On investor asset protection, see *infra,* Section VI.

[55] For different methods of holding sufficient securities, see Geneva Securities Convention, *supra* note 17, at art. 24(2).

of their intermediary.[56] However, in relation to upper-tier entities, the account holder has only the rights that attach to the securities held by its own intermediary.[57] Where the Convention gives account holders rights directly against the issuer, this is conditional upon the implicit assumption that the client's intermediary has sufficient securities of the issuer in its custody.[58] The account holder can never exercise more rights than what are held by its own intermediary; if it did, a hyperinflation of securities would ensue, diluting the rights of other shareholders and bondholders and undermining financial stability.[59]

Wholly new challenges arise in the context of digital securities, where title is recorded not on the books of an intermediary, but on a distributed ledger. The precise moment when the recording is considered "final" by market participants varies depending on the technology used. For proof-of-work networks, like Bitcoin, a precise moment cannot be determined.[60] Rather, a reversal becomes increasingly improbable with every validation round after the confirmation of a transfer, which is why one speaks of "probabilistic finality."[61] In proof-of-stake networks, such as Ethereum, a transaction reversal incurs a heavy financial penalty; therefore, one may speak of "economic finality."[62] For other technologies, there are yet further types of finality.[63]

These problems relate to the technological side of the matter. Finality in the legal sense can be determined independently, e.g., through statutory

[56] *Id.* at arts. 18, 21.

[57] *Id.* at art. 24.

[58] *See, e.g.*, *id.* at art. 9(2).

[59] *But see* KANDA ET AL., *supra* note 4, at 7–8 (discussing transparent systems). *See also id.* at 45–46.

[60] *See* Hossein Nabilou, *Settlement Finality and Legal Certainty in Proof-of-Work Blockchains*, *in* DIGITAL ASSETS IN ENFORCEMENT AND INSOLVENCY 235, 245–46 (Christian Koller & Matthias Lehmann eds., 2025).

[61] *Id.* at 248.

[62] Fabian Schär, European Comm'n, *Enhancing Financial Services with Permissionless Blockchains* at 4.4, 5.4 (2024).

[63] For an overview, see *What is Transactional Finality in Crypto? A Complete Guide*, NERVOS NETWORK (May 28, 2024), https://www.nervos.org/knowledge-base/What_is_finality_crypto (explaining CKBot).

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fiction. Yet, the law must not be too removed from reality; otherwise, it risks being ignored.[64]

The Digital Assets Principles (the "Principles") do not define a precise moment of finality for blockchain transfers; instead, they leave the question of "whether a proprietary right in a digital asset has been validly transferred to another person" to "other law," i.e., national law.[65] The Principles do address innocent acquisition, but in this context, they require that the transferee must obtain control of a digital asset.[66] The notions of "control" and "change of control" are defined by referring to certain (exclusive) abilities, such as the ability to transfer the asset or prevent others from obtaining substantially all the benefit from the digital asset.[67] However, these definitions raise the question of when such an ability, and consequently, control, is achieved. The Principles do not give an answer to that.

The circumstance that crypto custodians may register crypto assets both in off-chain books and records and in corresponding on-chain wallets further complicates the analysis.[68] The concept of the "tier-by-tier approach" is helpful for elucidating the distribution of rights in the context of off-chain blockchain securities. If the latter are held by a custodian, transfers to other investors are final when they are entered in the account of the intermediary. At this moment, the title passes to the client *on this level*. However, such an off-chain transfer needs to correspond to the property distribution *on the blockchain*, to which end additional steps may be necessary, e.g., recording the transfer on the blockchain. At this point, the array of finality standards for the corresponding on-chain crypto assets creeps into the analysis again. If the entries in the off-chain books of crypto custodians are not backed up by "final" registrations of crypto assets on corresponding on-chain ledgers, investors may be left with mere contractual claims. Clearly, any mismatch in

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[64] *See also* Louise Gullifer & Richard Hay, *How Final is Final? Settlement Finality, Blockchains and DLT*, 1 J. INT'L BANKING & FIN. L. 8 (2020); Amy Held, *Finality, Rights in Rem, and the Blockchain: Can Transactions in Crypto Assets Be Set Aside?*, *in* DIGITAL ASSETS IN ENFORCEMENT AND INSOLVENCY 265 (Christian Koller & Matthias Lehmann eds., 2025).

[65] *See Digital Assets Principles*, *supra* note 6, at princ. 3.3(b).

[66] *Id.* at princ. 8.1(a).

[67] *Id.* at princ. 6.

[68] *See* INT'L SWAPS & DERIVATIVES ASS'N [ISDA], NAVIGATING BANKRUPTCY IN DIGITAL ASSET MARKETS: DIGITAL ASSET INTERMEDIARIES AND CUSTOMER ASSET PROTECTION 16–17 (2023), https://www.isda.org/a/CrLgE/Navigating-Bankruptcy-in-Digital-Asset-Markets-Digital-Asset-Intermediaries-and-Customer-Asset-Protection.pdf.

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the timeline of the finality of entries in corresponding registers should be either excluded or reduced to a minimum.

In short, "finality" is a complex issue. In the crypto context, legal standards designed for intermediated securities may only be partly relevant and must co-exist with finality rules that reflect the variety of technology underpinning digital assets.

IV. FINANCIAL COLLATERAL

Over the past few decades, an innovative, detailed legal regime has emerged for collateral transactions involving intermediated securities. This regime is apparent from instruments such as the 2002 EU Financial Collateral Directive,[69] which, in turn, was a blueprint for Chapter V of the Geneva Securities Convention with "Special Provisions in Relation to Collateral Transactions."[70] Key aspects of this regime originate from U.S. and U.K. financial market practices and tie in with standardized market documentation for repos, securities lending, and derivatives, which financial products became ever more popular since the 1990s.[71]

Content-wise, the regime for financial collateral consists of special rules on a range of topics that deviate from customary private and secured transactions law. These rules include the provision of collateral with minimal formalities, a prohibition of the recharacterization of a transfer as a security interest, a collateral taker's right of use in connection with a security interest (i.e., an unfettered right of disposal, also in the absence of default by the collateral provider),[72] liberal enforcement and close-out netting rules, and the abolition of certain insolvency rules. A notable feature of the regime is its creditor-friendliness; this feature was introduced to enhance liquidity in the financial markets. However, during the global financial crisis of 2007–2008, problems arose that led to some regulatory restrictions of the creditor-

[69] Financial Collateral Directive, *supra* note 46.

[70] Geneva Securities Convention, *supra* note 17, at ch. V.

[71] Currently popular master agreements are the Global Master Repurchase Agreement (GMRA) for repos, the Global Master Securities Lending Agreement (GMSLA) for securities lending transactions, and documentation issued by the International Swaps and Derivatives Association (ISDA) for collateral provided in the context of derivatives. These documents have developed over time, and other standardized agreements are also available for these financial arrangements.

[72] This structure may be qualified as an irregular pledge.

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friendly approach, including by way of a regulatory stay on enforcement.[73] When dealing with financial collateral, there are thus three various legal "mindsets" that should be considered: customary private and secured transactions law, creditor-friendly modifications thereof, and subsequent regulatory constraints.[74]

Besides intermediated securities, the existing regime for financial collateral may also cover other financial assets such as cash and credit claims, but it was crafted without digital assets in mind.[75] The extent to which this prevailing regime is suitable for digital assets is the subject of ongoing discussion. For example, Liu and Gullifer argue that the current U.K. regime for financial collateral transactions[76] (which mirrors the EU regime and the Geneva Securities Convention) is "messy and unsatisfactory" and that segments of digital assets markets may have specific features, such as the policy objective of incentivizing innovation or certain technological characteristics (such as a heavy reliance on automation). For those market segments, Liu and Gullifer propose the design of a legal regime for collateral transactions involving digital assets from a clean slate, although this does not deny that there are good arguments in favor of convergence where tradfi and digital securities serve similar functions.[77]

We will not assess all the features of the current financial collateral regime here in terms of their suitability for digital assets. We will limit ourselves to an example that reveals significant deviations in the approach

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[73] See notably Financial Stability Board [FSB], *Key Attributes of Effective Resolution Regimes for Financial Institutions*, 4.2-4, App.1, Annex 5 (revised version, Apr. 25, 2024).

[74] The financial collateral regime as it currently stands is discussed extensively in literature. *See generally* Louise Gullifer, *What Should We Do About Financial Collateral?*, 65 CURRENT LEGAL PROBS. 377 (2012); FINANCIAL COLLATERAL LAW AND PRACTICE (Matthias Haentjens ed., 2020); Matthias Haentjens et al., *Financial Collateral: From Private to Regulatory Law Reform*, *in* TRANSNATIONAL SECURITIES LAW 26 (Thomas Keijser ed., 2d ed. 2022) (as updated on the Oxford Law Pro platform in January 2025); Thomas Keijser, *Financial Collateral Arrangements in the European Union: Current State and the Way Forward*, 22 UNIF. L. REV. 258 (2017); Riz Mokal, *Liquidity, Systemic Risk, and the Bankruptcy Treatment of Financial Contracts*, 10 BROOK. J. CORP. FIN. & COM. L. 15 (2015); Marcel Peeters, *On Close-out Netting*, *in* TRANSNATIONAL SECURITIES LAW 60 (Thomas Keijser ed., 2d ed. 2022).

[75] *See, e.g.*, Financial Collateral Directive, *supra* note 46, at arts. 2(1)(d)-(e), (o).

[76] *See* Financial Collateral Arrangements (No. 2) Regulations 2003, SI 2003/3226 (Eng.)

[77] Hin Liu & Louise Gullifer, *Financial Collateral Arrangements in the Digital Assets World*, 8 J. INT'L BANKING & FIN. L. 527, 532–33 (2022). For practical arguments in favor of convergence, *see supra* Section I.B (under "Corpus of international legal instruments").

for the two asset classes in the ongoing debate, namely consumer (retail investor) protection.

The liberalization of rules regarding financial collateral triggered a lively debate on their personal scope, as reflected in Article 1(2)-(3) of the Financial Collateral Directive and Article 38(2)(a) of the Geneva Securities Convention.[78] Arguments put forward in this context include the following: the availability of credit as a function of enhanced rights for collateral takers; the resulting liquidity of financial markets; the position of wholesale market participants, whose more or less equal bargaining position arguably makes inroads into the domain of property and insolvency law acceptable; the potential negative consequences for smaller enterprises and natural persons when dealing with more powerful financial institutions that may determine the conditions under which credit is made available; and the relative competitiveness of markets (race to the bottom). Although several authors have argued that the creditor-friendly rules reflected in the Financial Collateral Directive and the Geneva Securities Convention should apply only to wholesale market participants,[79] various EU Member States have opted for a wider personal scope in their implementation of the Directive, resulting in a rather fragmented European landscape on this point.[80]

This wide-ranging debate about the desirable personal scope of the current framework is missing in the Digital Assets Principles. The Principles generally envisage a broad personal scope, including "entrepreneurs/businesses" and even "consumers."[81] Section V ("Secured Transactions") of the Digital Assets Principles does not contain any limitations of this broad scope to protect actors with a relatively weak bargaining position. This approach may be justified by the idea that the position of investors in digital assets will be markedly improved by the proprietary rights they are allotted. It could be argued that investors of every stripe should have the liberty to use this position for secured transactions. However, this argument becomes increasingly problematic the more

[78] *See, e.g.*, Gullifer, *supra* note 74, at 401–03, 409–10; Keijser, *supra* note 74, at 292–94.

[79] Gullifer, *supra* note 74, at 401–03, 409–10; Keijser, *supra* note 74, at 292–94.

[80] Commission of the European Communities, *Evaluation Report on the Financial Collateral Arrangements Directive (2002/47/EC)*, COM (2006) 833 final, at 8–9 (Dec. 20, 2006); European Commission, *Summary Report of the Targeted Consultation on the Review of the Directive on Financial Collateral Arrangements*, at 7–12 (June 28, 2023), https://finance.ec.europa.eu/system/files/2023-06/2021-financial-collateral-review-summary-of-responses_en_0.pdf.

[81] *See Digital Assets Principles*, *supra* note 6, cmt. 0.8.

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securities are recorded in digital form. As the blockchain encroaches on the traditional landscape of securities law, it becomes ever more necessary to adopt similar protective rules. This also concerns the personal scope of rules for financial collateral transactions with intermediated or digital securities because differences here would lead to unjustified investor discrimination. This approach is also in line with the general "same activity, same risk, same regulation/regulatory outcomes" adage propagated by both the FSB and IOSCO.[82]

The importance of investor protection may be illustrated using the issue of enforcement. Article 4 of the Financial Collateral Directive and Article 33 of the Geneva Securities Convention contain significantly looser enforcement requirements than those typically available for secured transactions. A collateral taker can, for example, enforce without prior notification, the involvement of an independent third party, or procedures such as a public auction. It may essentially only be bound by a standard of commercial reasonableness or good faith post enforcement.[83] Section V ("Secured Transactions") of the Digital Assets Principles, especially Principle 17 on enforcement, is an amalgam of general secured transactions law and aspects of the creditor-friendly regime for financial collateral and other specific asset classes that echoes the liberal law reform and potentially broadens its scope. Likewise, the ELI Principles on the Use of Digital Assets as Security (2022) generally promote "flexibility and efficiency" in the context of enforcement of collateral arrangements, relying solely on

[82] *See* Fin. Stability Bd. [FSB], *FSB Global Regulatory Framework for Crypto-Asset Activities*, at 1, 3 (July 17, 2023), https://www.fsb.org/uploads/P170723-1.pdf; FSB, *High-Level Recommendations for the Regulation, Supervision and Oversight of Crypto-Asset Activities and Markets*, at 5 (July 17, 2023), https://www.fsb.org/uploads/P170723-2.pdf. *Cf.* IOSCO, *Policy Recommendations for Crypto and Digital Asset Markets Final Report*, at 1 (Nov. 16, 2023), https://www.iosco.org/library/pubdocs/pdf/IOSCOPD747.pdf [hereinafter IOSCO, *Policy Recommendations*]. *Cf.* Liu & Gullifer, *supra* note 77, at 533 (arguing that any carve-out in the context of new rules for digital assets should be "as narrow as necessary"); IOSCO, *Policy Recommendations*, at 11 (finding that "robust investor protection measures are essential" given factors such as exponential growth of retail investments in crypto-assets and a history of losses by retail investors in crypto markets).

[83] Financial Collateral Directive, *supra* note 46, at art. 4(6); Geneva Securities Convention, *supra* note 17, at art. 35; *Digital Assets Principles*, *supra* note 6, at cmt. 17.6. On the debate on the pros and cons of such a standard post enforcement instead of mechanisms to guarantee fair valuation during enforcement, see Thomas Keijser, *Enforcement of Security Interests in Transnational Commercial Law: Current State and Future Trends*, 2 TRANSNAT'L COMM. L. REV. 1, 5–6 (2022); Anna Veneziano, *The Contours of 'Commercial Reasonableness' under the Cape Town Convention*, 7 CAPE TOWN CONVENTION J. 83 (2018).

standards of good faith and commercial reasonableness to protect the interests of the debtor and third parties.[84] However, because enhanced rights of collateral takers have a direct impact on the position of collateral providers and their other creditors, the confines of liberalized rules and their impact on investor protection need to be determined carefully, with coherence between different types of investment securities in mind.

V. CORPORATE ACTIONS PROCESSING: THE CASE FOR (SELF-)REGULATION

A core task that must be carried out in relation to investment securities is the processing of corporate actions, such as voting rights, income payments, and information flows between issuers of and investors in securities. However, especially in the context of intermediated securities, these processes have been plagued by inefficiencies, errors, and other problems for decades.[85] While processing corporate actions up and down the intermediary chain, a variety of actors (including the issuer, its transfer agent, securities depositories, intermediaries, other service providers, and investors) may be confronted with different (non-interoperable) legacy systems, unclear or inconsistent information, duplication of work, manual processes, (overly) tight timelines, inconsistent data formats, incompatible legal frameworks, and the like. Growing volumes are rendering this issue more acute and increasingly costly.[86]

Papers by ISSA and the ValueExchange, reflecting industry input from across the globe, identify further automation (including by way of smart contracts and applications of artificial intelligence) and standardized formats (such as ISO20022 and its predecessor ISO15022) as possible solutions.[87] They also refer to issuers and their transfer agents as actors who can produce

[84] *See ELI Principles 2022*, *supra* note 24, at 32–33. However, ELI Principle 1 explicitly recognizes the carve-out of the "dedicated regime" of the Financial Collateral Directive. *Id.* at 23; Financial Collateral Directive, *supra* note 46.

[85] *See, e.g.*, INT'L SEC. SERVS. ASS'N [ISSA], *Corporate Action Data Sourcing: The Case for a Standardized, Automated Single Source Model* (2023), https://issanet.org/content/uploads/2023/02/ISSA-Data-Sourcing-White-Paper-February-2023.pdf; Thomas Keijser & Maria Vermaas, *Corporate Actions Processing: Bridging the Gap Between Issuer and Investor*, *in* TRANSNATIONAL SECURITIES LAW, 147 (Thomas Keijser ed., 2d ed. 2022); Mooney & Rocks, *supra* note 1, at 368–71, 375–87; VALUEEXCHANGE, *Asset Servicing Automation* (2024), https://thevx.io/wp-content/uploads/2024/09/Asset-Servicing-Automation-2024-Full-Report.pdf.

[86] ISSA, *supra* note 85, at 5; VALUEEXCHANGE, *supra* note 85, at 4.

[87] ISSA, *supra* note 85, at 8; VALUEEXCHANGE, *supra* note 85, at 32.

standardized, "golden copy" event information at source and could thus be key enablers in solving bottlenecks in the current infrastructure.[88] Moreover, the reports single out the potential for more robust (self-)regulation, which is the focus of this section.[89]

Some international standards for corporate actions in the context of intermediated securities may be found in the Geneva Securities Convention and the Legislative Guide on Intermediated Securities.[90] These instruments underscore the importance of processing voting rights, income payments, and information flows up and down the intermediated chain.[91]

In Europe, a more detailed framework with primarily intermediated securities in mind has been developed in the context of the launch of the TARGET2-Securities (T2S) settlement platform. To turn the tide in the problematic corporate actions sector, standards have been developed by the private sector in conjunction with legislation. The current framework consists of the 2009/2015 Market Standards for Corporate Actions Processing,[92] the 2010 Market Standards for General Meetings,[93] and the complementary T2S Corporate Actions Standards.[94] These initiatives dovetail with the 2017 amendment of the Shareholder Rights Directive (SRD2)[95] and the detailed complementary guidance in Commission Implementing Regulation (EU) 2018/1212 by establishing minimum requirements regarding shareholder identification, the transmission of information, and the facilitation of the

[88] ISSA, *supra* note 85, at 5; VALUEEXCHANGE, *supra* note 85, at 27.

[89] ISSA, *supra* note 85, *passim*; VALUEEXCHANGE, *supra* note 85, at 32–33.

[90] *See* Geneva Securities Convention, *supra* note 17, at arts. 9(1)(a), 10(2)(e)–(f); *Legislative Guide*, *supra* note 17, at paras. 72, 78, 82, 102, 110–13, 246–50, 322.

[91] *See also* Keijser, *supra* note 39, at 423–24.

[92] CORPORATE ACTIONS JOINT WORKING GROUP [CAJWG], *Market Standards for Corporate Actions Processing* (rev. 2015), https://www.ecb.europa.eu/paym/target/t2s/governance/pdf/casg/ecb.targetseccasg120606_MarketStandardsForCorporateActionsProcessingCAJWGStandardsRevised2012Updated2015.en.pdf.

[93] JOINT WORKING GROUP ON GENERAL MEETINGS, *Market Standards for General Meetings* (2010), https://www.ebf.eu/wp-content/uploads/2017/07/Market-Standards-for-General-Meetings.pdf.

[94] EUR. CENT. BANK, *T2S Corporate Actions Standards* (2018), https://www.ecb.europa.eu/paym/target/t2s/governance/pdf/casg/ecb.targetseccasg180308_T2SCAStandardsFAQsUpdatedMarch2018.en.pdf.

[95] Directive 2017/828 of the European Parliament and of the Council of 17 May 2017 Amending Directive 2007/36/EC as Regards the Encouragement of Long-Term Shareholder Engagement, 2017 O.J. (L 132) 1 [hereinafter Directive 2017/828].

exercise of shareholders' rights.[96] Although SRD2 relates to shares only,[97] not to bonds, it is driving significant automation in Europe, but mainly regarding notifications from the top to the bottom of the intermediated chain, less so for reverse communications.[98]

These international and EU instruments, which were developed with primarily intermediated securities in mind, may be instrumental in shaping a legal framework for corporate actions processing in relation to digital securities. To what extent does or should the legal framework for intermediated securities apply? Are there additional issues that need to be addressed?

The initial discussion on digital assets saw distributed ledger technology as an opportunity to address all kinds of shortcomings arising from intermediation, including in the field of corporate actions. The underlying technology would allow a "golden record" of relevant information to be available to all nodes involved, facilitating seamless corporate actions processing.[99] However, the appearance of custody and permissioned ledgers in the crypto space altered this premise. Intermediaries were, again, interposed between issuers and investors. Nonetheless, the ready availability of data in a distributed ledger setting may facilitate corporate actions operations to a greater extent than in the intermediated setting.[100]

For digital securities, the 2023 UNIDROIT Principles on Digital Assets and Private Law touch on corporate actions but provide less guidance than the UNIDROIT instruments on intermediated securities. Principle 11(3)(e) is limited to digital assets in custody structures. It relates only to the "downward" passing on of benefits by a custodian of digital assets to its client, not to "upward" instructions or other communications by the client to its custodian and the issuer.[101] Moreover, Commentary 11.14 to the Principle

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[96] Commission Implementing Regulation 2018/1212, 2018 O.J. (L 223) 1.

[97] A major flaw of SRD2 is that it refers the definition of "shareholder" to the applicable law. *See* Directive 2017/828, *supra* note 95, at art. 2(b).

[98] THE VALUEEXCHANGE, *supra* note 85, at 24, 32. *See also* European Securities and Markets Authority & European Banking Authority [hereinafter ESMA & EBA], *Report: Implementation of SRD2 Provisions on Proxy Advisors and the Investment Chain*, ESMA32-380-267, EBA/Rep/2023/26 (July 27, 2023) (evaluating SRD2).

[99] This also presumes the interoperability of different use cases of distributed ledger technology across the industry.

[100] *See, e.g.*, Schär, *supra* note 62 (discussing blockchain structures consisting of interconnected, more or less open layers).

[101] *See Digital Assets Principles*, *supra* note 6, at princ. 11(3)(e).

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mentions only voting rights and different types of income distribution, not the provision of information.[102] These gaps should be filled.[103]

International legal standards for the processing of corporate actions relating to digital shares and bonds are thus largely absent, though this market segment is growing. Intermediated and digital securities markets are likely to benefit from compatible standards in this arena. The cost of implementing common standards is likely to be relatively short-term, while addressing persistent problems in the corporate actions processing space will help keep the lid on costs for market participants in the longer term and contribute to a sound financial system overall.

VI. INVESTOR ASSET PROTECTION

In the context of intermediated securities, account holder protection is achieved by a variety of mechanisms. Account holders commonly have some kind of proprietary claim against their intermediary or the issuer.[104] Where, exceptionally, a contractual model is adopted, investors are protected through the use of insolvency-remote vehicles or by otherwise ensuring insolvency protection.[105] Moreover, account holder asset protection is often achieved through a combination of requirements at the level of intermediaries, which should hold sufficient securities and allocate such securities to account holders (notably by way of segregation), while loss-sharing rules should be applied if a shortfall nonetheless occurs in the event of the intermediary's insolvency.[106] This is in line with the "tier-by-tier approach."[107]

In the context of digital assets, including blockchain securities, there is growing consensus that they can be the subject of proprietary rights,[108] and that investors may thus have such rights. In addition, client asset protection mechanisms concerning custodians are enshrined in Principles 11 (duties

[102] *See also* Keijser, *supra* note 39, at 423–24.

[103] On the debate regarding application of SRD2 to digital shares, see ESMA & EBA, *supra* note 98, at 124–25, 504–05.

[104] *Legislative Guide*, *supra* note 17, at paras. 39–48.

[105] *Id.* at paras. 49–50.

[106] *See* Geneva Securities Convention, *supra* note 17, at arts. 24–26. For a discussion of Articles 24–26, *see* KANDA ET AL., *supra* note 4, at 151–67; *Legislative Guide*, *supra* note 17, at paras. 209–19, 259–62, 264–66, 270. *See also* Guillermo Caballero et al., *Sufficient Securities, Segregation, and Loss Sharing*, *in* TRANSNATIONAL SECURITIES LAW 171 (Thomas Keijser ed., 2d ed. 2022).

[107] *See generally supra* Section III.

[108] *Digital Assets Principles*, *supra* note 6, at cmts. 3.1–3.4.

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owed by a custodian to its client) and 13 (insolvency of a custodian and creditor claims) of the Digital Assets Principles, especially, as with intermediated securities, regarding the availability of sufficient assets, segregation, and a shortfall in insolvency.[109]

However, the level of investor asset protection differs between intermediated and digital securities in a number of ways. We discuss the possibility of contracting out of protection mechanisms, rules with a mandatory or voluntary character, and different approaches to loss sharing in insolvency.[110]

A. Possibility of Contracting Out of Protection Mechanisms

In the context of digital assets/securities, investor asset protection should be assessed against different business models. Three varying models are self-custody of digital assets/securities by an investor itself;[111] custody with the help of a custodian;[112] and an arrangement in which the "custodian" is the owner, while its "client" has a mere contractual claim.[113] Principle 10 of the UNIDROIT Digital Assets Principles offers criteria to delineate these different models.

Both self-custody and custody usually entail some kind of proprietary claim for the investor.[114] In the case of custody, investor protection is also enhanced by a set of protection mechanisms laid down in Principles 11 and 13, including maintenance of sufficient assets, adequate segregation, and loss-sharing rules. These protection mechanisms echo those commonly provided in the context of intermediated securities.

However, the third business model, embodied in Principle 10(4) of the Digital Assets Principles, allows the possibility of contracting out of proprietary protection and the protection mechanisms of Principles 11 and 13

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[109] For a worrisome overview of the level of client protection enshrined in the terms and conditions of crypto custodians, see Dirk Zetzsche & Areti Nikolakopoulou, *Crypto Custody in Insolvency: An Empirical View*, *in* DIGITAL ASSETS IN ENFORCEMENT AND INSOLVENCY 177, 178–91 (Christian Koller & Matthias Lehmann eds., 2025).

[110] This section builds on Keijser, *supra* note 39, at ch. 20, § 3.

[111] *Digital Assets Principles*, *supra* note 6, at cmts. 10.13–10.15.

[112] *Id.* at cmts. 10.10-10.12.

[113] *See id.* at cmts. 10.7–10.8, 10.20–10.21; ISDA, *supra* note 68, at 9–10; IOSCO, *Policy Recommendations*, *supra* note 82, at 34–35.

[114] For self-custody, *see Digital Assets Principles*, *supra* note 6, at cmts. 3.1–3.4; for custody, see *id.* at cmt. 10.1.

that are typical for custody.[115] Principle 10(4) makes it possible to disapply such protection mechanisms if it is clear from the agreement between the service provider and the investor that, should the service provider be subject to insolvency-related proceedings, the digital assets would be part of the service provider's assets available for distribution to its creditors.[116] This implies that the investor may be left with a contractual claim only.[117] Since investor asset protection is virtually absent in this context, the Digital Assets Principles suggest (but do not straightforwardly recommend) several safeguards when applying this third business model, one of which is to limit the type of eligible (wholesale) investors.[118] Whether it should be possible to simply contract out of custody and the protection it entails is subject to debate.[119] In any case, this approach differs from the protection inherent in the (quasi-)proprietary claims that are typical in the setting of tradfi securities.

B. Protection in Case of Custody: Mandatory vs Optional Rules

The rules for holding sufficient intermediated securities and their allocation/segregation are largely intended to be mandatory.[120] In contrast, the formulation of Principle 11(3) of the Digital Assets Principles is much weaker, using the language "may include" for the details of what duties are owed by a custodian to its client, namely record keeping, secure and effective maintenance of digital assets, acquisition of assets, if need be, and segregation. The rules regarding the maintenance of sufficient assets and segregation in the Digital Assets Principles are thus largely optional, as opposed to the mandatory standards for intermediated securities.

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[115] *See Digital Assets Principles*, *supra* note 6, at princs. 10(4), 11, 13.

[116] *See id.* at princ. 10(4).

[117] This is a bank-like structure that may be qualified as an irregular deposit or irregular mutuum.

[118] *Digital Assets Principles*, *supra* note 6, at cmts. 10.8, 10.21.

[119] *See, e.g.*, ISDA, *supra* note 68, at 9–10, 13, 18 (presuming that mere contractual claims are an inherent component of the system). *But see* Keijser, *supra* note 39, at 420–23 (questioning whether this is a desirable system from an investor perspective); Kokorin, *supra* note 27, at 1260–66 (explaining the need for investor protection beyond mere contractual mechanisms); Matthias Lehmann, *Digital Assets in Insolvency Law's Maze: Key Issues and Possible Solutions*, *in* DIGITAL ASSETS IN ENFORCEMENT AND INSOLVENCY 143, 152–56 (Christian Koller & Matthias Lehmann eds., 2025) (cautioning against relying solely on the agreement between the parties in light of, among other considerations, imbalances of expertise and negotiating power, and highlighting the public good of harnessing client protection).

[120] *See, e.g.*, Geneva Securities Convention, *supra* note 17, at arts. 24–25.

C. Loss Sharing in Insolvency

In the context of intermediated securities, Article 26 of the Geneva Securities Convention concerns loss sharing in the event of the insolvency of an intermediary.[121] Several approaches are possible if insufficient securities are available despite the requirements to hold sufficient securities[122] and to properly allocate and segregate them, including a rule allocating intermediary securities to account holders.[123] To start with, losses may be allocated to a single account holder to whom securities have been individually allocated.[124] In the case of pooled securities, losses may be shared pro rata among account holders per asset type, which is the approach proposed in Article 26(2)(b) of the Convention.[125] Another way of addressing shortfalls is to share them pro rata among all account holders, irrespective of asset type.[126] Article 26(1) of the Convention ("unless otherwise provided by any conflicting rule applicable") leaves the opening for States to apply this latter approach. The content of Article 26 of the Geneva Securities Convention is reflected in the Legislative Guide.[127]

The Digital Assets Principles address loss sharing in Principle 13(5)-(7). Principle 13(6) provides an optional rule to mitigate the consequences of a shortfall in insolvency, namely that a shortfall is first met by the custodian's own digital assets of the same description.[128] If a shortfall nonetheless persists, Principle 13(7) envisages pro rata loss sharing per type of digital asset.[129] This approach largely coincides with the loss-sharing rule of Article 26(2)(b) of the Geneva Securities Convention.[130] However, Principle 13(7)

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[121] The definition of "insolvency proceeding" in the Geneva Securities Convention differs from the definition of "insolvency-related proceeding" in the *Digital Assets Principles*, as explained in the commentary. *Compare* Geneva Securities Convention, *supra* note 17, at art. 1(h), *with Digital Assets Principles*, *supra* note 6, at princ. 2(6), cmt. 2.28.

[122] Geneva Securities Convention, *supra* note 17, at art. 24.

[123] *Id.* at art. 25(1)-(4); *cf.* art. 25(5) (stating that this rule may be opted out from).

[124] *Id.* at art. 26(2)(a).

[125] *Id.* at art. 26(2)(b).

[126] Loss sharing among all account holders irrespective of asset type is common in market segments in the U.S. *See generally* Charles W. Mooney, *The Truth About Shortfall of Intermediated Securities: Perspectives under the Geneva Securities Convention, United States Law, and the Future EU Legislation*, *in* INTERMEDIATED SECURITIES: THE IMPACT OF THE GENEVA SECURITIES CONVENTION AND THE FUTURE EUROPEAN LEGISLATION 160 (Pierre-Henri Conac, Ulrich Segna & Luc Thévenoz eds., 2013).

[127] *See Legislative Guide*, *supra* note 17, at paras. 259–61, 264–66, 268.

[128] For this opt-in rule, see *Digital Assets Principles*, *supra* note 6, at princ. 13(6).

[129] *Id.* at princ. 13(7).

[130] Geneva Securities Convention, *supra* note 17, at art. 26(2)(b).

does not leave room for other approaches, such as loss sharing among all clients irrespective of asset type, unlike Article 26(1) of the Convention.[131] Moreover, the Digital Assets Principles only provide a loss-sharing rule for pooled assets (Principle 13(5)(b)), not for individual holdings, unlike Article 26(2)(a) of the Convention.[132] This implies that Principle 13(6) does not apply in the case of individual holdings, meaning that a shortfall may not be met by a custodian's "own" assets in this case.

The discussion in Subsections (A)-(C) above shows that custody of digital assets may entail more risks for an investor than custody in the context of intermediated securities. There is no apparent justification for these diverging approaches that is rooted in the underlying technology. These differences are also not in line with the "same activities, same risks, same regulation/regulatory outcomes" paradigm promoted by the FSB and IOSCO.[133] Likewise, they are inconsistent with ISDA's key findings that "traditional and fundamental protections of clear legal terms and segregation of assets can be adapted to the world of digital assets" and that it should be ensured that customers in the digital asset space are given "equivalent rights and protections to what they would expect for traditional assets (such as securities) or financial products (such as derivatives)."[134]

Helpfully, Chapter 7 of the IOSCO Crypto Recommendations contains rules on the custody of digital assets/securities that fill some of the gaps in the Digital Assets Principles.[135] Although these "regulatory" rules do not relate to loss sharing, they contain elements that contribute to investor protection, for example in the fields of segregation, disclosure, and client asset reconciliation. This is all the more important considering the broad personal scope of the Digital Assets Principles that encompasses entrepreneurs, businesses, and consumers.[136] The broad scope and limited protection envisaged in the Principles contrast with the warning in the

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[131] *See Digital Assets Principles*, *supra* note 6, at princ. 13(7); Geneva Securities Convention, *supra* note 17, at art. 26(1).

[132] *See Digital Assets Principles*, *supra* note 6, at princ. 13(5)(b); Geneva Securities Convention, *supra* note 17, at art. 26(1).

[133] *See* FSB, *FSB Global Regulatory Framework for Crypto-Asset Activities*, *supra* note 82, at 1, 3; IOSCO, *Policy Recommendations*, *supra* note 82, at 1.

[134] ISDA, *supra* note 68, at 3.

[135] IOSCO, *Policy Recommendations*, *supra* note 82, at 33–38.

[136] *Digital Assets Principles*, *supra* note 6, at cmt. 0.8.

IOSCO Crypto Recommendations that a considerable number of retail investors in the crypto space have incurred significant losses.[137]

VII. ATTACHMENT

In the context of intermediated securities, the issue of attachment[138] is dealt with primarily from the viewpoint of attachments that could disrupt trading in the intermediated system. Such disruption may arise if a creditor attempts to attach an account holder's securities at the level of an intermediary other than the account holder's own "direct" or "relevant" intermediary or at the issuer. Such "upper-tier" attachments are therefore generally prohibited in the Geneva Securities Convention and the Legislative Guide on Intermediated Securities (although there are certain exceptions to this prohibition where specific information on the account holder is available at upper tiers).[139]

The Digital Assets Principles recognize that digital assets/securities may be held through tiers of custodians[140] but do not consider the possible risk of disruption if attachments are not carried out at the right tier.[141] As far as nodes are interconnected and relevant information may thus be readily available, this risk may be less than in the intermediated setting. Nonetheless, where relevant information is unavailable in the custodied crypto chain, this omission should be addressed to ensure a level playing field with intermediated securities.

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[137] IOSCO, *Policy Recommendations*, *supra* note 82, at 11. *See also supra* Section IV (comparable discussion of the personal scope of the rules for collateral transactions).

[138] *See* Geneva Securities Convention, *supra* note 17, at art. 22(2) (defining "attachment of intermediated securities of an account holder").

[139] *See id.* at art. 22; KANDA ET AL., *supra* note 4, at 139–45; *Legislative Guide*, *supra* note 17, at paras. 199–208; Thomas Keijser & Charles W. Mooney, Jr., *Intermediated Securities Holding Systems Revisited: A View Through the Prism of Transparency*, *in* INTERMEDIATION AND BEYOND 309, 317–19, 332 (Louise Gullifer & Jennifer Payne eds., 2019); Mooney & Rocks, *supra* note 1, at 387–89.

[140] *Digital Assets Principles*, *supra* note 6, at princ. 10(1)(b) (defining "sub-custodian") and cmt. 10.4.

[141] The issue of upper-tier attachment is also not addressed in the Global Code of Digital Enforcement and the ELI Principles and Guidance for Enforcement Against Digital Assets. *See* UIHJ, *supra* note 23; *ELI Principles 2025*, *supra* note 26.

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The Digital Assets Principles approach the issue of attachments (although this terminology is not used here)[142] from a different angle to address specific challenges posed in the context of digital assets.[143] Commentary 18.6 focuses on asset preservation and, with that policy goal in mind, allows creditors a form of interim relief such as a freezing order or an order that the control of digital assets be transferred to a court or other public authority.[144] Likewise, Article 41 of the Global Code of Digital Enforcement allows provisional or interlocutory measures to safeguard the rights of creditors.[145] The ELI Principles and Guidance for Enforcement Against Digital Assets contain useful further provisions that help give practical form to attachment procedures in relation to digital assets. Examples are the recommendations on disclosure obligations (Principle 6), search measures and access to information (Principle 7), access to digital assets (Principle 8) and designated wallets for digital assets seized by enforcement agents (Principle 9).[146]

VIII. INSOLVENCY

Insolvency is a multi-faceted matter requiring a detailed legal regime, especially where financial institutions and investors in investment securities are involved. Only a few of these issues are addressed in the Geneva Securities Convention.[147] As phrased in Legislative Principle 12: "the law should address many other important and relevant features of insolvency and regulatory law that the Convention leaves to it."[148] One of the most noteworthy overviews of such other features is provided by Charles Mooney Jr., Guy Morton, and Karen Saperstein, who offer "a roadmap for . . .

[142] The UNIDROIT Principles of Digital Assets *inter alia* refer to a "freezing order," which, of course, should not be confused with a "stay" or "freeze" relating to assets that are part of an insolvent estate and that is intended to give an insolvency administrator time to take appropriate measures. *Digital Assets Principles*, *supra* note 6, at cmt. 18.6.

[143] *See* Theodora Kostoula, *Security Rights in Crypto-assets: An Opportunity for Uniform Law?*, 28 UNIF. L. REV. 434, 451 (2023) (assessing the difficulties that arise in practice).

[144] *Digital Assets Principles*, *supra* note 6, at cmt. 18.6.

[145] UIHJ, *supra* note 23.

[146] *ELI Principles 2025*, *supra* note 26, at 18–24.

[147] *See Legislative Guide*, *supra* note 17, at paras. 251–62.

[148] *Id.* at princ. 12.

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substantive and procedural aspects of insolvency" and propose the "harmonization of a taxonomy of issues that insolvency law should treat."[149]

In the crypto space, a comparable contrast may be observed between the current content of international guidelines regarding insolvency and relevant issues identified in literature (informed by various insolvencies in the crypto space). The Digital Assets Principles cover just a fraction of the array of relevant issues.[150] This may be due to their much broader coverage, which includes many assets that are not securities. Still, there is a wide range of issues that need to be considered in insolvency proceedings involving crypto assets. These could be informed by the "roadmap" or "taxonomy" requirements that apply in an intermediated setting. However, digital assets/securities may pose specific challenges because of their intangible and cryptographic nature,[151] while such assets also come in different shapes and guises (e.g., custodied or non-custodied, or based on a variety of technological applications).[152]

To illustrate that the treatment of intermediated and crypto securities in insolvency may be similar, we will discuss a few relevant points. A key issue in insolvency is investor asset protection. Where the intermediary fails, it is of the essence that the investor's assets remain untouched.[153] This is true for securities of all forms.

There has been a lively transnational debate about the characterization of cryptocurrencies in insolvency.[154] Their treatment varies; sometimes they

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[149] Charles Mooney, Jr. et al., *Principles of Insolvency Law for Intermediated Securities*, *in* TRANSNATIONAL SECURITIES LAW 200, 205–06 (Thomas Keijser ed., 2d ed. 2022) (as updated on the Oxford Law Pro platform in January 2025). A similar "roadmap" or "taxonomy" for intermediated systems is available in *Legislative Guide*, *supra* note 17, at paras. 263–77.

[150] See the discussion of the insolvency provisions of the *Digital Assets Principles* by Charles Mooney in Mooney et al., *supra* note 149.

[151] Lehmann, *supra* note 119, at 161.

[152] *See, e.g.*, Matthias Haentjens et al., *The Failed Hopes of Disintermediation: Crypto-Custodian Insolvency, Legal Risks and How to Avoid Them*, 32 SING. J. LEGAL STUD. 526 (2020); Kokorin, *supra* note 27; Mooney et al., *supra* note 149, at 241–46; Reyes, *supra* note 27; Janis Sarra & Louise Gullifer, *Crypto-Claimants and Bitcoin Bankruptcy: Challenges for Recognition and Realization*, 28 INT'L INSOLVENCY REV. 233 (2019).

[153] Haentjens et al., *supra* note 152; Kokorin, *supra* note 27; Mooney et al., *supra* note 149; Reyes, *supra* note 27; Sarra & Gullifer, *supra* note 152.

[154] *See* Haentjens et al., *supra* note 152; Sarra & Gullifer, *supra* note 152; Emmanuelle Inacio, *Digital Assets in Insolvency and Restructuring*, EUROFENIX (Spring 2018); Theodora Kostoula, *Valuation of Crypto Assets in EU Insolvency: Challenges and Prospects*, 32 INT'L INSOLVENCY REV. 8 (2023); and the contributions in DIGITAL ASSETS IN ENFORCEMENT AND INSOLVENCY (Christian Koller & Matthias Lehmann eds., 2025).

are regarded as mere money claims, sometimes as property.[155] For digital securities, however, there seems to be hardly any doubt that their holders enjoy proprietary interests, which must be protected as such in insolvency.[156] The reason again is that function is more important than form: shares, bonds, or derivatives would hardly be recorded on a blockchain if that entailed a reduction of the rights of the shareholders, bondholders, or derivative counterparties.[157] Consequently, tradfi and digital securities should be treated in the same way. To this extent, the hypothesis guiding this Article again holds true.

Equality in treatment between traditional and novel digital securities also applies with regard to the fate of the client's assets in the event of the intermediary's insolvency. What should be done with such assets? This is not an easy question as they cannot simply be handed over due to their intangible nature. The Legislative Guide on Intermediated Securities sets out two options: (1) the transfer to a solvent intermediary or, if that should prove impossible, (2) the prompt return of the securities to the client.[158] The same two options are relevant for digital securities as well. While the prompt return in paper form is impossible, they could be transferred to a public address created by the client and thus enter the client's sphere.

Special provisions are necessary to protect the functioning of clearing and settlement systems in case of insolvency. In the EU, such provisions can be found in the Finality Directive.[159] This provides, *inter alia*, that transfer orders and netting are legally enforceable against system participants, and cannot be revoked or unwound, and that the opening of insolvency proceedings has no retroactive effect on the rights and obligations of system participants.[160] This Directive was introduced before the first blockchain

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[155] *See, e.g.*, the different treatment by the Tokyo District Court, Civil Division 28, Aug. 5, 2015 (Year of Heisei 27), Mt Gox, Heisei 26 (Year of 2014) (Wa)33320 (transl. by Megumi Hara and others), https://blogs.law.ox.ac.uk/business-law-blog/blog/2019/02/english-translation-mt-gox-judgment-legal-status-bitcoin-prepared (treatment as a claim); and by the High Court of New Zealand, Ruscoe v. Cryptopia Limited (in liquidation) [2020] NZHC 728, at para. 120 (treatment as property).

[156] *See* Haentjens et al., *supra* note 152; Sarra & Gullifer, *supra* note 152; Inacio, *supra* note 154; Kostoula, *supra* note 154; and the contributions in DIGITAL ASSETS IN ENFORCEMENT AND INSOLVENCY, *supra* note 154.

[157] Haentjens et al., *supra* note 152; Sarra & Gullifer, *supra* note 152; Inacio, *supra* note 154; Kostoula, *supra* note 154.

[158] *Legislative Guide*, *supra* note 17, at paras. 269, 274.

[159] *See* Finality Directive, *supra* note 46.

[160] *See id.* at arts. 3(1)–(2), 5, 7.

transfer was ever made; unsurprisingly, it is tailored to traditional securities, intermediary structures, and clearing and settlement systems, and ignores digital securities.[161] A discussion has arisen as to whether the Directive should be extended to blockchain systems as well.[162] The European Commission included this question in a consultation on the review of the Directive.[163] It asked whether notions such as "system," "participant," "transfer order," and "book entry" should be extended to DLT. A majority of participants answered in the affirmative.[164] Whether this results in a clarification of the Directive remains to be seen. In any case, the mere existence of the consultation reveals the similarities between tradfi trading systems and blockchains from a private law perspective.

IX. REGULATORY FRAMEWORK

In traditional financial law, the main function of regulatory rules is to safeguard the stability of the financial system. This sometimes leads to interferences with private law. An example is the "insolvency safe harbors" introduced by the Financial Collateral Directive and mirrored in the Geneva Securities Convention.[165] These provisions guarantee the enforceability of close-out netting clauses, which are an essential building block of repo, securities lending, and derivatives transactions. They allow the termination of the contract in case of a looming insolvency and reduce all the obligations of the parties toward each other to a single net amount due by one of them.[166] The safe harbors ensure that these clauses are not declared invalid or void or

[161] *See generally* Finality Directive, *supra* note 46.

[162] Gullifer & Hay, *supra* note 64, at 8; Matthias Lehmann, *Payment Systems and Financial Markets*, *in* THE EUROPEAN INSOLVENCY REGULATION AND IMPLEMENTING LEGISLATION 242, 246–47 (Gilles Cuniberti & Antonio Leandro eds., 2024).

[163] European Commission, *Summary Report of the Targeted Consultation on the Review of the Directive on Settlement Finality in Payment and Securities Settlement Systems*, at 27–36 (June 28, 2023), https://finance.ec.europa.eu/system/files/2023-06/2021-settlement-finality-review-summary-of-responses_en_0.pdf.

[164] *Id.* at 30–32.

[165] Financial Collateral Directive, *supra* note 46, at arts. 4(5), 7–8; Geneva Securities Convention, *supra* note 17, at arts. 36–37. On the notion of insolvency safe harbors, see Mokal, *supra* note 74; Philipp Paech, *The Value of Financial Market Insolvency Safe Harbours*, 36 OXFORD J. LEGAL STUD. 855 (2016); Peeters, *supra* note 74.

[166] Financial Collateral Directive, *supra* note 46, at arts. 7–8; Geneva Securities Convention, *supra* note 17, at arts. 33, 36–37.

that their results are not reversed in insolvency.[167] As such, these safe harbors are designed to reduce counterparty risk and to avoid the domino effects of counterparty defaults.

During the global financial crisis, however, close-out netting clauses quickened the demise of core institutions and impeded counteractions by public authorities. Therefore, the FSB Key Attributes recommend that such clauses should not be triggered by the mere occurrence of resolution measures and, where they can nevertheless be exercised, that authorities should have the power to temporarily stay them, allowing a brief window of time in which to take appropriate action.[168] This development is reflected in the Legislative Guide on Intermediated Securities as well as in the Close-Out Netting Principles.[169] While the FSB measures are labeled "regulatory," they are essentially of a private law nature.[170]

The Digital Assets Principles do not take regulation into account. The Commentary specifically underscores the fact that the Principles cover only private law issues and not rules to be enforced by regulatory authorities, which in many jurisdictions are called "regulation" or "regulatory law."[171] That provides more than a hint of the need for a regulatory supplement, including regarding a regulatory stay, especially since a regulatory stay may not apply to transactions involving digital assets if such assets are outside the scope of the relevant legislation, such as the Financial Collateral Directive.[172] If digital securities become a viable alternative to tradfi securities, and pose similar risks, they must be regulated equally.

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[167] Other examples of safe harbors are the abolition of the retroactive force of insolvency (notably in the form of "zero-hour" rules) and the enforceability of certain actions even *after* the commencement of insolvency proceedings. *See* Financial Collateral Directive, *supra* note 46, at art. 8.

[168] FSB, *Key Attributes*, *supra* note 73, at 4.2-4, App. 1, Annex 5. *See also* Financial Collateral Directive, *supra* note 46, at art. 1(6); Directive 2014/59/EU of the European Parliament and of the Council of 15 May 2014 Establishing a Framework for the Recovery and Resolution of Credit Institutions and Investment Firms and Amending Council Directive 82/891/EEC, and Directives 2001/24/EC, 2002/47/EC, 2004/25/EC, 2005/56/EC, 2007/36/EC, 2011/35/EU, 2012/30/EU and 2013/36/EU, and Regulations (EU) No 1093/2010 and (EU) No 648/2012, of the European Parliament and of the Council, arts. 68, 71, 2014 O.J. (L 173) 190.

[169] *See Legislative Guide*, *supra* note 17, at paras. 280–82; *Close-Out Netting Principles*, *supra* note 20, at princ. 8. *See also ELI Principles 2025*, *supra* note 26, at 12 (recommending that "specific regulations for enforcing digital assets in certain sectors, in particular, regulated ones such as financial markets, should be acknowledged and properly considered").

[170] *See* Thévenoz, *supra* note 34.

[171] *Digital Assets Principles*, *supra* note 6, at cmt. 0.9.

[172] *See* Haentjens et al., *supra* note 74, at paras. 2.75–77.

On the transnational level, the work of the Financial Action Task Force (FATF) in the area of anti-money laundering and countering the financing of terrorism is noteworthy. Even back in 2018, it included in its "Recommendation on New Technologies" the terms "virtual asset" and "virtual asset service provider" to create clearer definitions of these broad terms.[173] This was the starting point for a worldwide coordination of rules regarding the handling of such assets; a visible result is, *inter alia*, the coherence between the on-boarding procedures for new clients by banks and digital asset service providers. The FSB was particularly concerned about "stablecoins" which triggered legislative initiatives.[174] For example, in the EU, which has created a specific framework for crypto assets with MiCAR.[175] MiCAR focuses on stablecoins, which are its *raison d'être*.[176]

However, securities recorded on the blockchain are exempted from these special rules for digital, virtual, or crypto assets.[177] They are instead subject to exactly the same regulatory rules as tradfi securities. This is true not only in the EU, but also in the United States, where securities laws are applied even with particular rigor to digital securities.[178] Such identical treatment is supported by the principle of technological neutrality: digital securities fulfill the same functions and present the same problems as traditional securities and should therefore be regulated in the same way. For instance, when it comes to information asymmetries, conflicts of interest, insider trading, or financial stability, it does not matter whether a security is recorded in a centralized register, on the books of an intermediary, or on a blockchain. The risks are the same, and therefore the same rules should apply.

There are only a few provisions where different treatment is necessary to respond to the particularities of the underlying technology. For instance, the rules on central securities depositories, such as those of the EU's

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[173] FATF, *Opportunities and Challenges of New Technologies for AML/CFT*, at 7–9 (July 2021), https://www.fatf-gafi.org/en/publications/Digitaltransformation/Opportunities-challenges-new-technologies-for-aml-cft.html.

[174] Fin. Stability Bd. [FSB], *Assessment of Risks to Financial Stability from Crypto-Assets*, at 11–15 (Feb. 16, 2022), https://www.fsb.org/2022/02/assessment-of-risks-to-financial-stability-from-crypto-assets.

[175] MiCAR, *supra* note 17.

[176] *See* Matthias Lehmann, *MICAR—Gold Standard or Regulatory Poison for the Crypto Industry?*, 61 COMMON MKT. L. REV. 699, 715 (2024).

[177] *See, e.g.*, MiCAR, *supra* note 17, at art. 2(4)(a).

[178] *See* Frank Emmert, *United States of America*, *in* CRYPTOCURRENCIES AND NATIONAL LAWS—A GLOBAL SURVEY 797, 816 (Matthias Lehmann & Tetsuo Morishita eds., 2025).

CSDR,[179] are incommensurable with the decentralized structure of the blockchain; therefore, they must be suspended. This is allowed in the EU under the DLT Pilot Regime.[180] This regime has a specific set of rules for "DLT financial instruments," i.e., digital securities. It also allows divergence from the rules of the CSDR.[181] This is indispensable for blockchain securities to work.

In all other areas, the regulation of digital securities is the same as that of traditional securities. This historic evidence demonstrates that a proper function is more valuable than form. Securities must be regulated in the same way, and are regulated in the same way, regardless of whether they are embodied in paper form or are recorded electronically in a central register, on the books of an intermediary, or on a distributed ledger. This holds true transnationally.[182]

How securities are actually regulated is a different matter, of course. For instance, the rules on prospectuses, broker-dealers, or insider trading vary from country to country. These differences are a vector of divergent traditions, experiences, and policies. They do not cast doubt on the primacy of function over form. Yet some countries have also introduced particularly favorable regimes for digital assets in the form of sandboxes.[183] Other countries have taken the opposite approach and prohibited digital assets.[184] To the extent that this also applies to digital securities, it is a departure from the principle of technological neutrality, which may accelerate or inhibit particular forms of securities. However, the decision as to which technology

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[179] *See* CSDR, *supra* note 46, at art. 3(2) (requiring that, where a transaction in transferable securities takes place on a trading venue, the relevant securities are recorded in book-entry form in a central securities depository).

[180] Regulation 2022/858, of the European Parliament and of the Council of 30 May 2022 on a Pilot Regime for Market Infrastructures Based on Distributed Ledger Technology, and Amending Regulations (EU) No 600/2014 and (EU) No 909/2014 and Directive 2014/65/EU, 2022 O.J. (L 151) 1.

[181] *See id.* at art. 5(2) (allowing operators of a settlement system based on DLT to apply for an exemption from various provisions of the CSDR, inter alia its Article 3).

[182] See for instance on the application of the *Howey* Test to crypto-assets by the SEC in the U.S., *Report of Investigation Pursuant to Section 21(a) of the Securities Exchange Act of 1934: The DAO*, Exchange Act Release No. 81207 (July 25, 2017); *In re* Tezos Sec. Litig., Case No. 17-cv-06779-RS (N.D. Cal., May 25, 2018); SEC v. Terraform Labs PTE Ltd. (S.D.N.Y. Dec. 23, 2023). A functional analysis applies also for the EU, *see* Matthias Lehmann & Fabian Schinerl, *The Concept of Financial Instruments: Drawing the Borderline between MiFID and MiCAR*, 19 CAP. MKTS. L. REV. 330, 331 (2024).

[183] *See generally* Emmert, *supra* note 178, at 816; Kuhn & Löber, *supra* note 5, at 309-22 (reporting on such favorable sandboxes).

[184] Emmert, *supra* note 178; Kuhn & Löber, *supra* note 5.

best fits the needs of the market should be taken by the market itself, not by a legislator or regulator.

X. PRIVATE INTERNATIONAL LAW

Private international law, or conflict of laws, determines which national law applies to a particular security, market participant, or transaction.[185] It supplements transnational substantive law. Since transnational uniform law is constantly adapting, it remains necessary in each case to identify the applicable national law.

Private international law contains different rules for proprietary interests depending on the type of asset. For tangible, corporeal assets, including paper securities, it refers to the law where the asset is situated (*lex rei sitae*).[186] For intermediated securities that are recorded by book entry, it refers to the place where the relevant securities account is maintained. The details vary: whereas the Hague Securities Convention—which has been ratified by the U.S. and Switzerland, for example—allows the parties to choose the relevant office in which the securities account is maintained, EU law opts for a more objective approach that seems to exclude any choice.[187] Ultimately, the differences may not be as significant as one might think. When identifying the place where the relevant account is maintained under EU law, some EU Member States look to the account agreement or otherwise achieve results that are consistent with the Hague Securities Convention.[188] In the opinion of the European Commission, this practice is in line with EU law.[189] If that is true, the step for the EU to formally sign and ratify the Convention should be

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[185] On conflict of laws, *see, e.g.*, PETER HAY ET AL., CONFLICT OF LAWS (6th ed. 2018) (from a U.S. perspective); LAWRENCE COLLINS & JONATHAN HARRIS, DICEY, MORRIS & COLLINS ON THE CONFLICT OF LAWS (15th ed. 2012) (from a U.K. perspective).

[186] *See* HAY ET AL., *supra* note 185, at 1199–1201; COLLINS & HARRIS, *supra* note 185, at 1323–24.

[187] *See* Finality Directive, *supra* note 46, at art. 9(2); Financial Collateral Directive, *supra* note 46, at art. 9; Directive 2001/24/EC, of the European Parliament and of the Council of 4 April 2001 on the Reorganisation and Winding Up of Credit Institutions, art. 24, 2001 O.J. (L 125) 15.

[188] European Commission, *Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions on the Applicable Law to the Proprietary Effects of Transactions in Securities*, at 5, COM (2018) 89 final (Mar. 6, 2018).

[189] *Id.* at 6.

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small.[190] The result would be a uniform transatlantic rule on conflicts of securities law. This could considerably strengthen legal certainty, trust, and efficiency of the financial markets.[191]

Nevertheless, an area of considerable uncertainty remains: the law governing digital, or blockchain, securities. The Digital Assets Principles as well as the UCC embrace the principle of party autonomy, i.e., free choice of law.[192] At first sight, this principle raises eyebrows in the area of property law, which is generally determined by the physical location of the asset. On second thought, however, there is hardly an alternative to the free choice of law for assets that are recorded on a ledger designed to avoid a significant connection to any particular state.

However, the Digital Assets Principles seem to contradict the connecting factors chosen by the Hague Securities Convention and EU law. The preference of the former for the chosen law seems incompatible with the dominant role that the latter gives to the place where the relevant account is maintained, regardless of how it is determined precisely.

On closer inspection, the Digital Assets Principles do not completely ignore the importance of the relevant account. Principle 5(3) explicitly refers to the law governing the account agreement.[193] As the Commentary makes clear, this provision prevails over Principle 5(1) and (2).[194] Its scope encompasses the issues addressed in Principles 10–13, including whether an agreement is a custody agreement. It covers a number of issues that concern proprietary rights, such as the protection of the client's assets against attachments by creditors of the intermediary and their protection in case of insolvency (Principle 13(1) and (2)).[195]

In short, the conflict-of-laws rules for *custodied* digital assets are not significantly different from those governing *intermediated* traditional securities. Both assign a dominant role to the law of the custody agreement, and for similar reasons. As is explained in the Commentary to the Digital

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[190] *See generally* Matthias Lehmann & Klaus Löber, *Securities Transfer and Applicable Law: Anything Goes?*, 11 J. INT'L BANKING & FIN. L. 622 (2018).

[191] *See also* Francisco Garcimartín et al., *Conflict-of-Laws Rules*, *in* TRANSNATIONAL SECURITIES LAW 361, 361–90 (Thomas Keijser ed., 2d ed. 2022).

[192] *Digital Assets Principles*, *supra* note 6, at princ. 5(1); U.C.C. § 12-107(1)-(4) (AM. L. INST. & UNIF. L. COMM'N 2022).

[193] *Digital Assets Principles*, *supra* note 6, at princ. 5(3).

[194] *Id.* at princ. 5.4, cmts. 5.18-5.21.

[195] *Id.* at princs. 13(1)–(2).

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Assets Principles, this rule typically results in the application of a single law to specified matters, which is appropriate for a custody relationship.[196] The same idea underpins the Hague Securities Convention and EU law. As a result, it is likely that a harmonious conflict-of-laws rule will emerge for all types of intermediated securities.

XI. CONCLUDING REMARKS

As a result of technological innovation, securities can today be recorded in a variety of forms. Paper securities vie with electronic book entries by intermediaries and blockchain-based securities. These forms are addressed by different texts at the international level. The risk is that the legal rules will diverge and, consequently, the legal framework will become divided, with form prevailing over function.

To counter this tendency, this Article has demonstrated that an integrated law for all types of intermediated securities is possible. This would cover issues as diverse as the client's rights, collateral transactions, and investor asset protection. In all these areas, centrally stored securities and blockchain-based securities can be treated the same as long as they are intermediated.

These commonalities, rather than the differences, should be stressed in the future. On this basis, different components of the current legal framework should be coordinated and missing elements added. This would allow the market to choose the appropriate technology according to its merits rather than based on the diverging legal rules set for it by international organizations. It would also ease the transition from one technological solution to the other and treat investors equally. Finally, it would make the transnational regime less complex, more secure, and foreseeable.

[196] *Id.* at cmt. 5.18.