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Private Law Frameworks for Tokenized Assets: Implications from Legal Developments in Switzerland, Germany, France, and the United States[*]

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Abstract

In recent years, "asset tokenization" has attracted attention, with proof-of-concept experiments and actual transactions progressing worldwide. These initiatives can be understood as efforts to introduce new technologies to payment and settlement systems and extend their functionality in such a way that is only possible with digital technologies. As a prerequisite for that, legal stability concerning rights is essential. Various approaches exist among jurisdictions regarding how to determine private rights concerning the holding and transfer of tokenized assets.

In this paper, we (i) extract the private law elements required for asset holding and transfer, (ii) analyze the legal developments carried out in Switzerland, Germany, France, and the United States while focusing on how these elements can be satisfied during tokenization, and (iii) provide an overview of proof-of-concept experiments and actual transactions conducted based on these developments. As a result of the analysis, a difference was confirmed between cryptoassets such as Bitcoin and tokenized assets: the former is designed to take on the characteristics of transferable assets by placing emphasis on the exclusivity of the power to dispose of tokens held by the managers of private keys rather than the principle of consensual transfer of rights, while the latter is premised on the structure that "rights *in personam*" (typically, claims) are recorded by tokens. Similarly, in Japan, considering these characteristics of tokenized assets, it would seem to be an option to proceed with further clarification of private rights through refinement of legal interpretation while considering legislative solutions that reference precedents from the above countries.

JEL Classification: G18, G38, K11, K22
Keywords: tokenization, control, principle of consensual transfer of rights, requirements for perfection, transactional security

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1. Introduction

In recent years, initiatives called "asset tokenization" have become prominent. In October 2024, two G20 reports on tokenization were published.[1] Additionally, the Bank for International Settlements (BIS), in its *Annual Economic Report 2025*, pointed out that "[t]okenisation stands to be the next logical step in the evolution of money and payments."[2] While the definition of "tokenization" varies depending on the context, in the field of payments, it often refers to initiatives that aim to introduce new technologies to payment and settlement systems and thereby extend their functionality or enhance their performance in ways that are only possible with digital technologies.[3] The nature of the "tokens" that appear in such initiatives is often discussed in connection with the accrual, extinction, holding, and transfer of rights linked to tokens.

For tokenized assets to take on stable value as assets, they should be salable (or in other words, exchangeable for cash). From a private law perspective, it is important that the buying and selling of rights concerning tokenized assets does not involve unnecessary legal risks, and it is desirable that the relationship between tokens and rights concerning tokenized assets be clear. Jurisdictions that are leading in legal developments have been conducting examinations in this regard, including practical perspectives, and there are many points to learn from such jurisdictions.

Firstly, an attempt is made in this paper to extract the private law elements required for the holding and transfer of rights (Section 2). Secondly, the history leading up to asset tokenization is reviewed (Section 3), and how Switzerland, Germany, France, and the United States legally approach tokenization is analyzed by satisfying each element shown in Section 2, while providing an overview of proof-of-concept experiments and other initiatives conducted based on these legal approaches (Section 4). On this basis, the characteristics of legislation in the above countries are considered (Section 5) and an attempt is made to gain insights into challenges when connecting asset tokenization with Japan's private law system (Section 6). Finally, a summary of this paper is presented in Section 7.

2. Components of Legal Stability in Rights Transfer

First, leaving aside the context of tokenization, we would like to envision a scenario

[1] BIS-CPMI (2024), FSB (2024).

[2] BIS (2025).

[3] For the definition and objectives of tokenization, see Sugimura and Bessho (2024).

where rights of assets in general in high circulation are transferred between two parties (X, Y) from X to Y. At least the following six matters should be considered under private law when transferring held rights.

(I) Clarity of the content and volume of rights

As a prerequisite for transferring rights, it is necessary to be clear what the rights in question are and how many rights are to be transferred. Only when these are clear can Y properly evaluate the value of the asset.

(II) Immutability of the content and volume of rights

In situations where rights are attributed to X, the value could be lost if, in the process of transfer from X to Y, the rights were fraudulently duplicated, altered, or eliminated. It is important that there is no such risk and that the content and volume of rights are immutable.

(III) Exclusivity of the attribution of benefits derived from rights

For X to transfer rights to Y, X must be able to exclusively enjoy any and all benefits derived from the rights.[4] "Any and all benefits" includes the right of disposition as well as, for example, the receipt of civil fruits such as interest.

(IV) Principle of consensual transfer of rights

Under the principle of private autonomy, which is one of the basic principles of private law, it is fundamental that rights are transferred only through agreement (i.e., matching manifestations of intent) between parties X and Y (i.e., the principle of consensual transfer of rights). In other words, it is desirable that rights are not transferred to others without agreement, against X's will, through theft or any loss of control. Note that this point can be partially modified from the perspective of protecting transactional security described below, depending on the nature of the asset.

(V) Requirements for perfection: (i) Relationship with third parties

From the perspective of dealing with risks such as rights being transferred to third parties other than Y (i.e., conflicting transfers of the same property), Y must be able to legally assert that Y has reliably acquired rights from X, even in relationships with third parties. In such cases, as a result of adopting the principle of consensual transfer of rights,

[4] For discussions regarding "exclusiveness" and "control," see Suzuki (2025).

it may be required that the transfer of rights can be recognized from the outside (e.g., some external appearance or records). Under Japanese law, which adopts the system of requirements for perfection, for many assets, rights are evaluated as transferred even in relation to third parties only after acquiring the requirements for perfection against third parties for acquired rights.

(V) Requirements for perfection: (ii) Relationship with obligor

In addition to this, when an asset has the nature of rights (typically, claims) against a person other than X or Y (i.e., Z), it is necessary to be clear to whom Z should perform the obligations, and for Z to be able to access the true rights holder without cost. Otherwise, Z might bear the cost of searching for the true rights holder and the risk of duplicate performance. To address these points, Japanese law provides systems such as requirements for perfection against the obligor. From the perspective of protecting Z, when Z performs obligations to someone who is not the true rights holder, systems are sometimes adopted that exempt Z from liability under specific conditions. In Japanese law, "performance to a person that appears to be authorized to accept" (Article 478 of the Civil Code) corresponds to this.

(VI) Protection of transactional security

Even if X were without rights, for assets that should ensure high liquidity, systems are sometimes adopted where Y can acquire rights on certain conditions (e.g., Y was unaware of the circumstances). In Japanese law examples, the system of acquisition in good faith and protection of reliance on appearance of rights correspond to this.

Additionally, when an asset has the nature of rights against a person other than X or Y (i.e., Z), from the perspective of protecting Y's transactional security, Y's protection is sometimes achieved in a form such that Z cannot assert against Y what Z could assert against X. In Japanese law, restriction on assertion of personal defense corresponds to this.

Under mechanisms that protect transactional security, the standard of duty of care regarding whether the counterparty is the true rights holder and whether there are restrictions on the rights is reduced in a manner that matches the nature of the asset. As a result, it is possible to reduce Y's investigation costs and achieve high liquidity of the asset.

3. Development of Asset Liquidity Enhancement and Digital Technology

In capitalist economies, from the perspective of enhancing the liquidity of rights and facilitating fundraising and investment, securities systems that represent rights in securities have been devised and widely used. Traditional paper securities can be said to satisfy the elements (I) through (VI) shown in Section 2 by linking the transfer of possession of paper, which is a tangible object, with the transfer of rights.

However, with the expansion and increased frequency of securities transactions, there arose a strong recognition of the handling costs of paper securities and risks of loss and theft, leading to the adoption of methods for centrally managing rights by recording them in the databases of trusted institutions. This is the so-called "dematerialization of securities" under the book-entry transfer system for securities. In Japan, the Act on Book-Entry Transfer of Corporate Bonds (currently the Act on Book-Entry Transfer of Corporate Bonds and Shares; hereinafter referred to as the "Book-Entry Transfer Act") was enacted in 2001, and dematerialization was sequentially realized for various types of securities.[5]

Taking book-entry transfer corporate bonds as an example, looking at the characteristics of rights transfer of dematerialized securities in Japan (Table 1), entries or records giving information on the amount of book-entry transfer corporate bonds by issue are made for each customer account in a book-entry transfer account register (Article 68 of the Book-Entry Transfer Act) ((I) Clarity of the content and volume of rights). Book-entry transfer institutions (Japan Securities Depository Center, Incorporated) and account management institutions (e.g., securities firms) form a hierarchical structure and appropriately manage book-entry transfer account registers under book-entry transfer business regulations ((II) Immutability of the content and volume of rights). A participant is presumed to be the lawful holder of the rights under a book-entry transfer corporate bond that has been entered or recorded in the account thereof (Article 76 of the Book-Entry Transfer Act) and can generally enjoy any and all benefits derived from rights ((III) Exclusivity of the attribution of benefits derived from rights). Additionally, based on the existence of the parties' intent as expressed in "application for a book-entry transfer" ((IV) Principle of consensual transfer of rights), the transfer of book-entry transfer corporate bonds is effective only if the transferee has had an entry or record created in the holdings column of its account, showing an increase equal to the amount of book-entry transfer corporate bonds subject to the transfer (Articles 73 and 86-4 of the Book-Entry Transfer

[5] For details, see Workshop on Dematerialized Securities and Electronically Recorded Monetary Claims (2015).

Act, see also Article 688, Paragraph 1 of the Companies Act) ((V) Relationship with third parties and obligor). Furthermore, provisions for acquisition in good faith are established (Article 77 of the Book-Entry Transfer Act) stating that a participant that has had an entry or record created in its account showing an increase in book-entry transfer corporate bonds of a particular issue acquires the rights associated with the entry or record showing the increase in the book-entry transfer corporate bonds of that issue, unless the participant has acted in bad faith or with gross negligence ((VI) Protection of transactional security).[6]

(Table 1) Case of book-entry transfer corporate bonds (Japan)

(I) Clarity of the content and volume of rights	Entries or records giving the information of the amount of book-entry transfer corporate bonds by issue are made for each customer account in a book-entry transfer account register (Article 68 of the Book-Entry Transfer Act).
(II) Immutability of the content and volume of rights	Book-entry transfer institutions (Japan Securities Depository Center, Incorporated) and account management institutions (e.g., securities firms) form a hierarchical structure and appropriately manage book-entry transfer account registers under book-entry transfer business regulations.
(III) Exclusivity of the attribution of benefits derived from rights	A participant is presumed to be the lawful holder of the rights under a book-entry transfer corporate bond that has been entered or recorded in the account thereof (Article 76 of the Book-Entry Transfer Act) and can generally enjoy any and all benefits derived from rights.
(IV) Principle of consensual transfer of rights	"Application for a book-entry transfer" (Articles 73 and 86-4 of the Book-Entry Transfer Act) is based on the existence of the parties' intent.
(V) Requirements for perfection: (i) Relationship with third parties	The transfer of book-entry transfer corporate bonds is effective only if the transferee has had an entry or record created in the holdings column of its account, showing an increase equal to the amount of book-entry transfer corporate bonds subject to the transfer (Articles 73 and 86-4 of the Book-Entry Transfer Act, see also Article 688, Paragraph 1 of the Companies Act).
(V) Requirements for perfection: (ii) Relationship with obligor	
(VI) Protection of transactional security	Provisions for acquisition in good faith are established (Article 77 of the Book-Entry Transfer Act). A participant acquires the rights unless the participant has acted in bad faith or with gross negligence.

In this way, through the dematerialization of securities, efforts have been made to complete rights transfers digitally. Recently, with an additional view to extending the functionality or enhancing the performance in ways that are only possible with digital technologies, attention has been focused on asset tokenization. In particular, many initiatives attempt to apply distributed ledger technology (DLT), which is utilized in cryptoassets.

[6] The acquisition in good faith of book-entry transfer securities also includes types of acquisition in good faith where "something from nothing" occurs, with the total issued amount increasing for mistaken entry portions. The portions arising from "nothing" are resolved at the expense of the book-entry transfer institutions or account management institutions that caused the mistaken entry, but this type of acquisition in good faith is evaluated as unique to book-entry transfer securities recognized under the Book-Entry Transfer Act, which differs from acquisition in good faith regarding movable property or paper-based securities. For details, see Workshop on Dematerialized Securities and Electronically Recorded Monetary Claims (2015). In this regard, in Bitcoin-like cryptoassets and tokenized assets described later, efforts are made to technically prevent ledger tampering using DLT.

Cryptoassets using public-key cryptography, under the existence of distributed ledgers (databases), attempt to become assets by allowing persons who exclusively manage (control) private keys to monopolize the ability to dispose of cryptoassets linked to those private keys. The idea that data can be held as assets by managing private keys, which are merely alphanumeric character strings, spread rapidly only after Satoshi Nakamoto's 2008 paper proposed Bitcoin, [7] and therefore had not been anticipated when the dematerialization of securities was being discussed. The law traditionally recognized tangible objects and rights *in personam* as assets, while "replicable" data was, in general, merely one form of record without exclusive value or rights.[8] However, through the use of cryptographic technology and DLT concepts such as blockchain technology, data that should have been easily replicable gained exclusivity.

It is true that cryptoassets such as Bitcoin attempt to create new assets independently of existing assets and rights such as securities, rather than attempting to digitize existing assets or rights, and in this sense, their characteristics differ from those of asset tokenization. However, they also have commonalities in terms of technical characteristics. Therefore, from the perspective of comparing with asset tokenization, we attempt to evaluate cryptoassets such as Bitcoin based on each element shown in Section 2.

Looking at the characteristics of the transfer of cryptoassets such as Bitcoin (Table 2), by using DLT to prevent ledger tampering ((II) Immutability of the content and volume), cryptoassets recorded in the ledger ((I) Clarity of the content and volume) are transferred only by private keys ((III) Exclusivity of the attribution of benefits), based on extremely strong technical control. This ensures that the holders of cryptoassets and the managers of private keys coincide at all times as a matter of fact ((VI) Protection of transactional security).[9] As a result of the adherence to such transactional security, cryptoassets are

[7] Nakamoto (2008).

[8] However, there is an exception in intellectual property rights, which recognize rights by enacting legislation that recognizes exclusivity even though replication is easy.

[9] However, as a legal interpretation, there are indications that "primarily using ledger and register records as clues, when the person recorded as rights holder is not the true rights holder, it is desirable to ensure that cryptoassets belong to the original true rights holders" (Morishita (2017)), and based on this premise, "this would result in recognizing proprietary restitution (or similar rights) to the original true right holders" (Financial Law Board (2019)). However, as it is pointed out that "even if recognizing proprietary restitution, it is not possible to recover unspent transaction outputs to the state before unauthorized Bitcoin transactions were made," thus "the content of proprietary restitution would mean requesting changes in Bitcoin attribution, and in that respect, it would be similar to claims for unjust enrichment" (Kamo (2019)). At least it seems difficult to conceive situations where Bitcoin holders and managers of private keys are separated in factual states. Regarding this point, there are views that deny the separated state of factual control and legal authority attribution based on network participants' recognition and cryptoasset liquidity (Masujima and Hori (2023)), and views that Bitcoin holding is a factual state and does not involve any rights or legal relationships (Shiba (2017)). The

transferred solely by private keys regardless of the parties' intent (i.e., regardless of the (IV) Principle of consensual transfer of rights), and theft damage often occurs through hacking, meaning that it is difficult to restore the cryptoassets stolen against the parties' will. Despite such a drawback, as long as one strictly manages private keys themselves, the attribution of cryptoassets is not denied as a matter of fact in relation to any third parties ((V)(i) Relationship with third parties). Considering these characteristics, various discussions have been conducted in Japan regarding the legal nature of cryptoassets under private law,[10] but as many of their characteristics differ from those of traditional assets, no academic consensus has yet been reached. That is, since cryptoassets such as Bitcoin are merely a form of data and have no issuing entity or assets or rights that serve as value backing, it is necessary to determine their legal characterization, including whether they can be regarded as rights or not.[11]

(Table 2) Case of Bitcoin (cryptoassets)

(I) Clarity of the content and volume of rights	The content and volume of cryptoassets are recorded in the ledger. * There is no settled view regarding the legal nature of cryptoassets under private law, including whether they can be regarded as rights or not.
(II) Immutability of the content and volume of rights	Ledger tampering is prevented by using DLT.
(III) Exclusivity of the attribution of benefits derived from rights	Cryptoassets are transferred only by private keys and the managers of private keys can enjoy any and all benefits.
(IV) Principle of consensual transfer of rights	— (Cryptoassets are transferred solely by private keys regardless of the parties' intent.)
(V) Requirements for perfection: (i) Relationship with third parties	As long as one strictly manages private keys themselves, the attribution of cryptoassets is not denied in relation to any third parties.
(V) Requirements for perfection: (ii) Relationship with obligor	— (No issuer exists, and an obligor is not conceived.)
(VI) Protection of transactional security	The holders of cryptoassets and the managers of private keys coincide at all times as a matter of fact because cryptoassets are transferred only by private keys.

issue of coincidence between asset holders and managers of private keys in cryptoassets seems to also appear in the fact that cryptoasset seizure is difficult or impossible except when cryptoassets are held through cryptoasset exchange service providers (when cryptoasset exchange service providers manage private keys). For details, see Shimizu (2018).

[10] There is no settled view regarding the legal nature of cryptoassets under private law, including whether they are rights or not, and "(I) Clarity of the content and volume of rights" is not guaranteed. For the state of discussions regarding Bitcoin's legal nature under private law, see also Suzuki (2025) Supplement.

[11] For example, the Japanese Civil Code presumes that the object of ownership is tangible (see Articles 85 and 206 of the Civil Code) and does not contemplate ownership over data, which is an intangible object. For other issues related to the legal treatment of tokens that do not represent rights, see Shiba (2020a).

4. Analysis of Overseas Legal Frameworks and Their Practical Implementation

Following the aforementioned circumstances, in recent years, considerable attention has been drawn to the concept of tokenizing traditional assets and managing them through decentralized systems. In this context, jurisdictions such as Switzerland, Germany, France, and the United States have taken the lead in enacting legislation to govern private rights surrounding tokenized assets. Furthermore, based on such legislation, initiatives including proof-of-concept experiments for utilizing asset tokenization in financial transactions are being advanced.

In this section, we provide an overview of how rights of tokenized assets are legally transferred in each jurisdiction and briefly introduce initiatives carried out under such frameworks.

4.1 Switzerland

4.1.1 DLT Act

In Switzerland, the Federal Act on the Adaptation of Federal Law to Developments in Distributed Ledger Technology (hereinafter referred to as the "DLT Act") was enacted in 2020 and came into force in 2021. The DLT Act amended ten laws simultaneously concerning securities issued on DLT ledgers. Among these amendments, the revision to the Swiss Code of Obligations, which constitutes general private law, introduced a new concept of "ledger-based security" (German: *Registerwertrecht*). This enabled the definition of a new category of securities, making it possible to tokenize financial instruments such as bonds and shares.

The concept of ledger-based security aims to achieve the same legal stability as traditional paper securities for securities issued on DLT ledgers.[12] It is designated as a new category of securities, presupposing the existence of underlying assets or claims (e.g., contractual claims or shares in a corporation).[13]

According to the Swiss Code of Obligations, a ledger-based security refers to a right which may be exercised and transferred to others only via the linked securities ledger (Article 973d, Paragraph 1, Number 2), and the content of the rights is recorded in the ledger or in linked accompanying data (Article 973d, Paragraph 2, Number 3) ((I) Clarity

[12] For background analysis and detailed information on the necessity for the DLT Act, see Swiss Federal Council (2018) and Swiss Blockchain Federation (2021).

[13] Cryptoassets such as Bitcoin and algorithmic stablecoins are considered not to fall under ledger-based securities because they lack claims against issuers (i.e., they lack underlying rights).

of the content and volume of rights). As a requirement for the ledger, its integrity must be secured through adequate technical and organizational measures, such as joint management by several independent participants, to protect it from unauthorized modification (Article 973d, Paragraph 2, Number 2) ((II) Immutability of the content and volume of rights). Furthermore, the securities ledger must use technological processes to give the creditors, but not the obligor, power of disposal over their rights (Article 973d, Paragraph 2, Number 1) ((III) Exclusivity of the attribution of benefits derived from rights). The transfer of the ledger-based security is subject to the provisions of the registration agreement (Article 973f, Paragraph 1) ((V)(i) Requirements for perfection against third parties). Additionally, the obligor under a ledger-based security is entitled and obliged to render performance only to the creditor indicated in the securities ledger and subject to appropriate modification of the ledger (Article 973e, Paragraph 1), and by rendering the performance due at maturity to the creditor indicated in the securities ledger, the obligor is released from the obligation even if the indicated creditor is not the actual creditor, unless the obligor is guilty of malice or gross negligence (Article 973e, Paragraph 2) ((V)(ii) Relationship with obligor). Moreover, while it is anticipated that creditors recorded in ledgers may not be the true rights holders ((IV) Principle of consensual transfer of rights), when acquiring a ledger-based security in a securities ledger from the creditor indicated therein, the acquirer is protected even if the seller was not entitled to dispose of the ledger-based security, unless the acquirer acted in bad faith or with gross negligence (Article 973e, Paragraph 3) ((VI) Protection of transactional security).

As described above, the transfer of a ledger-based security has been carefully designed to achieve equivalence with the rules of paper securities (Table 3).

(Table 3) Case of ledger-based securities (Switzerland)

(I) Clarity of the content and volume of rights	The content of the rights is recorded in the ledger or in linked accompanying data (Article 973d, Paragraph 2, Number 3).
(II) Immutability of the content and volume of rights	As a requirement for the ledger, its integrity must be secured through adequate technical and organizational measures to protect it from unauthorized modification (Article 973d, Paragraph 2, Number 2).
(III) Exclusivity of the attribution of benefits derived from rights	A ledger-based security may be exercised and transferred to others only via the linked securities ledger (Article 973d, Paragraph 1, Number 2), which must use technological processes to give the creditors power of disposal over their rights (Article 973d, Paragraph 2, Number 1).
(IV) Principle of consensual transfer of rights	It is anticipated that creditors recorded in ledgers may not be the true rights holders.
(V) Requirements for perfection: (i) Relationship with third parties	The transfer of the ledger-based security is subject to the provisions of the registration agreement (Article 973f, Paragraph 1).
(V) Requirements for perfection: (ii) Relationship with obligor	The obligor under a ledger-based security is obliged to render performance only to the creditor indicated in the securities ledger (Article 973e, Paragraph 1), and the obligor is released from the obligation by rendering the performance due at maturity to the creditor indicated in the securities ledger (Article 973e, Paragraph 2).
(VI) Protection of transactional security	Provisions for acquisition in good faith are established (Article 973e, Paragraph 3). (The acquirer of a ledger-based security in a securities ledger is protected even if the seller was not entitled to dispose of the ledger-based security, unless the acquirer acted in bad faith or with gross negligence.)

4.1.2 Project Helvetia

Under these circumstances, the Swiss National Bank (SNB) and the SIX Group, which operates SIX Swiss Exchange, have conducted the experiment "Project Helvetia" using wholesale CBDC as a settlement asset for tokenized assets. Phase III, implemented from December 2023 to June of the following year, was conducted as a pilot experiment including real transactions.

Specifically, on the SIX Digital Exchange's DLT infrastructure, organizations including the World Bank issued digital bonds totaling more than CHF 750 million. Additionally, the SNB issued digital SNB Bills as a monetary policy instrument.

4.2 Germany

4.2.1 eWpG (Act on Electronic Securities)

In Germany, the Act on Electronic Securities (*Gesetz über elektronische Wertpapiere*, hereinafter referred to as "eWpG") came into force in 2021. Initially, while the Act was applicable only to notes in bearer form, its scope was expanded to include shares through amendments in December 2023 (§1).

Under eWpG, securities may be issued as an electronic security (*elektronisches Wertpapier*) instead of paper-based securities. The Act stipulates two types of electronic securities: a "central register security" (*Zentralregisterwertpapier*) using a "central register" (*zentrale Register*) and a "crypto security" (*Kryptowertpapier*) using a "crypto securities register" (*Kryptowertpapierregister*) (§2, Paragraph 1; §4, Paragraphs 1, 2, and 3). The specific difference between these two types of registers is that a central register security is recorded and managed in central registers of central depositories for securities or custodians (§12, Paragraphs 1 and 2), while a crypto securities register is to be maintained on a tamper-proof recording system in which data is recorded in chronological order and protected against unauthorized deletion and subsequent modification (§16, Paragraph 1) ((II) Immutability of the content and volume of rights). While eWpG is considered to be technology-neutral legislation, the crypto securities register appears to be primarily conceived with blockchain technology among DLTs in mind.

For both the central register and crypto securities register, information on the register includes the main content of rights, the issue volume, the nominal amount, the issuer, the holder, and other information (§13, Paragraph 1; §17, Paragraph 1). Additionally, the crypto securities register must also record that the rights being represented are classified as "securities" (*Wertpapier*) (§17, Paragraph 1, Number 1) ((I) Clarity of the content and volume of rights).

Both central register securities and crypto securities are characterized as electronic securities despite the different technologies used in securities registers, with common rules established for electronic securities under private law without distinction. Electronic securities are classified as "property" (*Sache*) within the meaning of §90 of the German Civil Code (*Bürgerliches Gesetzbuch*) (§2, Paragraph 3), and unless eWpG provides otherwise, electronic securities shall have the same legal effect as a security issued in the form of a certificate (§2, Paragraph 2). That is, electronic securities are accorded the same exclusivity as tangible "property" (*Sache*), and persons recorded as holders of electronic securities are presumed to be the owners of the securities (§27) and can, in principle, enjoy any and all benefits arising from rights ((III) Exclusivity of the attribution of benefits derived from rights). Compared to Switzerland's orientation toward achieving exclusivity through technical processes, this approach is distinctive in its construction that invokes the principles of property law.

Furthermore, eWpG requires that to transfer ownership of electronic securities, the electronic securities shall be transferred to the acquirer on instruction of the entitled party and both parties shall agree to the transfer of ownership, stipulating that the entitled party

does not lose ownership until the transfer to the acquirer (§25, Paragraph 1) ((IV) Principle of consensual transfer of rights). It also stipulates that for transfers of electronic securities to be effective, a registration or transfer in the electronic securities register is required (§24) ((V)(i) Relationship with third parties). Holders of a note (*Schuldverschreibung*) issued as an electronic security may demand from the issuer the performance promised in the note and the issuer is also exempted by the performance to the holders (§28) ((V)(ii) Relationship with obligor). Moreover, provisions for acquisition in good faith are established, whereby persons acquiring electronic securities through transactions are protected unless they act in bad faith or with gross negligence, and are deemed to be the entitled party of the electronic securities without defects (§26) ((VI) Protection of transactional security).

As described above, under eWpG, even when registers become DLTs or blockchains, private rights are determined within the same framework as when central registers exist. Considering this, German law can be evaluated as an extension of the legal framework of the centralized book-entry transfer system for securities to DLT infrastructure (Table 4).

(Table 4) Case of electronic securities (Germany)

(I) Clarity of the content and volume of rights	The information on the register includes the main content of rights, the issue volume, the nominal amount, the issuer, the holder, and other information (§13, Paragraph 1; §17, Paragraph 1). Additionally, the crypto securities register must also record that the rights being represented are classified as "securities" (*Wertpapier*) (§17, Paragraph 1, Number 1).
(II) Immutability of the content and volume of rights	A central register security is recorded and managed in central registers of central depositories for securities or custodians (§12, Paragraphs 1 and 2). A crypto securities register shall be maintained on a tamper-proof recording system in which data is recorded in chronological order and protected against unauthorized deletion and subsequent modification (§16, Paragraph 1).
(III) Exclusivity of the attribution of benefits derived from rights	Electronic securities are classified as "property" (*Sache*) within the meaning of §90 of the German Civil Code (§2, Paragraph 3), and electronic securities shall have the same legal effect as a security issued in the form of a certificate (§2, Paragraph 2). That is, electronic securities are accorded the same exclusivity as tangible "property" (*Sache*), and persons recorded as holders of electronic securities are presumed to be the owners of the securities (§27) and can, in principle, enjoy any and all benefits arising from rights.
(IV) Principle of consensual transfer of rights	Electronic securities shall be transferred to the acquirer on instruction of the entitled party and both parties shall agree to the transfer of ownership. The entitled party does not lose ownership until the transfer to the acquirer (§25, Paragraph 1).
(V) Requirements for perfection: (i) Relationship with third parties	eWpG also stipulates that for transfers of electronic securities to be effective, a registration or transfer in the electronic securities register is required (§24).
(V) Requirements for perfection: (ii) Relationship with obligor	Holders of an electronic securities may demand from the issuer the performance promised in the note and the issuer is also exempted by the performance to the holders (§28).
(VI) Protection of transactional security	Provisions for acquisition in good faith are established (§26). (Persons acquiring electronic securities through transactions are protected unless they act in bad faith or with gross negligence, and are deemed to be the entitled party of the electronic securities without defects.)

4.2.2 Cases of Digital Bond Issuance in Compliance with eWpG

Examples of digital bonds issued in compliance with eWpG include cases where Siemens issued 60 million euros in 1-year bonds in February 2023 and 300 million euros in 1-year bonds in September 2024, and cases where NRW.BANK, the development bank of North Rhine-Westphalia, issued 100 million euros in 2-year bonds in July 2025.

Additionally, in Europe, regulations have been enacted as interim measures, and pilot experiments for settling tokenized assets using DLT infrastructure are being advanced. As a specific example of such initiatives, KfW Group issued digital bonds compliant with eWpG and utilizing blockchain in July 2024.

4.3 France

4.3.1 Code monétaire et financier (Monetary and Financial Code)

In France, mandatory dematerialization of securities has been achieved since the 1980s,[14] and securities issued in French territory and governed by French law have been required to be recorded in accounts of issuers or intermediaries. In addition to such conventional dematerialized securities, the Monetary and Financial Code (*Code monétaire et financier*), amended by *ordonnance* (a type of legislative act in France that is issued by the government) in December 2017, enabled the issuance of securities recorded in a "shared electronic registration system" (DEEP, *dispositif d'enregistrement électronique partagé*) (Articles L211-3 and L211-7). It should be noted that in the amendment to the Monetary and Financial Code by *ordonnance* in October 2024, the expression "in a shared electronic registration system" was replaced with "using distributed ledger technology (*technologie des registres distribués*)." However, below, we shall refer to these collectively as "DLT securities" to distinguish them from conventional dematerialized securities.

DLT securities are transferred by entries in records using DLT (Article L211-15), while conventional dematerialized securities are transferred through book-entry transfer between accounts. The design of DLT securities must guarantee the integrity of records and their modifications, while enabling direct or indirect identification of holders of such securities and the nature and quantity of securities held ((I) Clarity of the content and volume of rights), and requires the establishment and updating of business continuity plans including periodic data retention in external systems ((II) Immutability of the

[14] For details, see Morita (2006).

content and volume of rights) (Articles L211-4 and R211-9-7).

The transfer of ownership of dematerialized securities and DLT securities results from the registration of these securities in the purchaser's securities account or from the registration of these securities in favor of the purchaser in DLT (Article L211-17) ((III) Exclusivity of the attribution of benefits derived from rights, (V) Relationship with third parties and obligors). While it is also anticipated that record holders of dematerialized securities and DLT securities may not be the true rights holders ((IV) Principle of consensual transfer of rights), no person may claim, for any reason whatsoever, any DLT securities whose ownership has been acquired in good faith ((VI) Protection of transactional security) by the holder of the securities account in which the securities are registered or by the person identified by DLT ((III) Exclusivity of the attribution of benefits derived from rights, (V) Relationship with third parties and obligor) (Article L211-16).

As described above, under the Monetary and Financial Code, transfers of DLT securities have been carefully designed to achieve equivalence with the rules of conventional dematerialized securities (Table 5).

(Table 5) Case of DLT securities (France)

<table>
<tr><td>(I) Clarity of the content and volume of rights</td><td>The design of DLT securities must guarantee the integrity of records and their modifications, while enabling direct or indirect identification of holders of such securities and the nature and quantity of securities held (Articles L211-4 and R211-9-7).</td></tr>
<tr><td>(II) Immutability of the content and volume of rights</td><td>The design of DLT securities requires the establishment and updating of business continuity plans including periodic data retention in external systems (Articles R211-9-7).</td></tr>
<tr><td>(III) Exclusivity of the attribution of benefits derived from rights</td><td rowspan="3">The transfer of ownership of DLT securities results from the registration of these securities in favor of the purchaser in DLT (Article L211-17) and no person may claim, for any reason whatsoever, any DLT securities whose ownership has been acquired in good faith (Article L211-16).</td></tr>
<tr><td>(V) Requirements for perfection: (i) Relationship with third parties</td></tr>
<tr><td>(V) Requirements for perfection: (ii) Relationship with obligor</td></tr>
<tr><td>(IV) Principle of consensual transfer of rights</td><td>It is anticipated that creditors recorded in DLT securities ledgers may not be the true rights holders.</td></tr>
<tr><td>(VI) Protection of transactional security</td><td>Provisions for acquisition in good faith are established (Article L211-16). (The holder of the securities identified by DLT acquires the securities without defects.)</td></tr>
</table>

4.3.2 Cases of DLT Securities Issuance

Examples of issuance as DLT securities under French law include cases where the European Investment Bank (EIB) issued 100 million euros in 2-year bonds in April 2021, and cases where Société Générale issued 10 million euros in 3-year unsecured digital

green bonds in November 2023.

Additionally, in the aforementioned EU pilot experiments, the French public financial institution Caisse des Dépôts et Consignations (CDC) issued 100 million euros in 10-year digital-native bonds in November 2024.

4.4 United States

4.4.1 Article 12 of the Uniform Commercial Code

In the United States, Article 12 was newly established in the Uniform Commercial Code (hereinafter referred to as "UCC") in 2022, introducing the concept of "controllable electronic record" (hereinafter referred to as "CER"). The purpose of UCC Article 12 is to govern the transfer of property rights in certain intangible digital assets ("controllable electronic records") that have been or may be created and may involve the use of new technologies including DLT.[15]

Specifically, rules established under UCC Article 12 center on the concept of "control" of a CER (§12-102(a)(1)). That is, control of a CER is recognized when all of the following requirements are met: (i) power to avail itself of substantially all the benefit from the CER, (ii) exclusive power to prevent others from availing themselves of substantially all the benefit from the electronic record, (iii) exclusive power to transfer control of the electronic record to another person or cause another person to obtain control of another CER as a result of the transfer of the electronic record, and (iv) the ability to readily demonstrate by some method that such powers belong to oneself (§12-105) ((III) Exclusivity of the attribution of benefits derived from rights). "Control" signifies strong exclusive power to possess and use objects, presupposing that record contents cannot be changed by any method other than changes by holders ((II) Immutability of the content and volume of rights). Moreover, control plays a role in determining legal relationships with third parties, in addition to meaning that it cannot be interfered with by others ((V)(i) Relationship with third parties). Furthermore, while it is anticipated that persons having control may not be the true rights holders ((IV) Principle of consensual transfer of rights), a good faith purchaser acquires the rights in the CER free of a claim of a property right in the CER (§12-104(e)) ((VI) Protection of transactional security).

With the establishment of UCC Article 12, the amended UCC Article 9 also introduced concepts such as "controllable account" (§9-102(27A)) and "controllable payment

[15] For details, see Uniform Law Commission and the American Law Institute (2023).

intangible" (§9-102(27B)) for assets evidenced by a CER that provides that the account debtor undertakes to pay the person that has control ((I) Clarity of the content and volume of rights), and the same rules as the CER apply to these (§12-104(a)). The purchaser obtains control of the account or payment intangible if it obtains control of the CER that evidences the account or payment intangible (§12-104(b)), and account debtors on a controllable account or controllable payment intangible are, in principle, to discharge its obligation by paying the person having control of the CER that evidences the controllable account or controllable payment intangible (§12-106(a)) ((V)(ii) Relationship with obligor).

Thus, in states where UCC Article 12 applies, rules for transferring rights have been standardized for anything recognized as a CER, regardless of what rights are evidenced by the CER[16] (Table 6).

(Table 6) Case of controllable account and controllable payment intangible (United States)

(I) Clarity of the content and volume of rights	"Controllable account" (§9-102(27A)) and "controllable payment intangible" (§9-102(27B)) are assets evidenced by a CER that provides that the account debtor undertakes to pay the person that has control.
(II) Immutability of the content and volume of rights	Rules centered on the concept of "control" of a CER (§12-102(a)(1)) are established. That is, control of a CER is recognized when all of the following requirements are met: (i) power to avail itself of substantially all the benefit from the CER, (ii) exclusive power to prevent others from availing themselves of substantially all the benefit from the electronic record, (iii) exclusive power to transfer control of the electronic record to another person or cause another person to obtain control of another CER as a result of the transfer of the electronic record, and (iv) the ability to readily demonstrate by some method that such powers belong to oneself (§12-105). "Control" signifies strong exclusive power to possess and use objects, presupposing that record contents cannot be changed by any method other than changes by holders. Moreover, control plays a role in determining legal relationships with third parties, in addition to meaning that it cannot be interfered with by others.
(III) Exclusivity of the attribution of benefits derived from rights	
(V) Requirements for perfection: (i) Relationship with third parties	
(V) Requirements for perfection: (ii) Relationship with obligor	The purchaser obtains control of the account or payment intangible if it obtains control of the CER that evidences the account or payment intangible (§12-104(b)), and account debtors on a controllable account or controllable payment intangible are, in principle, to discharge its obligation by paying the person having control of the CER that evidences the controllable account or controllable payment intangible (§12-106(a)).
(IV) Principle of consensual transfer of rights	It is anticipated that persons having control may not be the true rights holders.
(VI) Protection of transactional security	A good faith purchaser acquires the rights in the CER free of a claim of a property right in the CER (§12-104(e)).

4.4.2 Regulated Settlement Network

The Regulated Settlement Network (RSN), with the Securities Industry and Financial

[16] For details, see Workshop on Characteristics of Digital Money under Private Law (2024).

Markets Association (SIFMA) serving as program manager, conducted proof-of-concept experiments on DVP settlement between tokenized U.S. Treasury securities and other assets and tokenized U.S. dollar deposits, publishing reports in December 2024.

The RSN is characterized by a design that avoids the application of UCC Article 12 while utilizing DLT. That is, tokens on the RSN are designed not to be subject to "control" (§12-105) by rights holders, and furthermore, they are categorized as existing asset classes such as "deposit accounts" and "investment property" that are explicitly excluded from the definition of CER in UCC (§12-102(a)(1)).[17]

The reason why tokens on the RSN do not become subject to control is that, on the RSN, holders of tokens in tokenized deposits or securities cannot directly transfer tokens representing deposits or securities to others. Specifically, when conducting remittance from X to Y, the process involves the extinction of X's tokens on the RSN and the issuance of Y's tokens on the RSN in the same amount, with traditional ledgers (e.g., account systems) being updated in conjunction with information updates on the RSN. Since what is executed in token-based settlement is not the transfer of tokens themselves but merely the extinction or redemption of tokens, tokens on the RSN are deemed not to be subject to control.[18]

In conclusion, the RSN mechanism is explained as merely adopting an alternative format for recording transfers of traditional deposits and assets using new technology, with legal relationships remaining unchanged from conventional practices. That is, even with tokenization, private rights are not determined within the new framework of UCC Article 12, and tokens on the RSN are not viewed as having newly independent legal significance.

5. Characteristics of Preceding Legislation Regarding Asset Tokenization

The legislation regarding asset tokenization in the countries surveyed above possesses different characteristics depending on the jurisdiction, but common features that emerge when contrasted with the nature of cryptoassets such as Bitcoin may be identified as follows.

On one hand, cryptoassets such as Bitcoin are designed to emphasize the (III)

[17] In the establishment of UCC Article 12, it was determined that asset classes excluded from CER are governed by existing legal rules, making separate rules by the CER unnecessary (Smith and Weise, 2022).

[18] RSN (2024).

Exclusivity of token disposition authority held by private key managers rather than the (IV) Principle of consensual transfer of rights, thereby acquiring the nature of transferable assets by fulfilling constituent elements. In other words, they are oriented toward governing transfer by placing no trust in people but relying entirely on DLT-based protocol and knowledge-based authentication (private key), with the characteristic that considers private rights centered on tokens. When such characteristics of the "token economy" are thoroughly pursued, transactional security can be protected by ensuring constant alignment between the holders of cryptoassets and the managers of private keys. However, since no entities other than protocol contribute to determining relationships, and the anonymity of transactions is high, compatibility with legal compliance such as anti-money laundering and combating the financing of terrorism (AML/CFT) is considered to be poor. Additionally, this can be said to have characteristics similar to property rights *in rem* in that holders directly control objects without the intervention of others as the basic form.

On the other hand, in asset tokenization, the construction is premised on rights *in personam* (typically, claims) being recorded by tokens. While the rights related to the tokenized assets should be salable (or in other words, exchangeable for cash) in order to have value as assets, what forms the value of such rights, in essence, is the existence of expectations that obligations will be performed in accordance with agreement (i.e., discounted present value of future cash flows) ((I) Clarity of the content and volume of rights). Additionally, differences from conventional dematerialized securities include managing registers of rights holders using DLT ledgers that make unauthorized duplication or falsification difficult without presupposing a centralized book-entry transfer system for securities ((II) Immutability of the content and volume of rights) and using knowledge-based authentication of private keys as means of identity verification ((III) Exclusivity of the attribution of benefits derived from rights). Since these are rights *in personam*, they are based on contractual relationships between people ((IV) Principle of consensual transfer of rights), making them seemingly incompatible with the "token economy" ideology that emphasizes protocol and anonymity over trust in people (Table 7).

(Table 7) Comparison between Bitcoin (cryptoassets) and asset tokenization

	Bitcoin (cryptoassets)	Asset tokenization
(I) Clarity of the content and volume of rights	The content and volume of Bitcoin are recorded in the ledger. * There is no settled view regarding the legal nature of Bitcoin under private law, including whether they are rights or not.	The construction is premised on rights *in personam* (typically, claims) being recorded by tokens. What forms the value of rights, in essence, is the existence of expectations that obligations will be performed in accordance with agreement. This information is recorded in the ledger.
(II) Immutability of the content and volume of rights	Ledger tampering is prevented by using DLT.	Registers of rights holders are managed by using DLT ledgers that prevent unauthorized duplication or falsification.
(III) Exclusivity of the attribution of benefits derived from rights	Cryptoassets are transferred only by private keys and the managers of private keys can enjoy any and all benefits.	Benefits arising from rights are enjoyed by persons who are presumed to be owners because of registers of rights holders and persons having control, using knowledge-based authentication of private keys as a means of identity verification.
(IV) Principle of consensual transfer of rights	— (Cryptoassets are transferred solely by private keys regardless of the parties' intent.)	It is anticipated that persons recorded in ledgers may not be the true rights holders based on contractual relationships between people because asset tokenization is premised on rights *in personam*.
(V) Requirements for perfection: (i) Relationship with third parties	Transfer rule is governed by relying entirely on DLT-based protocol and knowledge-based authentication (private keys).	Requirements for perfection against third parties based on records on ledgers or control is stipulated.
(V) Requirements for perfection: (ii) Relationship with obligor	— (No issuer exists, and an obligor is not conceived.)	Exemption from liability for debtors who trust records on ledgers or control is stipulated.
(VI) Protection of transactional security	The holders of cryptoassets and the managers of private keys coincide at all times as a matter of fact.	Acquisition in good faith is stipulated.

Under such circumstances, regardless of the types or legal nature of assets recorded by tokens, it seems possible to achieve legal stability of rights transfer by stipulating in the law: the ability to assert rights in (V)(i) Relationship with third parties based on records on ledgers or control, exemption from liability for debtors who trust these ((V)(ii) Relationship with obligor), and acquisition in good faith ((VI) Protection of transactional security).

Based on such understanding, we would like to examine the specific legislative content of Europe and the United States again. Though there are differences such as whether to govern private rights through the records of holders on securities ledgers using DLT as in Switzerland, Germany, and France, or to govern them centered on the more property-like concept of control as in the United States ((V)(i) Relationship with third parties), there are commonalities in general such as exemption from liability for debtors who perform obligations trusting the holder record or control ((V)(ii) Relationship with obligor), and

recognition of acquisition in good faith ((VI) Protection of transactional security). On the other hand, the U.S. RSN is oriented toward extensions of existing practices that possess practical experience and are more legally stable. That is, RSN can be evaluated as clearly advocating a direction to enjoy other advantages of DLT (such as programmability and continuous operation) while maintaining centralized "trust-based" ideology rather than aiming to embody self-sovereign "token economy" ideology through tokenization.

6. Implications for Japan

Looking at security tokens currently circulating in Japan, many cases involve tokenization of corporate bonds or (beneficial or equity interest in) real estate.[19] Under Japanese law, security tokens are defined as "Electronically Recorded Transferable Rights to Be Indicated on Securities, etc." under the Financial Instruments and Exchange Act (Article 29-2, Paragraph 1, Item 8; Article 6-3 of the Cabinet Office Order on Financial Instruments Business, etc.).

Regarding the characteristics of security tokens under Japanese private law, unlike Europe and the United States surveyed in this paper, Japan lacks a general law governing these. Thus, it is necessary to individually examine laws applicable to each tokenized right. As it is required to conduct rights transfer as a series of rewriting register which records rights holders/quantities,[20] matters regarding private rights such as (a) records on DLT ledgers become requirements for perfection against third parties and debtors ((V) Relationship with third parties and obligors), and (b) rights are not to be transferred apart from DLT ledger records (a certain degree of (VI) Protection of transactional security by contractually narrowing the (IV) Principle of consensual transfer of rights) need to be examined.

When tokenized rights are corporate bonds, legal relationships are governed by the Companies Act or Book-Entry Transfer Act. The perfection of a corporate bond transfer generally requires that the name and address of the acquirer be stated or recorded in the bond register (Article 688, Paragraph 1 of the Companies Act), and by managing bond registers on DLT ledgers or systems linked and synchronized with them, it is possible, to a certain extent, to link the tokens on DLT ledgers with the rights of corporate bonds.

[19] For analysis of the tokenization of other rights, see Shiba (2020b).

[20] See Japan Financial Services Agency "Matters to Note Regarding the Financial Instruments and Exchange Act, etc. (Guidelines for the Financial Instruments and Exchange Act, etc.)" 2-2-2 and public comment responses 174 through 176 dated April 3, 2020.

Therefore, tokenized corporate bond issuers often use a structure of uncertificated bonds[21] and are not book-entry transfer corporate bonds.[22]

For beneficial interests held in a trust, a complex arrangement is commonly adopted. This involves a beneficial interest that is represented by a certificate of beneficial interest, yet the governing trust agreement explicitly states that no separate beneficiary certificate will be issued with regard to the tokens. It is considered necessary to involve beneficiary certificates in order to avoid the application of the rule of notification or consent made by means of an instrument bearing a certified date required for perfection against third parties for beneficial interest in trust transfers under the Trust Act (Article 94, Paragraph 2 of the Trust Act). When dematerializing securities, reliance on the book-entry transfer system as strictly defined by the Book-Entry Transfer Act is expected. However, due to certain characteristics of DLT being incompatible with this book-entry system, there seem to have been the need to assert that security tokens themselves do not constitute beneficiary certificates.[23] Under such legal constructions of security tokens, the perfection of a beneficial interest transfer requires that the name and address of the acquirer be entered or recorded in the beneficial interest register (Article 195, Paragraphs 1 and 2 of the Trust Act), and by managing beneficial interest registers on DLT ledgers or systems linked and synchronized with them, it is possible, to a certain extent, to link the tokens on DLT ledgers with the rights of beneficial interest.

Both uncertificated bonds and "beneficial interests that are represented by a certificate of beneficial interest, but whose governing trust agreement explicitly states that no separate beneficiary certificate will be issued with regard to the tokens" share the characteristic that records on registers become requirements for perfection. Under such circumstances, as practical responses,[24] (a) perfection through records on ledgers is achieved by designating records on ledgers or systems linked and synchronized with them as registers. In addition, (b) to further ensure that rights are not transferred outside of these records, bond indentures and trust agreements explicitly prohibit off-ledger transfers

[21] If certificates are issued, delivery of certificates becomes a requirement for effectiveness of transfers of bonds (Article 687 of the Companies Act).

[22] Corporate bonds handled by book-entry transfer institutions under the Book-Entry Transfer Act are considered not to fall under Electronically Recorded Transferable Rights to Be Indicated on Securities, etc. (see public comment responses 164 and 165 dated April 3, 2020).

[23] A trust agreement, even for a trust legally defined as a "trust with certificates of beneficial interest," is not precluded from stipulating that no beneficiary certificate will be issued for a beneficial interest (Article 185, Paragraph 2 of the Trust Act). In a trust that issues beneficiary certificates, the delivery of the beneficiary certificate is a requirement for the transfer of the beneficial interest to be effective (Article 194 of the Trust Act).

[24] For details, see Financial Law Board (2022).

and state that such transfers will not be recorded in the registers.

From the current situation described above, the following implications for Japan may be derived. First, Japan has not implemented fundamental legislative responses regarding (V) Requirements for perfection of records on DLT ledgers. As a result, in practical implementation of security tokens, there are aspects that must rely on extremely technical interpretations of individual laws and rules. Additionally, considering the possibility that tokenization of various assets may be examined in the future, apart from areas where special law applies such that register records become requirements for perfection of transfers, and areas where unique legal principles apply through accumulation of precedents and interpretative theories,[25] general laws such as the Civil Code and Trust Act would apply, as they are capable of responding to diverse usage forms. However, to satisfy requirements for perfection against third parties for transfers of claims and beneficial interest in trust, notification or consent made by means of an instrument bearing a certified date remains necessary (Article 467, Paragraph 2 of the Civil Code; Article 94, Paragraph 2 of the Trust Act), and a certified date (Article 5 of the Act on Enforcement of the Civil Code) cannot be obtained on DLT ledgers. Regarding this point, legislative exceptions are recognized through amendments to the Act on Strengthening Industrial Competitiveness that came into force in 2021, and if one becomes an Approved Implementer of New Business Activities, notifications using information systems provided in accordance with the Approved Plan for New Business Activities are deemed to be notification or consent made by means of an instrument bearing a certified date (Article 11-2, Paragraph 1 of the Act on Strengthening Industrial Competitiveness). However, the number of Approved Implementers of New Business Activities remains few,[26] and for the majority of business entities not subject to special laws, where register records become requirements for perfection against third parties of transfers, the application of framework means of an instrument bearing a certified date—the paper-based legal framework in existence since the Meiji Era—persists. Furthermore, some indications suggest that the inability to conduct transactions in digital format presents a

[25] For example, bank deposits are a type of claim, but transfer of deposit claims in cases of deposit remittances is explained as being achieved through extinction of claims of remitting parties against their banks and accrual of claims of recipients against their banks. It is pointed out that the reason why such a legal construction is adopted is the need to resolve problems that arise when deposit transfers are conducted through claim assignment methods: (a) requirements for perfection against third parties of claim transfers require notification or consent made by means of an instrument bearing a certified date (Article 467, Paragraph 2 of the Civil Code), (b) defense of third-party debtors against transferors are not cut off, and (c) explanations of cases where claims are divided and transferred while maintaining the identity of claims become extremely complex. For details, see Workshop on Characteristics of Digital Money under Private Law (2024).

[26] Three companies as of October 2024.

significant challenge, particularly given the emergence of technologies that enable the transfer of rights while preserving legal stability.[27] The overseas laws examined in this paper respond by recognizing requirements for perfection through DLT ledger records or the concept of control in general laws, which also grants debtors an exemption from liability for trusting the records or control.

Second, while Japan addresses the non-transfer of rights apart from records on DLT ledgers through contractual practice, achieving a certain degree of (VI) Protection of transactional security by contractually narrowing the (IV) Principle of consensual transfer of rights, unlike cases where certificates are issued or under the book-entry transfer system for securities, no general legislation exists for acquisition in good faith of tokenized assets, which suggests room for further (VI) Protection of transactional security. Regarding this point, the overseas laws examined in this paper provide legislative measures by recognizing acquisition in good faith for records or control.

Regarding these points, interpretative theories that do not rely on a specific legislative framework[28] have been explored in Japan. It is anticipated that the systematization of these theories will advance alongside the accumulation of practical experience and judicial precedents.[29] Additionally, the U.S. RSN also orients toward tokenizing deposits and securities through interpretative theories without utilizing new legislation. In the United Kingdom's "Property (Digital Assets Etc.) Bill," which is currently being debated by Parliament, the text specifies that personal property encompasses a third category beyond "things in possession" and "things in action." The legislation refrains from describing the details of this new category, instead entrusting its development to the progression of judicial precedent.[30] Thus, in order to maintain the flexibility of legal schemes, there may be certain merits in deferring to the evolution of legal interpretations and judicial precedent. On the other hand, in Japan, there appear to be some types of rights

[27] Ikeda (2025).

[28] For example, Financial Law Board (2022) posits that records held by deposit banks, book-entry transfer institutions, and in security tokens possess a functionally equivalent legal nature, serving to identify rights holders and their balances. Accordingly, it can be argued that even in the absence of a specific legal basis, the general legal principle that the attribution and transfer of fungible rights are linked to account records may find recognition. This line of reasoning could provide a foundation for the conclusion that blockchain records can fulfill both the requirements for effectiveness and perfection.

[29] For an examination of possible legal constructs regarding the status of security tokens, see Tokutsu (2020). This work also analyzes cases where the attribution of rights represented by tokens and token records aligns and diverges. For a discussion on the limitations of aligning rights and records when trusts are used for security tokens, refer to Tokutsu (2023).

[30] Property (Digital Assets Etc.) Bill [HL] (Bill 237 2024-25), Explanatory Notes para. 25.

where tokenization is difficult because legal systems regarding perfection, debtor exemption from liability for trusting the records or control, acquisition in good faith, etc. are not developed for them. While the refinement of legal interpretations should be pursued to clarify private rights in areas where tokenization can be pursued through existing laws and case law principles, it would seem to be an option to consider legislative solutions in parallel, drawing upon precedents from the countries that have enacted general laws.

7. Conclusion

An overview of the characteristics of legal developments in Europe and the United States, with a particular emphasis on identifying the private law elements essential for asset transfers and exploring how these can be fulfilled through tokenization, has been provided in this paper. In each country, new rules for asset tokenization enabled by DLT, have been established. We have revealed that these rules also consider the differences between tokenized assets and cryptoassets such as Bitcoin. Considering international developments in asset tokenization, which do not necessarily align with conventional frameworks of securities dematerialization that rely on existing book-entry transfer systems, further examination of Japan's private law system, including the rules for secured transactions not discussed in this paper, is awaited.

References

Bank for International Settlements (2025), "The next-generation monetary and financial system."

Bank for International Settlements and Committee on Payments and Market Infrastructures (2024), "Tokenisation in the context of money and other assets: concepts and implications for central banks."

Financial Law Board (2019), "Summary of Discussion on Status of Virtual Currency under Private Law."

Financial Law Board (2022), "Requirements for Effectiveness and Perfection against Third Parties of Assignment of Securities Tokens (Especially regarding TK Interests and Beneficial Interests in Trust)," *NBL* vol.1237, pp.42-48 (in Japanese).

Financial Stability Board (2024), "The Financial Stability Implications of Tokenisation."

Ikeda, Masao (2025), "Digitalization of Assignment of Claims and Approach of the Principle of the Civil Code (1, 2)," *NBL*, vol.1282, pp.4-10, vol.1283, pp.49-55 (in Japanese).

Kamo, Akira (2019), "Legal Characterization of Virtual Currencies: Program Codes of Bitcoin and their Legal Evaluation," *Report by Kin'yu Homu Kenkyu Kai Workshop.1: Examining Issues on Virtual Currencies from Private Law and Regulatory Perspectives*, *Report No.33 by Kin'yu Homu Kenkyu Kai*, pp.1-34 (in Japanese).

Masujima, Masakazu, and Takane Hori (2023), *Law on Cryptoassets (2nd edition)*, Japan: Chuo Keizai Sha (in Japanese).

Morishita, Tetsuo (2017), "Introductory Study on Financial Laws in the Era of FinTech," *Path of Corporate Law*, pp.771-825, Japan: Yuhikaku (in Japanese).

Morita, Hiroki (2006), "Basic Theory of Dematerialization of Securities," *Kin'yu Kenkyu*, vol.25 (special edition for legal studies), pp.1-67 (in Japanese).

Nakamoto, Satoshi (2008), "Bitcoin: A Peer-to-Peer Electronic Cash System."

Regulated Settlement Network (2024), "Legal viability report."

Shiba, Akihiro (2017), "Legal Treatment of Virtual Currencies like Bitcoin," Nishimura & Asahi ed. *A Complete Work on Finance Law*, Japan: Shojihomu (in Japanese).

Shiba, Akihiro (2020a), "Treatment of Tokens without Representing Rights under Private Law," *Japan Business Law Review*, vol.20(1), pp.123-126 (in Japanese).

Shiba, Akihiro (2020b), "Treatment of Tokens Representing Rights under Private Law,"

Japan Business Law Review, vol.20(3), pp.102-106 (in Japanese).

Shimizu, Hiroshi (2018), "Compulsory Execution for Virtual Currencies: Focusing on Bitcoin," *Toyo Hogaku*, vol.62(2), pp.107-126 (in Japanese).

Smith, Edwin E., and Steven O. Weise (2022), "The Proposed 2022 Amendments to the Uniform Commercial Code: Digital Assets."

Sugimura, Kazutoshi, and Masaki Bessho (2024), "Deposit Tokenization: Survey of Overseas Initiatives," *Bank of Japan Review Series*, 2024-E-9.

Suzuki, Atsuto (2025), "Basic Viewpoints regarding 'Control' over Digital Assets," *Kin'yu Kenkyu*, vol.44(2), pp.1-51 (in Japanese).

Swiss Blockchain Federation (2021), "Circular 2021/01 Ledger-based Securities."

Swiss Federal Council (2018), "Legal framework for distributed ledger technology and blockchain in Switzerland."

Tokutsu, Akira (2020), "Legal Status of Tokens with Rights under Private Law: For an Arrangement of Issues (1, 2, 3)," *NBL*, vol.1182, pp.14-22, vol.1183, pp.23-31, vol.1184, pp.40-46 (in Japanese).

Tokutsu, Akira (2023), "Coincidence between Attribution and Records of Security Token Using Trust," *Theory and Utilization of Trust (Trust Forum Foundation Research Publication Series No.93)*, pp.41-61 (in Japanese).

Uniform Law Commission and the American Law Institute (2023), "Uniform Commercial Code Amendments (2022)."

Workshop on Characteristics of Digital Money under Private Law (2024), "Rights of Digital Money and their Transfer," *Kin'yu Kenkyu*, vol.43(1), pp.1-47 (in Japanese).

Workshop on Dematerialized Securities and Electronically Recorded Monetary Claims (2015), "Reexamination of Legal Constructions Reflecting the Introduction of Book-entry Securities and Electronically Recorded Monetary Claims," *Kin'yu Kenkyu*, vol.34(3), pp.1-66 (in Japanese).