FINTECH

NOTES

Private Law Aspects of Token-Based Central Bank Digital Currencies

Marianne Bechara, Wouter Bossu, Amira Rasekh, Chia Yi Tan, and Akihiro Yoshinaga

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March 2025

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I. Introduction

Many central banks are considering or preparing for the introduction of central bank digital currencies (CBDCs). Money has undergone various transformations throughout human history, from metal coins over book money to banknotes. Technological advances have occasionally accelerated these changes, such as when central bank book money was computerized. The next significant transformation is the creation of digital currencies available to the public. Interest in CBDCs has gained momentum in recent years: as of late 2023, 94 percent of 86 surveyed central banks were exploring CBDCs and the work is evolving from theoretical research to real-life experiments[1] and three central banks (The Bahamas, Nigeria, and Jamaica) have issued CBDCs.

In designing CBDCs, central banks must diligently consider its legal foundations. As with any form of money, CBDCs require a solid basis under public and private law to provide it with the necessary legal certainty and political support that will underpin its wide circulation. During discussions with central banks, IMF staff have noted that potential legal issues related to CBDC issuance are sometimes overlooked in initial design stages. These issues include discussions of how existing laws and regulations will apply to CBDCs or what new laws might need to be introduced. This Fintech Note is part of the IMF Legal Department's ongoing effort to address this gap. It follows a previous IMF working paper that examines the legal foundations of CBDC under central bank law and its treatment under monetary law—the main public law aspects of CBDC.[2]

This note examines the *private* law aspects of *token-based* CBDC primarily intended for retail use.[3] The primary focus on this type of CBDC is due to its novel nature, which raises several complex legal issues, unlike account-based CBDC (discussed in Section II). Additionally, many central banks seem to prefer token-based CBDC over account-based CBDC, mainly for anti-money laundering/combatting the financing of terrorism (AML/CFT) and legal reasons, as account-based CBDC would require opening the central bank's current accounts to the general public.

For the purpose of this note, "token-based" CBDC is defined as (a) a form of money; (b) issued by a central bank and thus expressed in the official monetary unit; (c) where the monetary claim on the central bank is incorporated in a digital token (in its various possible technological forms); and (d) the transfer of the token equates to the transfer of the claim, (e) without a current-account relationship between the central bank and the holder. (Section II discusses this definition, which is legal rather than technological, in detail).

[1] *Embracing diversity, advancing together – results of the 2023 BIS survey on central bank digital currencies and crypto* , A. Di Iorio, A. Kosse and I. Mattei, BIS Papers No 147, June 2024

[2] Bossu, W., M. Itatani, C. Margulis, A. Rossi, H. Weenink, and A. Yoshinaga, *Legal Aspects of Central Bank Digital Currency: Central Bank and Monetary Law Considerations*, IMF, WP/20/254, November 2020. That Paper concludes that (a) central banks need a robust legal basis for issuing CBDC and (b) the status of CBDC must be clear under monetary law. See also: Cheng, J., Lawson, A., and Wong, P., (2021). "Preconditions for a general-purpose central bank digital currency," FEDS Notes. Washington: Board of Governors of the Federal Reserve System, February 24, 2021, https://doi.org/10.17016/2380-7172.2839.

[3] This note does not discuss "wholesale" CBDC, that is CBDC available to "clearing banks," which could well take the form of account-based CBDC. However, the note will discuss in detail how the banking system would interact with token-based CBDC.

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"Private law" refers to the area of law that governs the "horizontal" relationships between natural or legal persons, as opposed to the "vertical" relationship between the state and its subjects, governed by public law. This note focuses specifically on the proprietary aspects of private law.[4]

Private law will be critical for the "legal life" of token-based CBDC at two levels.

- First, for a token-based CBDC to complement successfully other forms of money and circulate widely by being used daily by the general public, —this is one of the three economic functions of money—it must interact well with private law mechanisms that underpin its circulation and usage by economic agents. These mechanisms pertain for instance to the transfer, collateralization, and custody of the CBDC. Legal uncertainty in these areas could hinder the wide adoption of CBDCs.
- Second, an important and connected issue is how token-based CBDC will be held, especially the potential role of intermediated holding structures. If CBDC is held indirectly through intermediaries (as is the case for many actual CBDC projects), private law will govern the legal relationship between the holder and the intermediary, and between the intermediary and the central bank. The law must ensure that holders always have a direct claim on the central bank and are protected if the intermediary because insolvent. Without these safeguards, token-based CBDCs would not be risk-free central bank money, raising questions about its role in the monetary system.

In analyzing the private law aspects of token-based CBDC, it is essential to remember that the legal nature of this (and any) form of money must be firmly established in public law. Therefore, this Fintech Note should be read in conjunction with the previous working paper on the public law aspects of CBDCs.

The purpose of this note is to provide a practical legal-analytical framework for designing a private law framework for token-based CBDC that addresses these two levels. The note does not seek to be exhaustive, but will analytically consider the potential private law classifications, holding structures, ways in which the CBDC can legally circulate and be utilized in the monetary system, and cross-border aspects. Moreover, the note will make the central point that some of those factors (for example, private law classification) will shape others (for example, transfer and private international law rules) and thus the overall legal framework needs to be internally consistent. Where appropriate, it will also discuss constraints and requirements stemming from the interaction between law and design to achieve broader policy imperatives—this will particularly be relevant to ensure that the CBDC under all holding structures is an easily transferable and risk-free claim on the central bank. Finally, the note aims to be practical, in that its analytical framework will aid members of the IMF and other stakeholders to review their private law framework in the context of considering this form of CBDC. By pointing to conceptual perspectives as well as country approaches, this note will hopefully be useful as countries seek to strengthen their legal frameworks to address the digitalization of money.

This note is part of a broader endeavor to understand and develop the private law aspects of so-called "digital assets." Discussions on CBDC take place against a broader backdrop of the digitalization of finance. The increasing use of new technologies worldwide to issue and transfer digital assets, including

[4] There are other issues of private law that will not be covered: see e.g., fraud and general contractual liability. For a broad overview: see: Cheng, J., Lawson, A., and Wong, P., (2021). "Preconditions for a general-purpose central bank digital currency," FEDS Notes. Washington: Board of Governors of the Federal Reserve System, February 24, 2021, https://doi.org/10.17016/2380-7172.2839.

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CBDC, creates an imminent need for higher clarity in terms of the applicable private law rules. To make this connection explicitly, the note will at various instances (see Box 2 and Section VIII) make references to evolutions in respect of the private law aspects of digital financial assets and how these could impact token-based CBDC. Moreover, the legal-analytical framework of the note aligns with ongoing national and international initiatives to increase the legal certainty of transactions involving those new assets. Specifically, this note takes account of the ongoing work on digital assets undertaken by the International Institute for the Unification of Private Law (UNIDROIT) Digital Assets Working Group. This work aims at providing legal predictability guidance on key aspects of digital assets' transactions such as the acquisition, disposition, and custody of digital assets.[5]

This Fintech Note is subject to several important caveats. First, every country has its own private law, and collectively those laws can generally be regrouped in the two major legal traditions of the Common and Civil Law—and there are of course mixed legal systems. While this note will recognize at various instances the role of those legal traditions, it cannot come to conclusions under any specific national or regional (monetary union) law. Second, the note will flag broad challenges and potential avenues for solutions, but there is no "one size fits all" solution. The legal challenges of, and the appropriate solutions for, issuing token-based CBDC will ultimately depend on specific design features. In application of this principle, a third caveat is that there are inherent limitations to following the account-based versus token-based dichotomy. Importantly, in this note, this is a legal and not a technological distinction. Moreover, even from a legal perspective, not all issuers will necessarily issue their CBDC in either form—The Bahamas issued in the form of "electronic money." Fourth, the note presents a legal and not technological analysis and tries thus to be technology-neutral but cannot avoid referring at times to rapidly changing technological issues. It is hence possible that technological solutions emerge that do not fit very well in the conceptual framework presented by the note. Fifth, as the note's legal analysis is based upon the main implications arising from the common designs *being investigated* by central banks at the time of writing, new designs and features will likely arise. Therefore, the list of legal questions dealt with in this note is not intended to be exhaustive. Finally, it must be stressed that this note is an effort to provide analysis of an instrument that is yet to be issued at a large scale.

This note is structured as follows. After briefly considering the novelty of token-based CBDC under private law in Section II, Section III discusses the legal nature of token-based CBDC under "property law." Section IV inquires how ownership rights in token-based CBDC can be held and evidenced. Section V analyzes the legal questions emerging from the transfer of token-based CBDC, while Section VI addresses the application of habitual banking operations (deposit, custody, lending, and pledging) to token-based CBDC. Section VII discusses token-based CBDC under private international law. Section VIII reflects on ways to shape the private law framework. Section IX concludes.

[5] Digital Assets and Private Law - UNIDROIT

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II. The Novelty of Token-Based CBDC under Private Law

In contrast to account-based CBDC, token-based CBDC would legally truly represent a "new form of money." From the definition proposed above, three key legal features of token-based CBDC must be further developed.

- First, this form of CBDC incorporates a monetary claim on the central bank in a digital token. This calls for two specifications. First, in respect of the monetary claim, as is the case of banknotes, CBDC will represent a direct legal relationship (claim) of the holder of the token with the issuing central bank. Following the abolition of convertibility *in specie*, the object of this monetary claim has admittedly become very "sui generis" (mainly including a right to exchange banknotes) but it remains a claim, nonetheless: all issuing central banks book issued banknotes as a liability on their balance sheet.[6] Such booking has also been certified by the external auditors of those central banks. Under accounting law and standards, a reporting entity can only book a liability if it meets the applicable "recognition criterion." A typical such criterion will state that "a liability is a present *obligation* of the entity arising from past events, which is expected to result in an outflow from the entity of resources resulting in an economic benefit" (IASB). This means that CBDC, as with banknotes, incorporates an obligation *of* the issuing central bank and thus a claim of the holder *on* that central bank.

  Second, in relation to the "incorporation," it is important to acknowledge and recognize up front the autonomy of the law to utilize its own concepts, without being held hostage to technological perspectives. Way before the "digital revolution," the law—including monetary law—has used the concept of token in the sense of an object that can operate as a "sign of proof" or "carrier," including of value or a claim on a good or service.[7] In fact, many monetary laws use the concept of "token" in the material form to denote paper, plastic or metallic objects that could incorporate monetary claims. This said, while legal systems are comfortable with incorporating claims in paper documents (doctrine of negotiable instruments or *valeurs mobilieres*), the incorporation of monetary (and other) claims in an immaterial, digital token is quite unprecedented.[8] At any rate, the legal concept of token must be distinguished from the technological concept.[9] It is thus possible to countenance that a certain design gives rise to the occurrence of a legally accepted token, even if that is technologically not necessarily the case. In turn, designers of token-based

[6] See Bossu, W., M. Itatani, C. Margulis, A. Rossi, H. Weenink, and A. Yoshinaga, *o.c.*, para. 20 and footnote 66. *Contra*: see Lastra. R. et al. For a nuanced position: see Zellweger-Gutknecht, C., *Developing the Right Regulatory Regime for Cryptocurrencies and Other Value Data,* in Green, S., and Fox, D., (eds.) *Cryptocurrencies in Public and Private Law*. Oxford: Oxford University Press, pp. 57–91, nr. 4.29.

[7] Black's Law Dictionary 10th Ed. defines tokens as "sign or mark; a tangible evidence of the existence of a fact." See also Garrido, J., *Digital Tokens: A Legal Perspective*, IMF, WP/23/151.

[8] Perhaps the incorporation of an electronic money claim in a card and electronic check written payable to cash can be considered as precedents. There is also the electronification of trade finance documents (e.g., bills of lading), but this process does not really have recourse to a digital token.

[9] For a technological perspective: see *Token- or Account-Based? A Digital Currency Can Be Both* - Liberty Street Economics (newyorkfed.org)

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CBDC must ensure that their technological and financial solutions reflect the inherent legal characteristics of "digital tokenization."

- Second, the transfer of that token equals transfer of the claim. This means that control of the token will essentially amount to control over the CBDC—in other words, the transfer of the token can legally be accomplished without instruction to, and action by, the issuing central bank. As with traditional currency, this is of course an absolute precondition for its wide circulation in the economy. Again, this statement must be considered within the autonomy of the law from technology. In principle, this does not preclude that *technologically* there are instructions to, and actions by, the issuing central bank (or even an intermediary), for instance in the context of a permissioned ledger.[10] But legally, the token-based CBDC would be transferred between holders without legal intervention (for example, in the form of a debit instruction) of the central bank.
- Third, this form of CBDC entails no current-account legal relationship between the central bank and the holder.[11] This third aspect is what distinguishes this form of money from account-based CBDC, which is founded on the current account legal framework, is well established, and poses no new private law issues (see Box 1 for a detailed discussion).

[10] The same principle would apply if technologically tokens are not so much "transferred," but the original token is destroyed with the payor and the payee acquiring a new token. Legally, this would still amount to a transfer. The same principle applies already to transfers of book money.

[11] As discussed above, the primary legal relationship of all central bank money is the direct (since the abolition of conversion *in specie* admittedly very *sui generis*) monetary claim on the central bank incorporated in the "money" (currently: banknotes and credit balances in current account). In regard of the current accounts settling interbank payments: see Cheng, J., and Torregrossa, J., (2022). "A Lawyer's Perspective on U.S. Payment System Evolution and Money in the Digital Age," FEDS Notes. Washington: Board of Governors of the Federal Reserve System, February 04, 2022, https://www.federalreserve.gov/econres/notes/feds-notes/a-lawyers-perspective-on-us-payment-system-evolution-and-money-in-the-digital-age-20220204.html.

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Box 1: Private Law Aspects of Account-Based CBDC

Account-based CBDC would be a form of money whose value is recorded in the form of digital representations of credit balances on current accounts held in a central bank's books. (1) Those credit balances can basically be constituted in three ways: (i) "deposits" of banknotes and coins; (ii) transfers from other current accounts, and (iii) crediting by the central bank.

Transfers between current accounts are effected through debits and credits of these accounts. In other words, account-based CBDC would deploy conventional banking techniques. There is even an argument that wholesale account-based CBDC has been already in existence for many years. (2)

Current accounts represent a contractual legal relationship between the central bank and the account holder. By consequence, the rights and obligations of the parties are mainly provided by the contractual terms and conditions. For instance, central bank current account rules will typically stipulate the form and modalities of debit instructions and the right to make corrective bookings in case of errors.

The legal parameters of currents accounts are well developed and understood. For instance, the rules that protect good faith acquirers typically will not apply to this form of intangible money. Moreover, in many jurisdictions, the netting of debit and credit operations will be allowed after insolvency, even if general insolvency rules prohibit netting post opening of insolvency proceedings.

(1) In theory, account-based CBDC could be issued in an indirect model (also called: synthetic), but such a CBDC would not be a direct claim on the central bank, and hence not be CBDC in the meaning of the term. In the first tier, the central bank would open a current account to financial intermediaries through a contractual arrangement. In the second tier, financial intermediaries would open cash accounts to retail CBDC holders through contractual arrangements. Under this framework, "CBDC" holders can only claim their rights to the financial intermediaries based on their contractual rights and bear the credit risk on the financial intermediaries. Liabilities of commercial banks, even if backed by a 100% cash deposit in the books of the central bank, are not a central bank liability. A hybrid form can exist where retail CBDC holders open a bank account at the central bank with financial intermediaries handling payments as agents of the central bank (and possibly also of the CBDC holders).

(2) Quarles, R., *Parachute Pants and Central Bank Money*, Speech by Vice Chair for Supervision Quarles on central bank digital currency - Federal Reserve Board

This new form of money raises multiple challenges under private law. Under the current legal framework in many jurisdictions, *currency* enjoys a special private law status with privileges for its holders. This status is founded on the physical (i.e., tangible) form of currency (banknotes and coins). The main challenge going forward will be to provide similar currency-like legal privileges to a digital, by definition intangible, asset to support its wide circulation.[12] For instance, the good faith receiver will need to be protected (see section V). Furthermore, to integrate token-based CBDC in the traditional banking sector, the law will need to be clear that token-based CBDC can be deposited with, or, more accurately, loaned to financial institutions (see section VI).

What complicates matters even more is that token-based CBDC could be held through various arrangements in which multiple parties potentially play a role. Specifically, combining technological, financial and legal principles and tools, this form of CBDC can conceptually be held through three possible and very distinct holding patterns which central banks could choose to adopt.

[12] "The property regime applying to money is just one of a number of legal devices by which the state can support the efficiency of monetary functions". See D Fox, Property Rights in Money (2008) at 2.09.

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- First, it is possible to design token-based CBDC in a manner whereby the CBDC is controlled directly by its holders.[13] Such a holding structure would equate the CBDC most to digital cash. This said, service providers would likely play a role in acquiring the CBDC by providing technical services, and potentially by protecting holders from loss from their tokens.[14]
- Second, through a central bank-based holding structure, the users of CBDC could hold their tokens through a *direct* technical and legal relationship with the central bank. Under such a structure, it is possible that the central bank holds the CBDC, while the holder merely accesses it via an interface, such as a wallet.
- Third, under an *indirect* holding structure, the holders of CBDC hold their tokens through an intermediary,[15] but in a manner that does not transform the monetary claim on the central bank into a monetary claim on the intermediary.[16] (This would distinguish it from so-called "synthetic" CBDC, which as it is issued by a commercial bank is not a claim on the central bank and thus not CBDC.) Holders would transfer their CBDC through the financial intermediaries without direct legal interaction with the central bank. This legal relationship shares many characteristics with intermediated securities holding—an issue explored in more detail further in the note (see Section VI A. and Box 6). At any rate, many central banks are contemplating to introduce this indirect CBDC holding model.

From a legal perspective, the role of financial intermediaries in indirect holding structures is of critical importance. In analyzing the legal ramifications of a particular holding structure, it is important to focus on legal issues, rather than technological considerations. In an indirect CBDC model, retail holders of CBDC will use "custodial" wallets offered by financial intermediaries to hold and transact CBDC. Wallets should be understood as technological *and legal* tools to access token-based CBDC and make instructions to transfer it. In that regard, it is important to distinguish between CBDC custodial wallets and conventional mobile banking applications provided by commercial banks and other authorized electronic money issuers—these applications allow for transfers of book money/electronic money claims on the issuing private entity. For CBDC to remain a direct claim on the central bank, holders must have only a "custodial" relationship (as discussed below) and not a monetary claim on the wallet providers/financial intermediaries. Understanding the legal relationship between a custodial wallet provider and CBDC holder will be central to comprehending the full legal ramifications, including risks, of indirect holding structures.

This illustrates the challenge of legally equating token-based CBDC to a digital version of currency. On the one hand, token-based CBDC shares with physical currency—this is cash—the characteristic that it incorporates a monetary claim on the issuing central bank in an easily transferable carrier and thus can

[13] This pattern is considered for offline CBDCs where the token could be represented within the secure element of the owner's device (e.g.: https://www.bog.gov.gh/wp-content/uploads/2022/03/eCedi-Design-Paper.pdf), for tokens signed by blind signature (https://www.snb.ch/en/mmr/papers/id/working_paper_2021_03, Project tourbillon) or for DLT-based CBDC with users controlling directly private keys, similarly to "self-custodial" wallets used for crypto assets.

[14] In a DLT based scenario, tokens could be controlled jointly to offer a recovery procedure. Similarly, offline tokens could be reissued after a certain date.

[15] Technologically, this custodianship can take various forms, such as holding the CBDCs via an omnibus account, via segregated accounts or stored in secure elements.

[16] We note that this legal approach differs from similar categories developed by other authors. E.g., CBDC architectures, the financial system, and the central bank of the future | VOX, CEPR Policy Portal (voxeu.org) and The technology of retail central bank digital currency (bis.org) Under the "indirect structures" proposed by the latter, "the consumer has *a claim on an intermediary*, with the central bank keeping track only of wholesale accounts". This would entail that the CBDC ceases to be CBDC but is transformed into commercial bank money. The term "indirect holding structure" used in this note is like the "hybrid Model" used by said authors.

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be transferred between holders without legal intervention (for example, in the form of the execution of a debit instruction) by the central bank. On the other hand, in direct and indirect holding structures, the digital currency can only be held through a wallet offered by respectively the central bank or an intermediary. This is radically different from physical currency, which is held directly and in physical form by the owner. This note will thus at times make parallelisms of token-based CBDC with physical currency, but at other times important distinctions will be in order.

Hence, from a private law perspective, it is not necessary to consider token-based CBDC as a "banknote." It is recognized that jurisdictions *can* legislatively establish a legal "functional equivalence" between token-based CBDC and traditional banknotes.[17] If such an avenue were to be chosen, it would be important not only to establish the general principle, but also to ensure that this equivalence plays out in all relevant aspects of private law, from property law classification to private international law. In that regard, simply declaring the principle of equivalence may not suffice, as delicate and difficult fundamental legal questions may arise (for example, how is the owner dispossessed of digital tokens? What is the situs of a digital token?). As discussed below, this note takes the position that a sound private law framework for token-based CBDC can be established without need for such a functional equivalence with banknotes. What really matters is that the legal framework—admittedly in most cases through legislative intervention—establishes clear and solid private law rules that allow token-based CBDC to properly play its role in the monetary system.

[17] On this route: see Ingves, S., Julin, E., Lindskog, S., Söderberg, G., and Vestin, D., *What is money and what is the role of the state in the payments market?* Sveriges Riksbank Economic Review, 2022 – 2, Chapter 4.

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III. The Legal Nature of Token-Based CBDC under Property Law

Determining the legal nature of token-based CBDC under property law is critical to understand its treatment under core aspects of private law. Specifically, this legal nature—which can also be called "classification"—will first allow to determine whether and how ownership rights in token-based CBDC can be held and evidenced (see Section IV). This, in turn, will shape how token-based CBDC can legally be transferred between economic agents (see Section V), held in custody and be "deposited" with financial intermediaries, and pledged with creditors (see Section VI). Critically, it will also determine the rights of holders in the insolvency of their counterparts (Box 6). Finally, it will guide the application of private international law rules (Section VII). Regarding those matters, legal systems often have very different rules for different categories under property law. These differences, in turn, shape the rights and obligations of all parties involved, for example, the transferor, transferee and creditors.

Legal systems have traditionally developed clear "binary" categories for classifying property along certain well-established criteria**.** Key distinctions in this classification include movable versus immovable goods, and tangible versus intangible goods.

- ***Under Common law***, there are two types of property: real property (for example, land and real estate) and personal property (movables). Under personal property, there are chattels real (for example, interest in land such as a lease) and chattels personal. Within chattels personal, there are mainly *choses in possession* (tangible goods) and *choses in action* (intangible goods, for example, contractual claims, rights in tort, or copyrights).[18]
- ***Under Civil law,*** all rights can be classified either as rights *in rem* (a "real" or "objective" right over an object) or rights *in personam* (a "subjective" right against a person). The rights *in rem* include the property or ownership right, which historically was mainly considered to apply to tangible goods. Those in turn can be categorized into *immovable* and *movable* goods, and movable goods can be distinguished between *fungible* and *non-fungible* goods.[19]

However, to deal with novel developments, those legal systems have also developed "hybrid" categories. Common law created *hybrid* property, that is, an intangible asset represented by a tangible *chose in possession.* For instance, documentary intangibles (for example, negotiable instruments such as bills of exchange and promissory notes), which are intangibles represented by a tangible object (piece of paper) where the transfer of the tangible object equates the transfer of the intangible object.[20] Under Civil law,

[18] See, for example, *Colonial Bank v Whinney* [1885] 30 ChD 261 with respect to English law.

[19] See, for example, Articles 587 and 1892 of the French Civil Code and Malaurie, Ph, and Aynes, L., *Les Biens,* 2004, p. 25 et seq. With respect to Germany, see §§90, 91 of the German Civil Code and Wieling, Hans Josef, and Finkenauer, Thomas, Sachenrecht, 6. Auflage, 2020, Buch, Lehrbuch/Studienliteratur, 978-3-662-61797-7, p.33, paragraphs 5,6.

[20] See M. Bridge, Personal Property Law (2nd edition), 1996: Documentary intangibles are instruments or documents that are so much identified with the obligation embodied in them that the appropriate way to perform or transfer the obligation is through the medium of the document. The abstract intangible right acquires such a degree of concretised expression that it takes on some of the characteristics of a chattel. The document recording the right is itself a tangible thing and thus a chattel, and the right is thoroughly fused with the document. For an application of these principles in the context of digital assets: see Perkins, Joanna,

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especially since the second half of the past century, laws have been introduced and judicial decisions adopted to allow property and other "real" rights over intangible objects, such as contractual claims and intellectual property rights.[21] In some cases, this was achieved by attributing rules hitherto applicable to tangibles also to certain intangibles, such as in the case of bearer negotiable instruments and intermediated/dematerialized securities,[22] thus turning those assets similarly into hybrids. Finally, some countries have modernized their legal system fundamentally by explicitly providing in legislation that property rights can also apply to intangible goods.[23]

Additionally, several jurisdictions recently enacted new laws governing digital assets in the form of tokens. Distributed ledger technologies (DLT) and similar technologies present challenges in terms of the legal characterization of the instruments they generate, including under property law. In theory, the digital tokens could under private law either (a) be categorized under an existing category of property law, or (b) be assigned an altogether new category under property law. In practice, several of those new laws have addressed the legal nature of digital assets. Similarly, court cases and administrative practice have started classifying such assets. Box 2 gives an overview of these developments, which have as a common thread that, albeit not without difficulties, property/ownership rights over digital assets, or subcategories thereof such as securities, are increasingly being recognized.

and Enwezor, Jennifer, *The Legal Aspect of Virtual Currencies*, 10 JIBFL 569 (2016); *Issues of Legal Uncertainty Arising in the Context of Virtual Currencies*, FMLC (2016).

[21] See e.g., Malaurie, Ph, and Aynes, L., *o.c.*, p. 107, nr. 412.

[22] For instance, the Belgian law of 2 January 1991 on dematerialized government securities stipulates that those securities are subject to the Civil Code regime for tangible movables including in case of loss or theft (Art. 13bis referring to Articles 2279 and 2280 Civil Code). This said, not all jurisdictions followed this approach for designing the legal framework for intermediated securities; some jurisdictions opted for a new set of (often *sui generis*) rules, such as under Art. 8 UCC in the USA. A similar approach was followed in Switzerland, with the Swiss Federal Act on Intermediated Securities (Federal Intermediated Securities Act, FISA) of 3 October 2008. It «regulates the custody of certificated and uncertificated securities by custodians and their transfer», Art. 1(2) FISA, and thereby «ensures the protection of property rights of investors», Art. 2(1) FISA.

[23] See Articles 3.7, 3.48 and 3.41 of the "new" Belgian Civil Code.

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Box 2: Legal Classification of Digital Assets

Common Law Jurisdictions. The main legal characterization of digital assets established so far in Common Law jurisdictions has been centered on property:

- Recent 2022 amendments to the **US**'s Uniform Commercial Code (UCC) introduced Article 12 to govern the transfer of property rights in digital assets, called "controllable electronic records" (CERs), whereby control of an electronic record is analogous to possession of tangible personal property—the person with control has the power to "spend" the intangible asset by transferring it to another person in exchange for goods or services.

- Separately, although not representative of other states, **Wyoming** law classifies digital assets as *intangible personal property* subject to the version of the UCC adopted by the state in which a security interest can be perfected. The Wyoming Digital Asset Statute (W.S 34-29-101 et seq.) divides those assets into 3 categories and classifies them within the state's version of the UCC as: (i) Digital Consumer Assets (digital asset that is used or bought primarily for consumptive, personal or household purposes and includes an open blockchain token constituting intangible personal property): Treated as general intangibles (personal property, including things in action, other than accounts, chattel paper, commercial tort claims, deposit accounts, documents, goods, instruments, investment property, letter-of-credit rights, letters of credit, money and oil, gas or other minerals before extraction, but includes payment intangibles and software) under UCC Article 9 of W.S. 34.; (ii) Digital Securities (digital asset which constitutes a security but excludes digital consumer assets and virtual currency): Treated as securities and investment property under UCC Articles 8 and 9 of W.S. 34.; and (iii) Virtual Currencies (digital asset that is used as a medium of exchange, unit of account or store of value, and not recognized as legal tender by the US government): Treated as money under UCC Article 9 of W.S. 34. whereby the security interest can be perfected only by the secured party's taking possession (WY Stat 34.1-9-313). (1)

- The **US** Internal Revenue Service (IRS Notice 2014-21) qualifies virtual currencies as *property* for tax purposes, and general tax principles applicable to property transactions apply to transactions using virtual currencies, such as the sale or other exchange of virtual currencies, or the use of virtual currencies to pay for goods or services or holding virtual currencies as an investment. This is applicable to "convertible" virtual currency, i.e. virtual currency that has an equivalent value in real currency, or that acts as a substitute for real currency, for example, Bitcoin.

- The Lawtech Delivery Panel's **UK** Jurisdiction Task Force (Legal Statement on Cryptoassets and Smart Contracts, November 2019) also characterizes crypto assets as *property*. This opinion was later confirmed by the English High Court in the case of *AA v Persons Unknown* [2019] EWHC 3556 (Comm), which concluded that crypto assets fulfill the four classic criteria of property set out in *National Provincial Bank v Ainsworth* [1965] AC 1175 (HL). (2) In its "Digital Assets: Consultation Paper" (Consultation Paper 256, 28 July 2022), the UK Law Commission is proposing for a "third" category of personal property distinct from things in possession and things in action, that is "data objects". The paper concludes that crypto tokens satisfy the proposed criteria of data objects and are appropriate objects of property rights. (3)

- In **Singapore**, the Singapore Court of Appeal in the case of *Quoine Pte Ltd v B2C2 Ltd* [2020] SGCA(I) 02 noted recent Commonwealth decisions and the UKJT's Legal Statement which concluded that cryptoassets could in principle be treated as property. The court agreed that cryptocurrencies could be capable of being assimilated into the general concepts of *property* but also noted that there are difficult questions as to the type of property that is involved and ultimately refrained from opining on the legal classification. A similar line was taken by the High Court in CLM v CLN and Others [2022] SGHC 46.

- The **New Zealand** High Court in *Ruscoe v Cryptopia Ltd (in liquidation)* [2020] NZHC 728 also held that cryptocurrencies were *property* for the purposes of the Companies' Act (and "probably more generally"), and that they were capable of being held on trust by a company for its accountholders and be out of reach of the

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company's creditors.

Civil Law Jurisdictions. The main existing classifications of DLT-generated digital assets found in Civil Law systems involve similarly ownership attributes:

- The **Liechtenstein** 2019 *Act on Tokens and Trustworthy Technologies Systems Service Providers* (also known as "Blockchain Act") covers all sorts of "tokens" and, although it does not mention their legal nature explicitly, it does give the holder of the private key *ownership attributes*, such as the power to dispose of the token assets and the power to demand performance if the token represents a claim (Articles 5 and 6.1). In doing so, the Act grants tokens that incorporate claims a private law treatment equivalent to movable tangibles, thus effectively establishing the token as "hybrids."
- The Article L211-4 of the **French** Monetary and Financial Code uses explicitly the term "owner" of DLT-held financial securities when it provides that the recording of those securities in the "*dispositif d'enregistrement electronique partage*" is made "in the name of one or more holders, owner of the recorded financial securities." (Art. L211-7, second para., uses similar language.) This seemingly recognizes that the holder enjoys *property* rights over the digital financial security.
- The **Swiss** *Distributed Ledger Technology Act* of 2021 recognizes tokenized securities (so called registered or «ledger-based securities») as intangible assets by creating a new sub-category of a "ledger-based security" (Art. 973.d Civil Code). The transfer of the ledger-based security is governed by the sole general principle that it "may be exercised and transferred to others only via this securities ledger" (Art. 973d(1)(2) CO), while the transfer itself "is subject to the terms of the registry agreement" (Art. 973.f.1 Civil Code), which permits derogation from the general assignment rules pertaining to intangibles to achieve a smooth transfer between economic agents. At the same time, some principles for tangibles are made applicable to these new securities albeit *mutatis mutandis* (for example, with respect to pledging Art. 973.g Civil Code). While the Swiss legislation does not explicitly state so, the whole rationale of the reforms is that ledger-based securities can be subject to *ownership rights*.
- In June 2021, **Germany** enacted a law on the issuance of electronic securities (Gesetz zur Einführung elektronischer Wertpapiere "eWpG"). A central element of the eWpG is that it replaces the requirement for a physical certificate by an entry into an electronic securities register, thereby making it possible to issue securities in an electronic form (eWpG §2). The eWpG provides for two types of electronic securities registers; central register securities and decentralized crypto securities register (eWpG §§ 12 and 16). Under the eWpG, electronic securities are classified as property (Sachen) within the meaning of §90 of the German Civil Code (eWpG § 2). Thus, the transfer of electronic securities will generally continue to be governed by the provisions of the German Civil Code regarding property.
- **Japan**: In the bankruptcy litigation case of Mt. Gox (a bitcoin exchange based in Tokyo), the district court ruled against users' claim that bitcoin is subject to ownership, reasoning that it does not meet the civil law interpretation which requires the object of ownership to be "tangible" and "exclusively controlled". In reaction to the court case, the *Payment Services Act* was amended in 2016 to introduce a registration system for Crypto Asset Exchange Service Providers. Furthermore, considering changes in the environment for crypto assets, the Act was amended in 2019 to strengthen consumer protection by recognizing a statutory lien combined with a segregation requirement on the digital assets in the hands of service providers. In that context, the Act (Art. 2 (5)) defined for the purpose of the Act "crypto-assets" as (i) property value which is recorded on an electronic device, and excluding the Japanese currency, foreign currencies, and currency-denominated assets, (ii-a) which can be used in relation to unspecified persons for the purpose of paying for goods and services and (ii-b) can also be purchased from and sold to unspecified persons, and (iii) which can be transferred by means of an electronic data processing system.

(1) Under the current version of the UCC, the general consensus is that virtual currency (other than bitcoin which could fall under the definition of "money," that is, a medium of exchange currently authorized or adopted by a domestic or foreign government)

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falls under the "catch all" category of general intangibles under Art. 9. A security interest in general intangibles may be perfected only by filing (UCC 9-310(a)). See however, recent amendments to the UCC which propose a new Article 12 governing the transfer of property rights in intangible digital assets, but which would exclude electronic money which is defined as money in an electronic form (CBDC would therefore fall within this definition).
(2) "… before a right or an interest can be admitted into the category of property, or of a right affecting property, it must be (i) definable (for example, confers a set of "rights" or functions or entitlements); (ii) identifiable by third parties; (iii) capable in their nature of assumption by third parties; and (iv) having some degree of permanence."

(3) The proposed criteria are that the thing must: (i) be composed of data represented in an electronic medium, including in the form of computer code, electronic, digital or analogue signals; (ii) exist independently of persons and exist independently of the legal system; and (iii) be rivalrous.

This begs the question whether token-based CBDC fits into one of those traditional or novel categories. In the absence of any specific laws or court decisions to date addressing the legal nature of CBDC under property law, [24] it makes sense to start such an analysis by considering token-based CBDC against the backdrop of existing legal categories.

- First and foremost, for a CBDC to be classified as a "property" under either Common Law or Civil Law, it will need to fulfil the classic criteria of "property" in the relevant jurisdiction. For example, for the English courts to qualify it as property, CBDC should meet the four classic criteria of property set in *National Provincial Bank v Ainsworth*. Given that the English courts have applied the criteria in *AA v Persons Unknown* to crypto-assets, which are more complex than CBDC, it is not unreasonable to expect that the courts could also consider token-based CBDC as property. Similarly, as Civil law jurisdictions have increasingly accepted "real rights" on non-material objects, accepting "real rights" on token-based CBDC would be a logical next step.
- Second, there is little doubt that this form of CBDC has features of the *movable intangible* category—the CBDC incorporates a *sui generis* monetary claim on the issuing central bank and this claim is intangible. The law will also likely allow economic agents to consider CBDC as *fungible* (even though intangible).[25]

Consequently, the main questions to be addressed are (a) whether the token-based CBDC displays features of hybrid assets due to additional tangible characteristics, (b) whether this form of CBDC can be a novel *sui generis* category, including one of those established by the novel "DLT-laws," and (c) when the CBDC is neither, how the CBDC thus qualifies as a pure yet novel intangible.

Token-Based CBDC as a Hybrid Asset

Could CBDC qualify as an existing or novel type of hybrid asset? Fundamentally, for token-based CBDC to qualify as a hybrid, legislation or case law would need to determine that there is a sufficient degree of "materiality" in the token to conclude that it can legally be equated to a tangible object. This would *inter alia* have as a consequence that such CBDC can be "possessed" (or at least be subject to a functional

[24] To date, the three jurisdictions (The Bahamas, Nigeria and Jamaica) that have formally issued CBDC have not addressed in their laws the legal nature of CBDC under property law. This said, under Bahamas law, the CBDC is classified as e-money. The private law and regulatory statuses of electronic money differ between countries and are often not clear. At least in some jurisdictions, e-money is legally not money at all but merely a payment instrument convertible in commercial bank book money: see Deguee, J. P., *Le statut legal des etablissements de monnaie electronique*, in "Juridische Aspecten van de Elektronische Betaling," Brussels.

[25] Note that token-based CBDC is not inherently fungible, as it may each have a unique public address on the ledger—this is also the case for physical banknotes that often have unique serial numbers. This said, the law should allow economic agents to treat CBDC as fungible through their contractual stipulations. In countries where legal convention considers banknotes as fungible, this approach could be expanded to token-based CBDC.

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equivalent, such as "control"). Historically, a similar reasoning was developed first for paper instruments—the negotiable instruments and banknotes—and later for dematerialized securities represented merely by a credit booking in a securities account. Box 3 investigates in certain detail whether CBDC could be qualified as one of the main categories of *existing* hybrid assets—the answer to that question is likely negative. Hence the question arises whether token-based CBDC can be considered as a *new* hybrid. It is the authors' opinion that in many jurisdictions nothing prevents the legislation or the courts to assign tangible attributes to token-based CBDC, thus making them new hybrids under property law.

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Box 3: Token-based CBDC and Existing Hybrid Assets

Negotiable Instruments. While the doctrine of negotiable instruments was originally developed by case law, most countries have today legislation governing those instruments. First, the economy of these laws is that the instrument needs to be incorporated in paper (absent electronic document legislation). Secondly, these laws will typically prescribe what the instrument should legally achieve in writing. For instance, under English law, a promissory note is "*an unconditional promise in writing made by one person to another signed by the maker, engaging to pay, on demand or at a fixed or determinable future time, a sum certain in money, to, or to the order of, a specified person or to bearer*" (Section 83 (1) of the 1882 Bills of Exchange Act). Thirdly, most countries recognize a limited, well-established list of the types of instruments that qualify as negotiable instruments. In that light, it would be very hard, if not impossible, to qualify token-based CBDC as a negotiable instrument in most jurisdictions.

Banknotes. Except for a few jurisdictions (for example, England, where they qualify as bearer on demand promissory notes), the legal status of banknotes is generally not specified in legislation. Some academics have argued accordingly that, while banknotes were traditionally issued in paper and later in plastic form, public law does not prevent banknotes from being issued in electronic or digital form. (1) It cannot be excluded that in some jurisdictions this legal reasoning will be followed. However, token-based CBDC differs from banknotes in some important respects. As discussed, in contrast to paper and plastic notes, digital tokens are not yet widely considered as tangible. Thus, given that this form of CBDC requires a technological platform to serve as a medium on which the tokens are registered, this could affect the legal nature of the instrument. Moreover, several banknotes-related legislative provisions explicitly refer to a physical and printed carrier. Absent legislated "functional equivalence" (see para. 14), this makes it very difficult to assimilate under private law token-based CBDC to banknotes. This is valid even if, under public law, the authorization to issue banknotes were to be interpreted as including a reference to digital banknotes. (From a public law perspective, this argues for considering token-based CBDC as separate from banknotes in the issuance authorization enshrined in central bank laws. (2))

Intermediated/Dematerialized securities. In most countries, intermediated/dematerialized securities are governed by specific legislation (for example, Royal Decree Nr. 62 in Belgium, and the Luxembourg Law of 6 April 2013). Those laws will typically include a definition of "security" (see for example, Art. 1.11 of the Luxembourg law). In almost all those laws, money and currency do not fall under the definition of "security." Similarly, Art. 1 (a) of the UNIDROIT *Geneva Securities Convention* and Article 1 (a) of the *HCCH Securities Convention* explicitly carve out "cash" from the definition of "securities" and thus the scope of the Convention. By consequence, it is unlikely that token-based CBDC can be classified as an intermediated/dematerialized security.

(1) Grünewald, S., Zellweger-Gutknecht, C., and Geva, B, *Digital Euro and ECB Powers,* Common Market Law Rev, Vol. 58, pp. 1029–1056 (2021); Zellweger-Gutknecht, C., Geva, B., and Grünewald, S., *Digital Euro, Monetary Objects, and Price Stability: A Legal Analysis*, J of Fin Reg, Vol. 7, Issue 2, pp. 284s–318 (2021).

(2) Bossu, Wouter and others, *Legal Aspects of Central Bank Digital Currency: Central Bank and Monetary Law Considerations,* IMF WP 20/254.

CBDC as a Novel Sui Generis Category

Alternatively, could token-based CBDC be assigned a novel, *sui generis* property law category? This raises both substantive and formal questions. On substance, first, is it imaginable that legislation creates

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for CBDC specifically, or for an asset class to which CBDC belongs, a new property law category? [26] It would be quite uncommon to construct a new property law category for such a narrow asset class. In contrast, building upon the Swiss example discussed in Box 2, it appears that token-based CBDC could be assigned to a broader category, for example, the one of a "ledger-based intangible and fungible asset." If that is however the case, the legal treatment of that property law category will need to be clear, in particular with respect to the issues dealt with in the following three sections (transfer, habitual banking operations and private international law). From a formal perspective, this raises the question whether this form of CBDC, if deployed on DLT or a similar technology, would be covered by the above-discussed new "DLT laws." The response to this would depend on the concept and the structure of those laws: some DLT laws may have a very open material scope of application (for example, Liechtenstein) whereas other DLT laws may be narrower and be limited, for example, to securities (for example, Switzerland).[27] In other words: this will be jurisdiction-specific.

CBDC as Pure Yet Novel Intangible

In the absence of a hybrid or novel *sui generis* legal nature, token-based CBDC will likely be considered as a pure intangible asset, but with a need for bespoke rules. In this case, the broader private law treatment will follow those of intangible assets. This said, it would be very problematic if token-based CBDC were to be equated with the archetype of intangibles, to wit contractual claims. This would, for instance, entail that token-based CBDC would need to be transferred per the rules of assignment. This would act as a fundamental obstacle to its circulation: transfer of the token would not result in the transfer of the right incorporated in the token, which would go against the very definition of token-based CBDC. Thus, under this approach, the law would need to design bespoke rules for this new intangible that support its circulation, as was done for book money, registered securities, and intellectual property rights.[28] Specifically, similar to those intangibles, the law would need to consider whether or not to grant some legal consequences to the technological registry or ledger on which the token-based CBDC is held (see below in Section 4).[29]

In sum, it is conceptually possible to bring token-based CBDC under a property law category and thus subject it to ownership rights. This conclusion is in line with broader developments in regard of crypto assets (see Box 2). In terms of property law categories, this form of CBDC can be a novel type of tangible-intangible hybrid, a novel *sui generis* category, or a pure, novel intangible.

[26] One jurisdiction considering establishing a new category of personal property for crypto assets is the UK with the creation of "data objects" personal property category (as suggested in the Digital Assets: Consultation Paper of UK Law Commission of July 2022).

[27] If a CBDC is to be generated on DLT or similar technology, the law should clarify that the generation of CBDC using a specific technology such as DLT is not enough to trigger the application of privately issued DLT digital assets laws.

[28] E.g., the concept of "current account" was applied to the intangible asset of book money to facilitate transfers by debt and credit, as opposed to by assignment.

[29] On the legal concept of ledgers, see also Bossu, W., M. Itatani, C. Margulis, A. Rossi, H. Weenink, and A. Yoshinaga, *o.c.*, Box 2.

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IV. How are Ownership Rights in Token-Based CBDC Held and Evidenced?

As a next step, building upon its property law categorization, it is necessary to determine how ownership rights in token-based CBDC will be held and evidenced. This analysis will provide the link between the previous section (legal nature) and the legal issues discussed in sections V (transfer) and VI (common banking operations). Many factors will come into play to determine how ownership rights in this form of CBDC—and thus the tokens through which it is represented—are held: the general legal traditions of a jurisdiction (for example, formalism versus consensualism), the legal categorization of the CBDC, and its structural and even technological design features. In the latter regard, the role played by registries/ledgers and wallets in holding tokens deserves special attention.

Registries/Ledgers

What is the legal role of so-called "registries" or "ledgers" in holding tokens? Technologically, if the tokens are held through some form of digital technology, they will typically be held on addresses on a registry/ledger and be controlled by so-called private keys. This raises two legal issues. First, *should a legal role* be granted to a technological ledger, for instance with respect to evidencing the holding and transfer of the CBDC? If yes, this would require legally equating the technological ledger with a legal ledger, which is not self-evident, and would most likely necessitate legislative intervention. Such an intervention can establish key concepts and mechanisms, or alternatively, as the Swiss example mentioned in Box 2, merely refer to the effectiveness of the contractual framework governing the registry/ledger. Secondly, if a legal role is given to the ledger, the fundamental question is then about *which* role that registry/ledger should play in holding and evidencing ownership rights in the tokens, relative to other technological instruments with a potentially legal role (such as private keys and access codes).[30] In this regard, there are two options at the extreme ends of a spectrum.
One option is that the registry/ledger is *constitutive* of ownership rights: ownership rights can only arise through holding on the registry/ledger and, conversely, no ownership rights in tokens exist unless reflected in (addresses on) the ledger.

The other option is to consider the registry/ledger as *indicative* of ownership rights: a registration of tokens on the registry/ledger acts as a presumption of ownership, but (the legal act resulting in) this ownership can also be proven and transferred outside the registry/ledger. By consequence, the "registrar" has a duty to adjust the registry/ledger to outside "legal acts" (for example, succession between natural persons or merger between legal persons) that have transferred ownership rights in the asset.[31]

This question must be considered in light of the legal nature of token-based CBDC. For instance, the first option could in theory work if token-based CBDC would be categorized as a *sui generis* or pure intangible asset: the legislation that were to establish the legal nature of the asset could in either case give

[30] This form of ledger must be distinguished from the general accounting ledger of the issuing central bank: see Bossu, W., M. Itatani, C. Margulis, A. Rossi, H. Weenink, and A. Yoshinaga, *o.c.*, Box 2. It is thus theoretically possible that the central bank ledger plays no role in evidencing ownership rights in token—only the private key would allow for the proof of possession and as a result ownership of CBDC.

[31] In most jurisdictions, this would be very similar to registries for immovable properties and securities.

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"absolute" meaning to registrations on the registry/ledger. This is however not the case if token-based CBDC were to be categorized as a hybrid, because attributing such an absolute meaning to the registry/ledger would be inconsistent with the partly tangible nature of the asset—ownership rights in tangibles can typically be transferred without registration, even if there is a subsequent requirement or possibility to evidence the transfer through registration.[32] In contrast, the second option could work with all three categorizations: as explained, such an approach would be consistent with the tangible aspect of hybrids and the legislation establishing the legal nature of the asset as a *sui generis* or pure intangible asset could in either case give this "non-absolute" meaning to registrations on the registry/ledger.

The response to this question depends on the practical and legal design of CBDC *holding structures*. For instance, depending on the technology, it could be argued that control of the private keys or tokens resembles "possession" (see para. 19). Thus, as the transfer of the tokens to another holder results in the transfer of control, this could also amount to transfer of (quasi-) possession and thus of ownership rights. Another factor is whether the financial intermediaries will operate their own registry/ledger and what would be the legal ramifications of that. Depending on the design features of an "intermediated" CBDC arrangement, a separate registry held by each financial intermediaries could determine how many tokens are held by holders in each digital wallet. The contractual framework governing the issuance of the token-based CBDC can also play a role: for the registry/ledger to result in legal relationships (rights and obligations) in that context, a legal link will likely need to be established by law between ledger and CBDC. This can be done through contract between the central bank, financial intermediaries and retail users, possibly with an anchor in legislation. Such a contract can be designed in many ways. This illustrates that the legal signification given to the registry/ledger of token-based CBDC will to a large degree depend on the design features of that form of money, which makes it very hard to come to general conclusions in this regard.

Wallets

Similarly, the question arises whether ownership rights in token-based CBDC can be held and evidenced through balances in custodial wallets. This question calls for two reflections. First, if the token-based CBDC can truly be held in custody—this issue will be discussed in detail in section VI—then the custodial wallets should reflect the ensuing constellation of ownership rights, including from an evidentiary perspective. This entails that the ownership rights in the token can be held, exercised and evidenced (including in case of insolvency of the wallet provider) through the wallet.[33] Secondly, the interaction between custodial wallets and registries/ledgers must be considered. Specifically, this would entail that the registry/ledger would be only indicative of ownership rights and need to be adjusted to CBDC transfers between wallets. This will be particularly relevant for transfers between holders of wallets of different intermediaries. But the issue is relevant even in case of transfers between wallet holders with the same intermediary. As will also be discussed in section VI, the intermediaries would likely be holding amalgamated client holdings of tokens in "omnibus" positions on (addresses on) the registry/ledger. To maintain the quality of CBDC as central bank money—a direct monetary claim on the central bank—it will

[32] Under many national laws, this would be akin to e.g. rules governing cars: ownership in a car can be transferred between contractual parties and the registration of new car ownership in a registry is the consequence of acquiring new ownership rights. This is also the logic of the Capetown Convention on International Interests in Mobile Equipment (2001): the parties can choose to register an interest, but such registration is not a precondition for a valid acquisition of interest (see Articles 7 and 20).

[33] Just as (co-)ownership rights in dematerialized securities can be held and evidenced through the securities account held by the holder in the books of the intermediary and evidenced by account statements pertaining to that account.

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be imperative under such a model that the holders maintain ownership rights in the tokens. The central point to make at this stage is that the legal frameworks governing those "omnibus positions" should recognize this—a rule whereby ownership rights are only recognized on the registry/ledger (the first option above) would be difficult to reconcile with ownership rights of holders on balances in wallets.[34]

[34] This will be discussed in detail in Section VI. For now, a similarity with the "co-ownership" concept used in dematerialized securities legislation can be useful to consider.

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V. Transfer of Token-Based CBDC

Private law rules should describe how ownership and other rights in token-based CBDC can be transferred between economic agents. The economy requires that economic agents transfer their goods. This is even more true for money, in the sense that transfers of money typically seek to achieve "payments" for goods, services, or monetary obligations. In that context, the good faith receiver of money should acquire ownership without investigating the transaction chain to assure that their ownership of the money is legitimate. This legal certainty will be the key for the circulation of money.[35]

In that regard, it will be of critical importance to determine when transfers of token-based CBDC are definitive, or "final." At various levels, the law is concerned with when somebody definitively acquires an asset from somebody else. This applies particularly to transfers of money, that is, payments. In respect of money transfers aimed at discharging monetary obligations, understanding when the transfer becomes definitive is critical to determine when the monetary obligation is exactly extinguished. Specifically, this "finality" operates at the following 3 levels:

- *When is a transfer effected?* The conditions for when a transfer (and for that matter, other types of transactions) is effected, that is legally "complete" (including vis-à-vis third parties), will essentially depend on the legal nature of the asset that is the object of it. For tangible assets, including "hybrid" assets such as banknotes and coins, a transfer is completed and finalized when the transfer is made hand-to-hand (the *traditio* related to physical possession). For account-to-account transfers of book money, credit to the receivers' bank account provides finality to the transfer (transfers between bank accounts are legally cancellations of previous claims and creation of new claims on the bank). For registered securities, the transfer is effected when it is reflected in the registry. Under contractual freedom under private law, parties can amend the conditions for finality (for example, transfer *solo consensu* and title reservation clauses), but always within the boundary of the legal nature of the asset.
- *Impact of insolvency rules on definitive character of transfer.* Many countries have a so-called "zero-hour rule" in their insolvency law. This rule establishes that transfers (and other transactions) conducted and "effected" by an insolvent person after midnight on the date the person is declared insolvent (or after the making of some other formal step in the process leading to them being declared insolvent) are automatically ineffective by operation of law and need to be unwound and returned. This rule can create major contagion in the financial system if large inter-bank payments are required to be returned in case of the insolvency of a payor bank.
- *Impact of the "Nemo Dat" rule*. This rule states that nobody can transfer more rights than he/she has—this means that the receiver of an asset cannot receive ownership rights if the transferor did not have such rights over the transferred asset. Payments in physical currency are typically exempted from this rule. The rationale of this exemption—which provides privileged treatment relative to ordinary transactions—is to protect the good faith receiver of physical currency from

[35] A similar point is made is respect of stablecoins in: Cheng, J., (2020), "How to Build a Stablecoin: Certainty, Finality, and Stability Through Commercial Law Principles," Berkeley Business Law Journal, Vol 17:2, https://lawcat.berkeley.edu/record/1137526

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legal challenges by the legal holder.[36] This is because (a) the receiver of currency is not expected to investigate whether the payor legally owns the transferred currency and (b) it is also practically impossible to track where the currency comes from.

How these three aspects could be relevant for token-based CBDC will be analyzed in more depth in the remainder of this section. At the end of the section, Box 4 will focus on the complex issue of legal challenges to so-called "offline" transactions.

A. Perfection of transfers of token-based CBDC

The legal framework should be clear as to when, considering the private law nature of token-based CBDC, a payment—that is, a transfer of token-based CBDC—with it is "effected." As highlighted above, the importance of the alignment with the private law classification and the ensuing way ownership rights in the tokens are held and evidenced cannot be sufficiently stressed.

Hybrid Asset: If private law were to consider token-based CBDC as a hybrid asset, transfers of it will be effected as per the rules for "modernized tangibles," namely (generally) when the control over the tokens is shifted from transferor to transferee. Depending on the design of the CBDC (in particular, in case of an indirect holding structure), this transfer of control could occur when the tokens are transferred from the transferor's wallet to the transferee's wallet (irrespective of who controls the private keys), even if the new positions are not yet reflected on a ledger or registry.[37] As will be discussed below, this can cause complexities.

Novel Sui Generis Asset: If private law were to consider token-based CBDC as a *sui generis* asset, transfers of it will be effected either per the mechanism established by the law granting the CBDC its *sui generis* private law status or per the contractual mechanisms governing the token-based CBDC—this is the Swiss approach mentioned above in Box 2. In case the former option is chosen, the legislation has the choice (as discussed in section IV) between relying in an absolute manner on transfers between addresses in the registry/ledger or, alternatively, granting "legal meaning" in this regard to transfers between wallets. Obviously, this choice will be conditional upon the design of the CBDC holding structure.

Intangible Asset: If private law were to consider token-based CBDC as a pure intangible asset, transfers of it will be effected as per the mechanism established by the law. As discussed above, in the absence of such a mechanism, the question arises whether the general rules on assignment apply. From the perspective of the imperative of broad circulation, this might not be an optimal outcome.[38] In designing the said mechanism, the legislation faces a similar choice as for novel *sui generis* assets, namely between an "absolute registry" and alternative, "softer" quasi-registration mechanisms, such as on a wallet.[39]

[36] Legal systems often impose the condition that certain legal prescriptions are met for the exception to apply. In addition, most legal systems include several other exceptions to the *Nemo Dat* rule, for instance for goods purchased on regulated commodity and financial markets.

[37] Under an indirect holding structure, there would be no transfer on the registry/ledger if transferor and transferee hold wallets with the same intermediary.

[38] As an illustration, for assignment to be perfected, it typically needs to be "notified" to the debtor, which in this case would be the central bank. This would not only be very cumbersome, but conceptually irreconcilable with an indirect holding system.

[39] See par. 25. In this case, a "booking" on a wallet would be very similar to a credit booking in current account for book money.

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B. Insolvency Protection, Payment System Settlement Finality, and Transfers of Token-Based CBDC

It is important to provide "settlement finality" to payments effected in systemically relevant interbank payment systems. To that end, many jurisdictions have enacted so-called Settlement Finality legislation aimed at providing definitive settlement in selected payment, clearing and securities settlement systems by neutralizing the "zero-hour" rules. For instance, in the EU, the Settlement Finality Directive regulates designated systems used by participants to transfer financial instruments and payments. This Directive guarantees that, under certain conditions, transfer orders which were entered into such systems will be finally settled, regardless of whether the sending participant has become insolvent, or transfer orders have been revoked. The participants to designated systems are either financial institutions (mainly banks and investment firms) or systems operators, such as central banks, central securities depositories (CSDs) or central counterparties (CCPs).

Typically, the form of the settlement asset of the payments is not determinative for the operation of such "settlement finality" protection. It is true that banks typically settle large-amount payments in central bank book money, and through payment systems (real time gross settlement systems of RTGS) generally run by the central banks themselves. To avoid systemic risks, the highest level of certainty is required for such large-amount transactions and this certainty is provided by risk free central bank money. However, the risk addressed by settlement finality rules is not credit risk on the settlement asset, but rather the insolvency (that is, unwinding) risk on the payor and the ensuing financial stability risk. Because settlement finality rules are an exception to well-established general insolvency rules promoting equal treatment of creditors, their personal scope of application needs to be circumscribed. Therefore, the application (and ensuing protection) of this type of legislation is not predicated on the form of the payment settlement asset but rather confined by (a) the type of systems (systemic interbank systems) and (b) the categories of participants (financial institutions and banks in particular). In fact, it is perfectly conceivable—and it is the case—that settlement finality is provided to interbank systems that do not settle in central bank money.

By consequence, Settlement Finality legislation will likely have little impact on "retail" token-based CBDC. Even though token-based CBDC is a means of payment using a central bank liability, it does not require the same level of protection of finality as interbank payment system transactions using central bank book money.[40] Specifically, if a person or entity using token-based CBDC is declared insolvent and some of its previously made payments are unwound, this is most unlikely to cause systemic frictions in the financial system, given for instance the relatively small amounts and number of payments involved. By consequence, the vast use of token-based CBDC by natural persons and commercial and industrial firms can perfectly be subject to general insolvency rules (that is, bankruptcy law).

[40] This conclusion would be very different for the use of "wholesale" account-based CBDC to settle payments in interbank payment systems. But as explained in paragraph 33, the protection would come from the type of system and categories of participants, irrespective of the settlement asset. Specifically, future interbank payment systems using wholesale CBDC will likely be protected because they are already protected today by settling in "electronic" central bank book money. As a second nuance, there may be cases where settlement mechanisms for token-based CBDC can usefully be brought under settlement finality protection rules, especially in the context of inter-bank settlement.

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C. Nemo Dat Rule and Transfers of Token-Based CBDC

There is an argument for disapplying the *Nemo Dat* rule to token-based CBDC to protect good faith acquirors. This form of CBDC could be traceable depending on how it is designed. This said, traceability should not necessarily argue against the protection of good faith receivers to facilitate the circulation of token-based CBDC—currency has traditionally enjoyed this "private law privilege" in many jurisdictions. This is mainly because CBDC might be traceable by the central bank, but not so by users. Moreover, as discussed in the previous section, token-based CBDC can conceptually be considered as property and be subject to ownership rights. By consequence, it can be "possessed" by, or at least be under the control of, the holder. Thus, the transferee of token-based CBDC can reasonably assume that the transferor's control signifies also title. Therefore, it is conceptually possible to apply an exemption of the *Nemo Dat* rule. Especially for token-based CBDC qualified under private law as a hybrid asset, this would be fully consistent with the partly tangible nature of it. However, this conclusion could be different if the token-based CBDC was to be considered as a pure intangible.[41] A parallel reasoning is helpful here: under the "bank account rule," balances in a bank account, which represent a contractual, intangible relationship with and personal rights on a commercial bank, do not qualify in many jurisdictions for an exemption to the *Nemo Dat* rule. Similarly, securities transfers in registries in most jurisdictions are covered by the *Nemo Dat* rule, albeit sometimes with a carve-out for trades executed on regulated and organized markets.

Box 4: The Legal Challenges of Offline Transactions

Central Banks are exploring the introduction of offline transactions of CBDC. The ability to pay when not connected to telecommunication systems (such as the internet) is considered important to increase resilience in crisis, to enable transactions when on-line access is suspended during natural disasters. (1) It is also important for financial inclusion objectives by allowing transactions in areas where telecommunication is limited. At the same time, central banks are facing technical challenges to establish sufficiently safe and efficient offline payment systems.

The question arises, however, whether and how such offline transactions can be legally feasible and be perfected. This question becomes particularly important in case of offline transactions that entail peer to peer transfer of tokens through wallets without (immediately) being recorded in ledger/registry kept at the central bank (and at financial intermediaries, depending on the design). Hence, these transactions will cause a gap between the records in the ledger/registry and the transfer of ownership rights in the tokens conducted between users. To support the integrity of, and trust in, off-line transactions, there should be a sound legal framework to provide "perfection" (including vis-à-vis third parties) of token transfers. (2) This will depend on how the roles of ledger/registry and wallets are legally defined.

- First, if token-based CBDC is designed in a manner whereby the holder holds the CBDC without any intervention of anybody, it would not be problematic to assume that the ownership of tokens can be transferred between Apps on users' devices.
- In case the holding structure of CBDC assumes the existence of a ledger/registry (either in one-tier or two-tier systems), the relationship between ledger/registry and the token ownership needs to be considered. If the registry/ledger is constitutive of ownership rights, in which no ownership rights in tokens exist unless reflected in

[41] See also Bossu, W., M. Itatani, C. Margulis, A. Rossi, H. Weenink, and A. Yoshinaga, *o.c.*, p. 38.

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the ledger, it is logically difficult to contemplate transfer of ownership in offline situations. If the registry/ledger is indicative of ownership rights, where ownership can be proven and transferred outside the ledger registry, the system can be adaptable to off-line transactions.

- The role of custodial wallets also affects the legal feasibility of offline transactions. Under the custodial model of a CBDC holding structure (see para. 28), the wallets would be managed in a "distributed" manner without being fully linked to the financial intermediaries' systems. Thus, these wallets would directly reflect the ensuing constellation of ownership rights, including from an evidentiary perspective. This would allow the ownership rights in the tokens to be held, transferred, and evidenced through the wallets.

In answering those questions, the role of the private law classification of token-based CBDC must be recognized. If CBDC were to be considered as a hybrid asset, the transfer of it will be perfected by rules for "modernized tangibles" (see para. 31). Depending on the design, the offline transfer of control of tokens can occur between users' wallets. In contrast, if the CBDC would be considered as a pure intangible, with a view to disapply the general rules on assignment, a legal registry will need to be established to govern i.a. the transfer of assets (para. 22). Under such a model, it will be logically difficult to consider how offline transactions can be perfected.

Offline transactions can amplify the risk of double spending and counterfeiting. Avoiding double-spending and ensuring authenticity of tokens are key technical challenges for central banks. These problems could occur due to technological glitches, operational mismanagement, or security loopholes. In principle, receiving a token from an illegitimate holder or a counterfeit token would not be a valid transaction. At the same time, to facilitate the circulation of CBDC and to maintain the trust in the entire system, it may not be desirable for the good faith receivers to bear the loss. This is an area where the (public) law could set a rule for compensation of damages and to provide powers to the central bank for adequate regulation and supervision of the "custody chain" for CBDC in case of an indirect holding model.

(1) See "Behind the Scenes of Central Bank Digital Currency-Emerging Trends, Insights, and Policy Lessons," p. 13-14.

(2) It is not advisable to create a legal situation that "ownership will be partly or conditionally transferred to a receiver". Given that settlement finality cannot be provided under offline circumstances, the legal situation can be better depicted as a contractual obligation of the transferor to transfer the token to the transferee, which will be executed upon a reconnection to the network. One way to formalize the obligation of the transferor to transferee may be to conceive the off-line transaction as transferring a "digital check" instead of a token. Once reconnected to telecommunication service, the digital check will be exchanged with a token while transferring the token with finality. However, the CBDC systems could be too complicated if this approach were to be taken.

Jurisdictions will need to carefully design rules to determine when exactly transfers of token-based CBDC become definitive. Given that this form of CBDC is intended and designed to be used in relatively small amounts for retail payments, often made for goods and services, the focus of those rules should be on (a) when and how the payee acquires the CBDC and (b) his/her/its protection against claims from alleged "true owners." The design of those rules will to a significant degree depend on the private law classification of the CBDC. In contrast, settlement finality rules aimed at financial system stability do not seem immediately relevant in this context.

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VI. Token-Based CBDC and the Common Banking Operations

Could the common financial services also be offered for token-based CBDC? Commercial banks provide banking services and products to the public, both individual consumers and businesses. These banking services include accepting money on various types of deposit accounts, lending money, agency functions such as purchase and sale of securities, and other services such as provision of safe deposit boxes. In relation to token-based CBDC, there is a need to distinguish the different transactions or services that a CBDC could be the object, or part of. For this to be legally possible, two legal issues are important.

> First, it is necessary to investigate whether and how token-based CBDC, with the property law classification that it would receive, can be the object of the legal mechanisms that reflect the said transactions. (for example, can a token-based CBDC be "deposited" or pledged?).
>
> Secondly, more in practice, it will also be important to look to the mutual intent of the parties in such transactions to determine the nature of relationship that exists between the parties in relation to such transactions. Specifically, in making use of their contractual freedom, the parties will need to ascertain that they meet the legal conditions for submitting the token-based CBDC to the legal mechanism they pursue. If not, the final legal outcome could be very suboptimal.[42]

This will be critical to ensure that token-based CBDC can co-exist with the existing banking system. This form of CBDC can be a part of the current banking system only if it can be "deposited" with commercial banks, in the same way that banknotes and coins can be "deposited." Similarly, if token-based CBDC can be pledged as security for debts and as a result be entrenched in day-to-day banking and commercial transactions, this would lend to the economic argument and justification for the issuance of CBDC to the public.

In that light, this section will discuss whether and how token-based CBDC can be the object of the common banking transactions by assessing the applicability of their core legal requirements. It will first analyze how such CBDC can be "kept" with a financial institution—this is critical to understand wallet structures in a two-tier holding model. It will then analyze whether this form of CBDC can be "deposited" with, and lent by, commercial banks, while the third subsection will discuss pledging—the traditional form of collateralization of movables.

A. Safekeeping and Custody

Noting that many CBDC models will involve a role for financial intermediaries in distributing CBDC to, and holding it for, end-users, it is critical to ascertain how that holding structure could legally be designed. The type of services that can be offered by a financial intermediary in that regard would depend on the legal nature of the CBDC and how it is legally treated. This nature, along with the terms of agreement between the parties, will determine the relationship between the intermediary and the CBDC holder. In case the intention is that the financial intermediary "holds" token-based CBDC for the holder, it must be analyzed

[42] For instance, if the "custody" of a token-based CBDC only grants personal rights to the holder as opposed to rights *in rem*, the latter would be exposed to the insolvency of the custodian: see Box 6.

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whether it is possible for this holding to take the form of the established legal mechanisms that legal traditions have developed for this type of transaction. As will be discussed below, these rules differ between the two main legal traditions.

Common Law

Under Common Law, where a person has possession of another's goods for the purpose of storage or safeguarding, the legal relationship is that of bailment. Bailment can be characterized by the delivery of possession, or physical control (as opposed to the delivery of title, or ownership) of a chattel, or tangible good, by the bailor to the bailee.[43] One of the reasons for the early development of banking was to provide a means for the safekeeping of coins and valuables.[44] In that respect, there can be a bailment of coin or notes where the intention is for the physical thing (as opposed to: an equivalent amount) to be returned.

Since possession is essential to bailment, could this legal relationship apply to a digital asset with intangible features like CBDC? Arguably, this could be the case if legislation assigns some "tangible" features to token-based CBDC and thus considers it as a hybrid asset. If, alternatively, the token-based CBDC would be established as a new, *sui generis* property law category, the legislation could also make bailment applicable to it. However, if the token-based CBDC would be considered as *purely intangible*, then it is difficult to characterize it as being the subject of a bailment or other analogous relationship based on possession, unless legislation would specifically provide for this option.[45] In this regard, it is interesting to note the case of Wyoming (US) which has enacted laws providing that digital assets held by qualified custodian intermediaries are held in a bailment relationship.[46]

If token-based CBDC cannot be the subject of bailment, then absent legislative change could the holding structure for custody of token-based CBDC be by way of trust? A trust is a legal relationship in respect of trust assets, between a trustee and beneficiary whereby the trustee holds the trust assets on trust for the

[43] "A person who voluntarily takes another person's goods into his custody holds them as bailor of that person (the owner)": KH Enterprise v Pioneer Container, The Pioneer Container [1994] 2 AC 324

[44] The rental of a safe-deposit box is a bailment. Lockwood v Manhattan Storage & Warehouse Co.,50 N.Y.S. 974 (N.Y. 1898)

[45] See however Beaves, A (1998). *Global Custody – A Tentative Analysis of Property and Contract*. In N. Palmer and E. McKendrick (Eds.), *Interest in Goods* (2nd ed.) (pp.117-139). LLP Reference Publishing, who argues that in the context of global custody involving dematerialized or immobilized securities, the critical element in the application of a bailment (or analogous) relationship should not be "physical possession" of the securities, but the ability of the client to direct or control an entitlement to those securities through actions of the global custodian being carried out to the client's order, and the authority from the client to the global custodian that enable the global custodian to deal with those securities, in effect "as owner", in its relations with any sub-custodian, central or common depositary, or indeed the issuer of the securities concerned; in this respect, whether the global custodian has (or ever had) physical possession of the securities in question (or indeed, if those securities could even exist in physical form, as with securities in dematerialized form only) should be irrelevant to the existence of a bailment (or other analogous) relationship (as with, for example, determining the protection of the client's ownership of the securities against the consequences of the insolvency of the global custodian).

[46] This digital asset custodial service appears to apply to all three categories of digital assets specified in Box 2 above, although "custodial services" has been defined to mean "safekeeping, servicing and management of customer currency and digital assets" (W.S. 34-29-104(p)(iii)). W.S. 34-29-104 (d) reads that *"(d)igital assets held in custody under this section are not depository liabilities or assets of the bank*," while a "*bank shall maintain control over a digital asset while in custody*." In line with this approach, "*a customer shall elect, pursuant to a written agreement with the bank, one (1) of the following relationships for each digital asset held in custody: (i) Custody under a bailment as a nonfungible or fungible asset. Assets held under this paragraph shall be strictly segregated from other assets; or (ii) Custody under a bailment pursuant to subsection (e) of this section*. "For the latter option, "*the bank may, based only on customer instructions, undertake transactions with the digital asset. A bank maintains control (…) by entering into an agreement with the counterparty to a transaction which contains a time for return of the asset*." W.S. 34-29-104 (e) This approach is a departure from traditional intermediated holding relationships, in which intangible assets are held on trust by custodians where purchasers only have a beneficial interest in their assets.

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beneficiary. Since any property (tangible or intangible) may be held in trust, it would in principle be possible for intermediaries to hold token-based CBDC as trustees irrespective of the private law classification of the CBDC.[47] Whilst in a bailment, the bailor still retains ownership of the asset, in a trust it is the trustee who has ownership, with the beneficiary having an equitable title. At any rate, bringing CBDC under trust would not modify its legal nature.

Another question is whether token-based CBDC could still be subject to the above custody or holding arrangements where the CBDC is commingled in so-called omnibus accounts? Where fungible goods are delivered by several depositors to a common depository, and are commingled so that the original deposits are unidentifiable, the inability of each depositor to demand redelivery of the specific goods which he has delivered will normally inhibit the creation of a bailment.[48] Similarly, this would preclude a bailment where money is delivered on terms that it shall be repaid.[49] Thus, in the case of token-based CBDC which is commingled in an omnibus account, there is uncertainty as to whether bailment can validly be granted over an unallocated part of the omnibus account. Similar reasoning would also apply in the case of a trust, whereby the property that is the subject matter of the trust must be clearly identifiable in order for a valid trust to be established.[50] A possible solution to declaration of trusts over such commingled, unallocated intangible token-based CBDC in an omnibus account could be by characterizing the claims of all holders as constituting beneficial co-ownership rights, which would be held by the holders as equitable tenants in common.[51]

Civil Law

Under Civil Law, the main question is whether token-based CBDC could be governed by deposit agreements? To the extent that wallets establish a custodial relationship with respect to the CBDC, this legal relationship would mainly combine features of the deposit and mandate (agency) contracts. The former is the most complex of the two and requires special attention. Almost all civil codes include the specific contract of "deposit," which governs the legal relationship whereby a depositary safekeeps a good, *gratis* or against a fee, to the benefit of a depositor, and with an obligation to restitute it when

[47] Provided that any asset or thing can be described as property or a right in property, then it can form the subject matter of a trust: Thomas, G and Hudson, A, The Law of Trusts, Oxford University Press, 2004.

[48] Palmer, A (2013), Bailment. In English Private Law, Oxford University Press. Bailment can be distinguished from a deposit/loan as discussed below (para. 45 et seq.) where currency is loaned or deposited in a bank, because the bank's obligation is merely to repay to the depositor/lender an equivalent amount.

[49] Walker v British Guarantee Assoc (1853) 18 QB 277, 118 ER 104; R v Hassall (1861) Le and Ca 58, 169 ER 1302

[50] In *Ruscoe v Cryptopia Ltd (in liquidation)* [2020] NZHC 728, the New Zealand High Court held that the various cryptocurrencies were at equity held on separate express trusts by the crypto exchange for all the accountholders. The Court further held that it is not a significant indicator against a trust that the fungible property of one party is mixed with the fungible property of another in a single pool, nor that the content of that pool and the identity of the beneficiaries is constantly changing. "If [the crypto exchange] was indeed holding these digital assets, then it was cryptocurrency that it had acquired only by virtue of the trust which accountholders had placed in it as custodian for them." In Hunter v Moss [1994] 1 WLR 452 (CA) concerning certainty of trust property in shares of a company, it was held that a person can declare himself trustee of ordinary shares in a company and that is effective to give a beneficial proprietary interest of part of the shares to the beneficiary under the trust.

[51] G Cooper, "Virtual property as trust assets and investments" [2021] Journal of International Banking and Financial Law 751, 752; The Law of Global Custody (4th edition) – in relation to a custody securities portfolio, the authors suggest that one may identify one global trust over all the client securities of a particular type in favor of all relevant clients as tenants in common. See also Beaves, A (1998). Global Custody – A Tentative Analysis of Property and Contract. In N. Palmer & E. McKendrick (Eds.), *Interest in Goods* (2nd ed.) (pp.117-139). LLP Reference Publishing: It is submitted that the correct approach to "fungibility" is to be found in the *confusio* and *commixtio* cases, where the English courts apparently have no difficulty in finding that after mixing, an indistinguishable mass of identical property belongs to its owners as tenants in common in proportion to their respective interests, irrespective of whether there is an express contractual term or any declaration of trust to that effect.

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requested. The contract of deposit can apply to a specific good (regular deposit) or fungible goods (irregular deposit). Whereas traditionally a deposit could only be constituted for tangible goods, many jurisdictions today accept that this legal concept can also apply to certain hybrid goods (for example, securities).[52] Importantly, under the right conditions,[53] the depositor maintains in principle ownership rights in the deposited goods.

Whether token-based CBDC fits under the deposit contract will depend on its private law classification. In most Civil Law jurisdictions, token-based CBDC could be governed by the rules on deposits if the CBDC is qualified as a tangible-intangible hybrid. This will not be the case if the CBDC would be considered a pure intangible. If legislation establishes token-based CBDC as a novel *sui generis* asset, this legislation should ideally shed clarity as to whether the rules of deposit can or cannot apply—absent legislative intervention, doubts will likely remain.

All Jurisdictions

In all cases, the contractual terms and conditions governing the custodial arrangements (of the wallets) should be consistent with the legal mechanisms discussed above. Specifically, those terms and conditions should ensure that the essential features of the mechanisms are established per the conditions required by law. Within the boundaries of the law, this offers opportunities to shape the parties' rights and obligations, for instance in respect of liability and agency features. Box 5 below assesses the main legal relationships established by wallets in the countries currently issuing CBDC, recognizing that the CBDC in those countries may not necessarily qualify as "token-based CBDC" as defined in this note—but when that is not the case, similar issues may arise, for example, insolvency protection in case of e-money.

[52] See De Page, H., *Traite Elémentaire du Droit Civil Belge,* T. V, nr. 184.

[53] Specifically, fungible goods deposited should not be commingled with similar goods of the depositary. See De Page, H., *o.c.,* nr. 265 C.

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Box 5: The Role of Legal Terms and Conditions for Wallets in CBDC Issuing Countries

In all countries that are currently issuing CBDC (The Bahamas, Nigeria and Jamaica), this form of money is held through wallets. The Terms and Conditions governing the CBDC wallets and some corresponding legislation can be summarized as follows:

The Bahamas. To issue its CBDC (the Sand Dollar), the Bahamas enacted the Central Bank of the Bahamas Act, in 2020 which grants the Central Bank the power to issue currency in the form of "e-money". E-money is defined as "monetary value represented by a claim on the issuer which (a) is stored electronically, (b) issued on receipt of funds for the purpose of making payment transactions but does not amount to a deposit; and (c) accepted as a means of payment by persons other than the issuer". Under the Central Bank's regulatory framework, payment service providers are generally required to establish publicly available terms and conditions for use of e-money but there are no special terms that apply exclusively to the use of Sand Dollars. Moreover, the CBB has issued the *Bahamian Dollar Digital Currency Regulation, 2021* that govern more specifically the wallet providers.

It is noteworthy that the Central Bank does not regulatorily establish standardized terms and conditions that providers are obliged to follow. However, the 2021 Regulation requires as a registration condition that wallet providers (i) take "adequate measures for the purpose of safeguarding the funds of wallet holders" (S. 8(b)) and (ii) have "effective arrangements in place *for the protection of client assets and money arrangements* consistent with any prescribed rules or guidelines issued by the Central Bank." (S. 8(e)). These prescriptions impose public law requirements on wallet providers to safeguard client CBDC, but the overall legal framework does not establish explicit private law protections.

While it cannot be generalized, one of the terms and conditions of a financial intermediary provides that, when the provider holds e-money for the users, the "funds corresponding to the e-money" are not the same as a bank holding money in that: (a) the provider cannot and will not use the funds to invest or lend to other persons or entities; (b) e-money will not accrue interest; (c) e-money is not covered by the deposit insurance and (d) the funds corresponding to e-money will be held in a segregated bank account separately from provider's own funds. The problem with this is that this establishes—in a way supported by S. 8 (e) of the 2021 Regulation—a logic for traditional e-money which does not work well for CBDC. Specifically, in regard of the latter, the wallet holders should not hold "funds corresponding to the e-money," but rather the total amount of client CBDC *qua* CBDC with the central bank.

Nigeria. *While deploying* the "eNaira," the central bank of Nigeria (CBN) issued *regulatory guidelines* to govern the intermediary financial institutions and users. (1) eNaira is meant to be the digital form of the national currency: it is a direct liability on the CBN, a legal tender and will be at par with the physical Naira. The downloading of eNaira application (App) is required to access, use and hold eNaira using the eNaira platform. This platform is administrated by the CBN where the intermediary maintains "treasury eNaira wallets" and "eNaira branch wallets" to "warehouse and distribute eNaira received from the CBN". The role of the intermediaries includes facilitating the wallets onboarding and requesting eNaira "on behalf of their customers" and developing innovative products that would drive the adoption of the eNaira.The regulatory guidelines set a wallet recovery process. This recovery relates to both lost access to the eNaira wallet and indemnification for the eNaira lost. The onboarding to any type of wallet requires the acceptance of the *Terms and Conditions of eNaira App* (TC). The TC state that the App is developed and owned by the CBN and enables "the Bank to provide services to Users" based on the set up contractual relationship. The App is provided "as is" and the CBN expressly disclaims any warranty or liability in connection with its use and reserves the right to disable or suspend access thereto. Finally, the TC provides that the user is responsible for "safekeeping any "passwords, PINs, private keys [..] any other codes to access" the

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App, but this seems to relate to the authentication codes to access the wallet account on the App rather than the private keys of the public addresses of the eNaira they hold.

This set up (1) creates a *direct contractual relationship* between the CBN and the App users for the provision of "technical services" (that is, use of the App) (2) which reportedly also includes a *safekeeping contractual relationship* between the CBN and the users for the actual eNaira held in the users' wallets.

Jamaica: To facilitate the issuance of CBDC ("Jam-Dex"), the BOJ Act was amended to include a definition of CBDC and making CBDC legal tender in electronic form, granting the Bank of Jamaica (BOJ) the sole authority to issue CBDC. The BOJ also has the power to make rules and regulations on the framework under which the CBDC is held or used by the public, cybersecurity standards for financial intermediaries distributing CBDC, and the interaction between these intermediaries and customers. The CBDC is issued by the BOJ to wallet providers consisting of commercial banks, building societies, merchant banks or authorized payment service providers. Consumers then obtain digital wallets from these wallet providers.

The first financial intermediary to distribute Jam-Dex, National Commercial Bank Jamaica Ltd., offers a mobile wallet service ("Lynk" application) to consumers to facilitate financial transactions via mobile technology using either a Lynk e-money wallet or a Jam-Dex wallet. There are no specific terms on the custody of the Jam-Dex in the wallet.

[1] CBN Regulatory guidelines on the eNaira, October 25, 2021.

B. Bank Deposit and Lending

Bank Deposit

One of the most basic and core banking services offered by commercial banks is accepting "deposits" in "bank accounts." Whatever the label of such accounts (most common: deposit, checking, and savings accounts), legally those accounts amount to current accounts in which all financial operations between the bank and its customer (account holder) are netted through debits and credits, thus resulting in a single credit or debit balance. In this context, the term "bank deposit" has legally a very specific meaning: when currency passes from the "depositor" to the bank and the amount of the "deposit" is credited to the account, this gives the bank both possession of, and title (that is, ownership) to, the currency. Specifically, the legal title to the currency "deposited" is surrendered, and it becomes the property of the bank *to use as it sees fit*, within the scope of its legal powers—this goes beyond the typical rights of a depositary. By consequence, the receipt of currency on a "bank account" constitutes the banker a debtor to the "depositor," similar to a loan of the currency:[54] the (credit balance resulting from) the deposit in the account becomes a liability (debt) of the bank.[55] The bank is under no duty to account to the "depositor" for the way in which it uses the money. Its main obligation is to repay the "deposit"—in fact: the credit balance in the account—according to the contract, that is, the return of an equivalent amount of currency (but not the specific money lent). The debt is repayable either on demand or on conditions agreed with the depositor. The deposits have fixed value to the extent they can be redeemed into currency at face value. The customer's right is in contract for repayment of the balance at credit of his account, and if this

[54] This corresponds to the *mutuum* under Roman law. This type of agreement allows the borrower, who becomes owner, to use the borrowed fungible goods, with an obligation to restitute to the lender an amount of similar goods, but not the goods themselves.

[55] Conversely, debit balances in the account would constitute a debt of the account holder toward the bank.

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is refused, his remedy is a claim for repayment of a debt.[56] If the holder's account shows a credit balance, the holder could in principle earn interest on it (that is, if so contractually stipulated and the contractual conditions are met).

Could token-based CBDC be subject to a "bank deposit" legal relationship? The response to this question is critical to determine the degree to which the CBDC can be interwoven with the traditional banking system. If such a CBDC would thus be deposited with a bank, the tokens would be transferred from the depositor's wallet to the bank (this could be either a wallet or directly on the registry/ledger). (As CBDC is money, only licensed commercial banks can take deposits of it, with very few exceptions.) Where applicable, the private key would also be held by the bank and transfer of ownership will be reflected on the registry/ledger. In this scenario, the CBDC would cease to belong to the holder and would be transferred to the commercial bank. In other words, the "depositor's" claim on the central bank would be converted to a claim on the commercial bank.[57] The latter can utilize the CBDC for its own use: for instance, the bank can "deposit" (redeem) it with the issuing central bank or use it, as an alternative to cash, to restitute commercial bank book money to clients withdrawing their deposits when so requested. Legally, given that the operation of this legal structure amounts—as it does with physical currency—to a transfer of CBDC from the holder to a commercial bank and the subsequent conversion of the holder's asset into commercial bank book money, it can be concluded that such a transaction will likely be legally possible, especially if documented through the appropriate contractual terms and conditions[58] (though legislative provisions could also govern this issue). Table 1 reflects the impact of a customer "depositing" CBDC with a commercial bank on the latter's balance sheet.

Table 1: Commercial Bank Balance Sheet Post "Deposit" of CBDC

Assets	Liabilities
Deposits with CB: --	
"Cash" issued by Central Bank (banknotes and token-based CBDC): + xx	Client Deposit Accounts: + xx
	Equity

Lending

Conversely, can token-based CBDC be lent by banks to their customers? Bank loans result in money being made available by the lending bank to the borrower and the borrower subsequently repaying the borrowed amounts with interest as per the structure of the loan. The disbursement of commercial bank loans does not in principle take the form of currency, but rather in commercial bank money, that is, by credit balances (book money) or certified checks (that is, a check drawn on the lending bank). It can reasonably be assumed that this practice will not change by the advent of CBDC. However, in a next

[56] Foley v Hill (1848), 2 H.L. Cas. 28, 35-36, 9 E.R. 1002. Lord Cottenham L.C.: "Money, when paid into a bank, ceases altogether to be the money of the principal; it is then the money of the banker, who is bound to return an equivalent by paying a similar sum to that deposited with him when he asked for it."

[57] Hence the "deposit" operation would lead to an expansion of the commercial bank's balance sheet: it would acquire CBDC as an *asset* and the equivalent amount would constitute a "deposit" *liability*.

[58] Which need to establish fungibility: see para. 19. The contours of the bank's repayment obligation would be shaped by the applicable terms and conditions. One can imagine that those stipulate repayment in the form of either commercial bank money or tokens-cum-private key of an equivalent value (but not the identical private keys/tokens: hence the need to establish fungibility).

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step, as the borrower seeks to make use of the borrowed sums, (s)he can convert his/her commercial bank money in central bank money as per the terms and conditions of the lending commercial bank. These terms and conditions would today allow for withdrawal in physical currency (albeit under certain conditions), and there is no fundamental legal reason why in the future withdrawal in the form of token-based CBDC could not be contractually stipulated by the commercial bank, albeit admittedly within the overall legal constraints of the CBDC framework (e.g., holding limits). Finally, the lender's terms and conditions will also govern the reimbursement of the loan and payment of interest—both could conceptually also be effected in token-based CBDC.

C. Pledging

Lastly, the circulation of token-based CBDC would be supported by its availability for collateralization, especially in the form of pledge. While most lending operations are secured by non-monetary assets (for example, mortgage on a house), the provision of "cash collateral" is still an important transaction in economic life (see for example, security for rental agreements). As a legal matter, the standard[59] transaction in many jurisdictions through which money is provided as security is a "pledge,"[60] which can be defined as a delivery of a movable asset by a debtor to his creditor as security for his debt, or any other obligations. It is a security limited by the extent of the pledgee's possession: if (s)he loses possession, (s)he loses his/her security. Moreover, the security extends only to what is in his possession, and the security is incapable of extending to anything which is not capable of being possessed. (On pledging of claims in civil law: see footnote 67.) Whilst possession of the asset passes to the pledgee, the legal ownership remains with the pledgor. Finally, a pledge gives generally a right of sale if default is made in payment of the debt. However, a pledge of money is enforced by applying the pledged money against the amount of the debt outstanding.

A pledge involves generally the following:

Creation (attachment) of a security interest - where a creditor obtains a security interest in a debtor's asset. This generally occurs when the creditor and debtor enter into a security agreement granting the security interest and describing the collateral.

Perfection – where a creditor ensures its security interest will be effective against other creditors and third parties in the bankruptcy process. In case of pledge, this is achieved by the transfer of possession: possession or control over the asset is required for perfection or priority.[61]

Priority – This is achieved when a creditor has a superior security interest in an asset as compared to other creditors with a claim to the same asset. The creditor with the first priority can use the collateral to

[59] In jurisdictions that only recognize pledge for tangible movables (see para. 52), other legal techniques that can serve as security could be used (e.g., liens, charges and assignments) but those are not the object of this note, apart from footnote 64.

[60] In some jurisdictions, another type of transaction, often labelled "financial collateral arrangement," has been created. Such a transaction can take two forms. Under one form, the collateral provider remains owner of the collateral, and this type of transaction will typically be governed by more modern rules than the traditional pledge, but the core legal principles are broadly the same. Under another form ("title transfer"), the ownership rights in the collateral will pass from collateral provider to collateral taker. In such a case, the rules governing transfers will apply.

[61] There are also jurisdictions where the perfection can be achieved by registration. This approach is not analyzed in this note.

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satisfy the debtor's obligation before other creditors later in the order of priority. In many legal systems, the pledgee enjoys a first priority right.

In many jurisdictions, the pledging of token-based CBDCs would require a change in the law. The Common Law is a good illustration of this point. Pledges are a form of bailment and depend on possession (see above): they can be created only if it is possible to transfer possession of a tangible movable asset to the party taking the security. In discussing crypto-token collateral arrangements, the UK Law Commission in its *Digital Assets Consultation Paper* (July 2022) suggests that it is possible to develop a new (or analogous) form of security interest for data objects, modelled on the pledge, but founded on a transfer of (exclusive) factual control by way of security from “pledgor” to “pledgee” that is the debtor would transfer control of the data object to the creditor.[62] Absent legislative change, the Common Law courts would need to expand their concept of possession to include a transfer of exclusive control over a specific item of incorporeal data. This conclusion would also be applicable to token-based CBDCs. In the case of *Your Response v Datateam,*[63] the Court of Appeal held that a lien could not exist over intangible property, because a person can only be in “possession” of tangible property. Possession requires “physical control of tangible objects”. The judge drew a distinction between the holder of a key to a warehouse (who has physical control over the physical objects inside), and someone asserting constructive control over a database of information, over which physical control is not possible.

Specifically, the law would need to provide legal certainty as to (i) whether token-based CBDC can be collateralized in the form of pledge (or similar type of security interest) and (ii) also specify how such a security interest would be created, perfected, and how priority is organized:

- **Creation** – Under most legal systems, provided token-based CBDC qualifies as a hybrid or *sui generis* asset under property law, there is nothing inherently prohibiting a pledgor from entering into a security agreement with the lender (pledgee) to grant a security interest in token-based CBDC as collateral for a loan or other obligation taken by the pledgor.[64] However, the more fundamental question here is how such a security interest can be perfected.
- **Perfection** – If pursuant to the legal system in a jurisdiction, pledges require the transfer of possession over the asset in question in order to perfect the security interest, then notwithstanding the fact that parties are free to contract, the pledgee may not be able to ensure that her/his security interest over the token-based CBDC is effective against third parties if it is considered as *intangible* property which is not capable of being possessed. As discussed above, legislation could therefore allocate some “*tangible*” features to token-based CBDC to enable it to be possessed and therefore pledged.[65] Since delivery of an asset can be actual or constructive, an analogy can be made to the

[62] However, they provisionally conclude that it is not desirable to make provision for data objects to be the subject of possessory securities such as the pledge, or to develop analogous security arrangements based on a transfer of control. Law reform efforts at crypto-token collateral arrangements should instead be directed to building on and enhancing the inherent flexibility of non-possessory security interests (i.e., mortgage or charge). They consider this approach as more appropriate than attempting to expand the scope of comparatively more rigid forms of security arrangement that have historically been based on possession (and therefore have developed by reference to tangible objects of personal property rights) (paragraph 18.43).

[63] Your Response Ltd v Datateam Business Media Ltd [2014] EWCA Civ 281, [2015] QB 41. See also Gullifer, L., and Goode, R., *Goode and Gullifer on Legal Problems of Credit and Security,* (6th ed 2017), paras 1-08 and 1-53.

[64] Most civil law jurisdictions feature the mechanism of pledging intangible contractual claims. However, the notification requirements to perfect such a pledge towards third parties are likely inconsistent with the transfer mechanisms of CBDC.

[65] Under Wyoming Law 34-29-103, perfection of a security interest in virtual currency may be achieved through possession (i.e. the ability to exclude others from the use of property, and includes use of a private key, a multi-signature arrangement exclusive to the secured party or a smart contract). A security interest held by a secured party having possession of virtual currency has

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delivery of documents of title which symbolize the asset, or storing of the asset in the pledgor's own warehouse, the key to which is then given to the pledgee. Similarly, for token-based CBDC, the "delivery" of the private key or of the underlying tokens by the pledgor to the pledgee could confer constructive possession of the token-based CBDC. However, as discussed above, the law would also need to clarify whether the transfer of the key or of the underlying tokens for pledging purposes does or does not equate to transfer of the ownership of the CBDC. Alternatively, if token-based CBDC is established as a new *sui generis* property law category, legislation should explicitly allow for it to be pledged as collateral. This entails clarifying in the law how a pledge of this form of money is created and perfected – this could be by giving control of the CBDC to the pledgee. In relation to CBDC held in a wallet environment, it is possible that perfection could take the form of either allowing the pledged CBDC to remain on the pledgor's account but giving "control" over that amount to the pledgee, or by directly transferring the pledged CBDC to the pledgee.[66] Recent proposed amendments to the US's UCC created the concept of "electronic money" (that is money in an electronic form, which would include CBDC) and provide that a party may perfect a security interest in electronic money by obtaining "control", which encompasses circumstances where a person has the power to avail himself of substantially all of the benefits from the electronic money; prevent others from availing themselves of such benefits and transfer the record and associated benefits; and the electronic money, a record attached to it or a system in which it is recorded enables the person readily to identify itself in any way, including by name, identifying number, cryptographic key, office or account number.[67]

- **Priority** – In relation to token-based CBDC as a security interest in a pledge, the law should also clarify the priorities amongst competing secured creditors where two or more creditors are properly perfected. Depending on how the law establishes perfection of the pledge, a pledgee that has "control" of the CBDC should have priority over other secured creditors with a security interest in the same.

D. Insolvency of Counterparty

For all the discussed common banking transactions, it is critical to determine the rights of the holders of token-based CBDC in case their counterparty enters insolvency. Specifically, the core question is whether the holder of token-based CBDC can reclaim through the *rei vindication* or similar form of relief his/her/its CBDC from an insolvent counterparty. Box 6 below will assess this in considerable detail.

priority over a security interest held by a secured party that does not have control. Before taking possession, the secured party is required to enter into a security agreement with the debtor, which may set forth terms under which the secured party may pledge its security interest as collateral for another transaction.

[66] This would in many jurisdictions constitute the (valid) irregular pledge (*pignus irregulare*), which however has as a consequence that ownership rights over the pledged assets pass from pledgor to pledgee.

[67] Recent amendments to UCC Article 9 (UCC Articles 9-105A and 9-312(b)(4)) approved in July 2022 by the Uniform Law Commission.

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Box 6: Rights of CBDC Holders in a Counterparty's Insolvency

Safekeeping and Custody–From a legal policy perspective, it is imperative that the holders of token-based CBDC are protected in case of the insolvency of the wallet provider. This is achieved by granting them rights *in rem* over the CBDC that are safeguarded notwithstanding the safekeeping or custody arrangement. (This, in turn, could be supported by prudentially enforced (public law) supervisory rules that require intermediaries to maintain robust internal records on client positions and segregate own and client CBDC, akin to rules applicable to securities holdings. This would also support swift restitution in case of insolvency, including by transferring aggregate client positions to another, solvent wallet provider.)

- Under Common Law, as the bailor remains owner of the bailed assets, her/his rights are protected in case of the bailee's insolvency. Thus, if bailment were to apply to token-based CBDC, the holder of the CBDC could retain ownership and, in the event of a CBDC wallet provider's insolvency, the CBDC would then revert to the holder. If, alternatively, the wallet would qualify as trust, the equitable title of the beneficiary/holder of the CBDC would safeguard her/his token-based CBDC in the event of a wallet provider's insolvency. If, however, in a particular jurisdiction, assets of an intermediary held in trust are not excluded or segregated from the estate, then legislation should clearly provide for such exclusion or segregation.
- Turning to Civil Law, the retention of ownership rights by the depositor (at least under the condition of absence of commingling) provides similarly protection in case of insolvency of the depositary, which could protect wallet holders of CBDC. Legislation could similarly be useful here to clarify rights of "depositors." (E.g., Switzerland has reformed its Debt Enforcement and Bankruptcy Act (DEBA) in 2021. Since then, Art. 242a DEBA allows the depositor to request that crypto assets are to be surrendered under certain conditions.)

In both legal traditions, however, these general conclusions could be impacted where the wallet provider uses an omnibus account. In theory, the holder could still have a proprietary right in the form of beneficial or co-ownership in the pool of CBDC, but this would of course depend on the legal framework in that jurisdiction *and* the agreement between the parties. In practice, in many (if not most) jurisdictions, the commingling in the omnibus account is likely to weaken the rights of holders. This will require enacting new laws for the protection of the CBDC holders or extending existing protective laws to CBDC.

"Bank Deposit"—Would "bank deposits" of CBDC be protected in the event of the deposit-taking bank's insolvency? The starting point should be that, by way of the "deposit," the CBDC-claim on the central bank ceases to be CBDC for the holder and has been converted into a claim on the commercial bank. In case of insolvency of the latter, the holder will in principle only have a contractual claim in the insolvent estate. Insolvency laws would typically determine the order of loss allocation between the creditors, including the "depositors," based on the different attributes of the claims and public policy goals. Whilst some countries have established "depositor preference," in others the depositors would rank as unsecured creditors. In jurisdictions which have deposit insurance schemes, if the deposit qualifies as a deposit under deposit insurance law, it would be protected up to the limit that is insured.

Pledge—In the event of insolvency of the pledgee, the pledgor is normally protected against the claims of the pledgee's creditors on the pledged asset. In such case, after the execution of the secured obligation, the pledged asset should revert to the pledgor since ownership remains with the pledgor. In case the token-based CBDC could be made subject to pledge, the same rules would apply. However, as with safekeeping/custody, care must be taken to analyze the impact of commingling the CBDC of the pledgor with the CBDC of the pledgee. If this would weaken the insolvency rights of the former, such commingling should be avoided.

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This section demonstrates that it is possible to design legal rules that allow to use token-based CBDC under the common banking operations, albeit not without challenges. As with the transfer rules, the property law classification will be an important determining factor, as will be the overall design features of the holding structure. While convertibility in commercial bank book money should be easy, CBDC should remain a claim on the central bank as long as it is held in that quality by holders. This will be critical to protect the latter's rights in case of insolvency of wallet providers.

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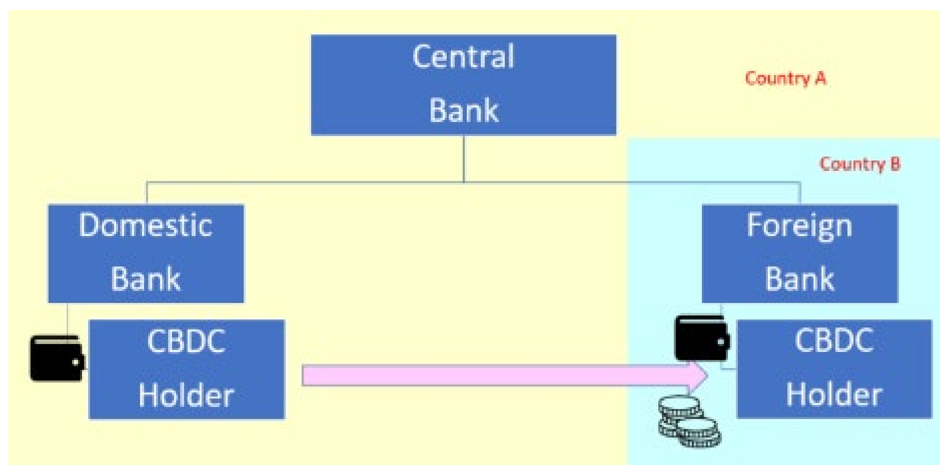
VII. Private International Law and Token-Based CBDC

To support its cross-border circulation, all forms of money require appropriate private international law rules as part of their broader legal framework.[68] Therefore, the private international law rules governing currency and money need to cover the multiple aspects of their relationships and functions. These would include the relationship with the issuer, proprietary aspects, their role in payment of monetary obligations, monetary status, and the insolvency of a possible intermediary.

Figure 2: CBDC and an "International Situation"



Today, many legal systems include well-established private international law rules governing traditional forms of money.[69] Among those rules, the two most fundamental and important rules are the *lex rei sitae*—a rule[70] that applies mainly to proprietary aspects of tangible assets—and the *lex contractus*—a rule[71] that applies to contractual claims as a form of intangibles. Following this link between each rule and the private law classification of the asset, legal issues regarding proprietary aspects of currency are governed by *lex rei sitae* because banknotes and coins are considered tangible-intangible hybrids. Legal

[68] For the non-lawyer reader: private international law is a specific body of law that establishes rules determining mainly (a) which domestic law applies to, and (b) which courts are competent to adjudicate conflicts pertaining to, "international situations." These are situations involving elements of two or more jurisdictions. A country's private international law may thus lead to situations where the national courts apply foreign law. Private international law does not have a single rule, but applies distinct rules based on the subject and nature of the legal issues in question (e.g., property, contract, companies).

[69] See Encyclopedia of Private International Law, Vol. 2, Money and Currency, p. 1255 et seq., and Rigaux, F. and Fallon, M, *Droit International Prive (13 ed.), nr. 13.20.*

[70] This rule stipulates that the applicable law is determined by the place where the good is located.

[71] This rule stipulates that the applicable law is the one governing the contract.

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issues regarding book money credited to bank accounts are governed by *lex contractus* or the law in which the branch of the bank where the account was opened is located.[72]

Would the current rules apply to token-based CBDC? The new legal nature of token-based CBDC might pose challenges to applying conventional private international law rules. And even if a rule is found to apply, it is not clear whether each rule is fit for token-based CBDC. For example, if token-based CBDC is under private law classified as a tangible-intangible hybrid, the *lex rei sitae* could in theory apply, but it is unclear what would be the *situs* of a token held on distributed registers and through wallets. The following paragraphs will discuss the applicability of private international law rules to most aspects of the relationships and functions of token-based CBDC, where applicable in function of the possible private law classifications.

The "conflict of law" rule for monetary and central bank-related issues seems rather straightforward. It is the central bank law and/or monetary law (*lex monetae*) of the issuing country that will (a) govern the "monetary" relationship between CBDC holder and the issuing central bank and (b) attribute monetary value, and the amount of that value, to a paper/plastic note (banknote) and/or data (CBDC)—the *cours force*.[73] These laws—which are public law and arguably even of public order—should apply to these issues, irrespective of (a) the private law classification of token-based CBDC, (b) the place where the token-based CBDC is used, or (c) the residence of the holder. Moreover, in the issuing country, the legal issues regarding currency status (for example, whether or not a form of money enjoys legal tender status) are also governed by these laws.[74] In turn, it is for other countries' monetary law to grant legal tender status in their territories to a token-based CBDC issued by a foreign country.

The proprietary aspects of token-based CBDC are, however, more complex. Basically, the CBDC private law holding framework is a combination of (i) proprietary aspects of the CBDC and (ii) contractual relationships between the central bank (under a direct holding model) or financial intermediaries (under an indirect holding model) and token holders. The conflict of law rule governing the proprietary aspects—ownership rights and transfer of such rights—will depend on the private law classification of the token-based CBDC. (On the contractual relationship: see next paragraph.) In case the token-based CBDC is considered as a tangible-intangible hybrid, the proprietary aspects would be governed by the domestic law of where the CBDC is held (*lex rei sitae*). However, as alluded to above, the fundamental challenge is to determine the *situs* of the CBDC.

- Under a system whereby the holder holds the CBDC without any intervention of anybody, determining the situs might be very challenging. Fundamentally, the answer to the question hinges on the issue where the registry/ledger has its *locus*.[75] In a digital world, the question may be asked whether distributed ledgers have a *locus* at all? To provide sufficient legal certainty under such a set-up, countries would be well advised to enact a legislative private international law rule that the CBDC is deemed in all instances to be located in the country of issuance. Of course, if it were possible to design a "national" CBDC ledger able to keep all nodes inside its own territory, there would be

[72] Dicey, Morris and Collins, *The Conflict of Laws* (15th ed.), 33-306.

[73] From a formal perspective, monetary law will often be part of the central bank law of a country.

[74] Bossu, W., M. Itatani, C. Margulis, A. Rossi, H. Weenink, and A. Yoshinaga, *o.c.,* p. 27 et seq.

[75] If, instead, the token-based CBDC were to be held on a card or other hardware (as opposed to on a ledger), the *lex rei sitae* in its purest form would apply.

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physical/technical support for legally setting the locus as the country of issuance, making the legislative act less of a "fiction."

- Under a central bank-based holding structure, the country issuing the CBDC will be the country (through the central bank) operating the register and offering the wallet. Under such a set-up, the *situs* may well be equated with the country of the issuing central bank.
- More complex questions arise under an indirect holding structure, especially when foreign entities would be allowed to play a role as wallet provider. In this case, would the *situs* lay in the jurisdiction of issuance and registry, or could it alternatively lay in the jurisdiction where the foreign wallet provider is located? Recent developments in the private international law of dematerialized securities offer poignant guidance on how the tension between place of issuance and holding through wallets can be solved. Specifically, for immobilized bearer or registered securities held through a fungible, intermediated securities holding regime, modern laws have clarified that the proprietary aspects pertaining to those securities will be determined by the place where the securities account is held by the ultimate investor,[76] and thus not by the *situs* of the immobilized bearer or registered security. If we apply the same logic, the proprietary aspects of token-based CBDC held through a foreign wallet provider would be governed by the *lex rei sitae* of the wallet, which would be the place of establishment of the wallet provider[77]—and not by the law of the jurisdiction of issuance.[78] Thus, foreign law could in theory govern those proprietary aspects.[79] This could have important consequences for holders in case of insolvency of the intermediary.[80] For this and other reasons, the decision to grant access to foreign wallet providers (and thus foreign holders) has major policy implications and should be very carefully considered.

In case the token-based CBDC would be classified as *sui generis*, there is no existing rule that can easily be applied, but it would rather be for the legislation to establish such a rule. Finally, if private law considers the token-based CBDC as an intangible and the transfer is considered an assignment, then absent a special framework, *the lex contractus,* or the law of the habitual residence of the debtor (the

[76] This “place” can be determined by a combination of factual (location of office of intermediary and engagement of that office in securities custody activities) and legal aspects (contractual choice of location of securities account and of law governing that account). This complex balance is espoused for instance by the *The Hague Securities Convention* (especially Art. 4).

[77] Admittedly, if an intermediary has offices engaged in CBDC custodial activities in more than one jurisdiction, there would be room for a contractual choice of where the wallet is legally located, albeit constrained by the actual custodial activities of the intermediary. This would *mutatis mutandis* be an application of the principle discussed in the previous footnote. Of course, the room for contractual freedom in this respect can be constrained by central banks through their regulations and contractual arrangements with the intermediaries.

[78] Obviously, this token-based CBDC would not be the official currency of the country in which it is held, but that country could attribute some currency-related features to the foreign CBDC, for instance by equating it with domestic CBDC in dealing with falsification under criminal law.

[79] This said, there is an argument that the application of the foreign *lex rei sitae* is up to a degree conditional to the ultimate recognition of the proprietary effects under the law of the jurisdiction of issuance. This was for instance the case in Canadian decisions on the expropriation of German shareholders in Canadian companies but whose share register was held in the US. It was decided that Canadian law could apply even though the register was held in the US and governed by US law: see Dicey, Morris and Collins, *o.c.*, 22-045.

[80] This would complicate the application of the principles enshrined in Box 6, namely that the rights of the CBDC holders should be protected in case of the insolvency of the wallet provider. Specifically, the *lex rei sitae, lex contractus* and the *lex fori concursus* would all be different from the law of the issuance jurisdiction, potentially causing risks for contradictions between rules. One way to deal with this is for the issuing central bank to request legal opinions on this issue from foreign applicants for intermediary status—the central bank could refuse to grant such status in case the foreign law would not respect the rights of holders in case of the intermediary’s insolvency.

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central bank)—in both cases: the law of the issuing country— or the law of the transferor could theoretically apply to the assignment. However, as assignment would in any case be suboptimal, it would be advisable to establish legally a bespoke holding and transfer mechanism (see para. 22). From a private international law perspective, the law governing that mechanism (e.g., a register) should be made to apply to the proprietary aspects. Presumably, this will also be the law of the issuing country.

Finally, some contractual issues can be governed by *lex contractus*. In case the CBDC is held through a two-tier structure by way of a wallet issued by a foreign wallet provider (assuming this would be allowed by the issuing country's legal framework), at least the contractual issues pertaining to the relationship between wallet holder and wallet provider will be governed by the *lex contractus* governing the wallet relationship. For instance, rules governing transactions in the CBDC and custody services can be governed by contracts based on the foreign law.

Given that foreign law could apply to certain aspects of CBDC, countries should pay careful attention to cross-border issues in the design of their CBDC framework. Central banks would be well advised to be explicit on (i) non-resident access to their CBDC, (ii) if authorized, the modalities of such access, and (iii) critically, on ensuring that non-resident access still results in a direct claim on the central bank. To achieve this, a central bank can use its secondary regulations and/or contracts (terms and conditions) with financial intermediaries to shape the ownership and holding framework, including the access by intermediaries located in foreign jurisdictions. For instance, this could allow the issuing central bank to ascertain that the law governing its foreign intermediaries is compatible with its own domestic law with a view to provide clarity on the monetary and proprietary aspects of CBDC. As written above, this does not preclude that other aspects of the relationship between foreign financial intermediaries and token holders be governed by a contractual relationship based on foreign law (*lex contractus*).

In most countries there will be a need to clarify the private international law treatment of token-based CBDC. Currently, the main source of private international law in most jurisdictions consists of case law (jurisprudence) developed gradually over time, although some countries have adopted specific legislative frameworks.[81] In either case, it will be necessary to ascertain how the available rules will apply in respect of token-based CBDC. As discussed, for the issuing country, the contractual or regulatory framework for the CBDC could be very helpful in determining the applicable private international law rules. Other countries—mainly those where financial intermediaries are established—do not enjoy that benefit. Case law might eventually provide clarity, but it will likely take time for clear and predictable rules to emerge. In many cases, it might hence be beneficial to enact the private international law of token-based CBDC in legislation. (On whether such legislation could include a broader regime for digital financial assets, see the next section.) In that regard, there is a very strong argument for central banks and their countries pursuing a significant degree of international coordination and harmonization, possibly under the auspices of, or in collaboration with, a dedicated and specialized international institution such as the The Hague Conference on Private International Law.

[81] In some countries, this legislation will be very specific and targeted and thus complement the body of case law, whereas other countries (e.g., Switzerland and Belgium) have adopted private international law codes that basically supersede the existing case law.

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Box 7: A Proposed Private International Law Regime for Token-Based CBDC

Because of the above, this note proposes a set of Private International Law rules that can govern the use of token-based CBDC in international situations.

- The monetary **legal relationship between the holder and the issuing central bank** stemming from the CBDC itself would be governed by the *lex monetae.*
- The **legal nature** of the token-based CBDC **as currency**, including the possible **legal tender status,** would also be governed by the *lex monetae*. It is recognized that the *lex monetae* of another country than the issuing country can establish the foreign token-based CBDC as currency within its territory, including by granting it legal tender status.
- The **proprietary issues** regarding the token-based CBDC classified as a hybrid under private law and held indirectly through wallets would be governed by the *lex rei sitae* of the wallet. This would basically be the place of establishment of the wallet provider. Where wallet providers offer CBDC custodial services in more than one jurisdiction, an explicit choice of law in the account agreement between the wallet holder and wallet provider could also play a role, subject to (i) conditions including a qualifying office rule and (ii) regulatory constraints. Other private law classifications and holding structures would presumably point to the application of the law of the jurisdiction of issuance.
- The **legal relationship between the CBDC holder and a foreign wallet provider** would be governed by *lex contractus* applicable to the wallet relationship.

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VIII. Is Law Reform Needed?

Albeit subject to significant limitations, some private law challenges can probably be addressed through contractual freedom. As discussed in this note, private law will govern the transactional use of CBDC (transfer, deposit, loan, or pledge) among the economic agents involved, namely the central bank, financial intermediaries, and token holders. This offers the possibility to "regulate" some aspects of that use through contractual frameworks.[82] Specifically, terms and conditions set by the central bank and agreed upon either by the users directly or, in an indirect holding structure, by financial intermediaries, can apply to that transactional use. In regard of the latter, financial intermediaries will need to replicate the core contractual stipulations "imposed" by the central bank in their own contractual frameworks with the holders. Contractual freedom in private law will thus provide the necessary flexibility to accommodate this new type of asset, albeit with two important limitations. First, contractual provisions cannot always derogate from otherwise applicable private law rules (for example, insolvency law), and will thus be constrained by them. Second, contractual arrangements are more likely to be challenged in the context of disputes and may not provide the highest degree of legal certainty to underpin a reliable means of payment.[83]

By consequence, in many jurisdictions, the design of a contractual regime for token-based CBDC will need to be supported through comprehensive legislative intervention. Current principles of private law may not be able to provide a sufficiently robust and predictable legal foundation for this new digital money with a view to promote its wide circulation in the monetary system. Commercial practices cannot wait for the courts' views to crystallize and coalesce through lengthy litigation. Moreover, a high number of litigations—the case law initially could contradict themselves—could undermine the legal certainty and credibility of digital money. To avoid these risks, legislation could play an important role in establishing a *sui generis* private law framework for token-based CBDC. In that regard, it will be important that countries ensure the internal coherence and consistency of their legal classification and treatment of token-based CBDC. "Cherry picking" between legal principles may cause an internally inconsistent legal framework that presents more problems than solutions. Finally, as with private international law, a degree of international harmonization of substantive rules would also contribute to the reduction of cross-border legal frictions, but the diversity in private law between jurisdictions might complicate convergence.

Jurisdictions will need to consider carefully whether to anchor such a legislative framework in a broader framework for digital "money" or financial assets.[84] Token-based CBDC may have features in common with other forms of digital "money" or financial assets in regard of which (a) digital data represents financial value and (b) financial value will be transferred by transferring (control over) digital data. At the same time, CBDC will need to have unique legal characteristics to underpin its use as *currency*. Many countries have not yet made comprehensive legal reforms to underpin digital financial assets. A country

[82] Of course, the central bank could also use its public law regulatory powers to require compliance with its contractual frameworks, thus providing a public law foundation to the private law contractual instrument.

[83] Central banks may also need to issue (public law) regulations governing the activities of wallet providers.

[84] On this concept, see Figure 1 of IMF, *Digital Money Across Borders-Macro-Financial Implications*, 2021. This concept does not necessarily entail that the covered assets qualify as money under the law.

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may opt for targeted legal reform for CBDC or, alternatively, provide a comprehensive legal framework covering both privately issued digital financial assets and CBDC.

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IX. Conclusions

This note seeks to present a practical legal-analytical framework to assess how private law rules can be designed to support the wide circulation and safe holding of token-based CBDC, in case the issuance of such form of CBDC is considered. Without intending to be exhaustive, the note considers systematically the key aspects that private law will need to address. How these aspects will be addressed concretely in any given jurisdiction will naturally depend on the exact design features of the token-based CBDC and the nature of local legal rules—these can differ significantly between jurisdictions, notwithstanding a degree of harmonization within the major legal traditions.

Such a framework is much needed, because unlike account-based CBDC, token-based CBDC constitutes from the legal perspective a new form of money and hence raises a lot of challenges under private law. The note is based upon the premise that, irrespective of technological design features, the concept of token-based CBDC has a very specific legal meaning. Specifically, by design, it refers to the incorporation of a monetary claim on the central bank in a digital token, which is unprecedented. To circulate widely and safely as money, it (a digital and by definition intangible asset) would need to enjoy a clear and adequate private law status—this may even include emulating “currency privileges” to this form of CBDC. This will be an important challenge confronting countries embarking on token-based CBDC issuance. Complicating matters even further is the fact that such form of CBDC can be held “indirectly” through wallets whereby holders own and transfer their CBDC through financial intermediaries but still retain a direct monetary claim on the central bank. This means that understanding the triangular relationship between the central bank, wallet provider and a CBDC holder will be central to comprehending the full legal ramifications, including risks, of the holding structure of token-based CBDC. In this respect, an important issue will be to ensure that the holder maintains at all times a direct claim on the central bank.

For countries, determining the legal nature of token-based CBDC under property law will be the starting point to understand its treatment under core aspects of private law. Specifically, this legal nature will shape how token-based CBDC can be transferred, held in custody, “deposited” with commercial banks, and pledged. For a country contemplating the issuance of token-based CBDC, a main question will be whether token-based CBDC could qualify as an *existing or a novel type of hybrid asset* or whether it could be assigned a *novel sui generis* property law category. On the former, it seems unlikely that CBDC could qualify as one of the main categories of existing hybrid assets though nothing prevents establishing it as a new type of hybrid asset under property law and assigning it tangible attributes. On the latter, it would seem possible that a new property law category be created for token-based CBDC, although this would raise a question as to the applicability of any new “DLT laws” to it in case DLT or a similar technology is deployed. At any rate, countries will need to consider the legal roles of registries/ledgers and wallets and determine their interaction with the holding and evidencing of ownership rights.

To support its wide circulation as money, it will also be crucial that private law rules establish with certainty how ownership and other rights in token-based CBDC can be transferred between economic agents. In this regard, it will be critical to determine when such transfers are to be considered definitive or final. In a nutshell, legal certainty will be needed in three respects; first, when a transaction (including offline ones) is to be considered effected; second, the impact of any existing settlement finality legislation; and third, the application (or not) of the *Nemo Dat* rule.

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It is equally important to clarify the type of banking services that CBDC could be the object of; in other words, whether it can be held in safekeeping/custody, "deposited," lent, and pledged. This will be critical for the co-existence of token-based CBDC within the existing banking system and its integration in day-to-day banking and commercial transactions. Usually, the type of transactions that token-based CBDC could be the object of will depend on its classification under property law and the extent to which this classification allows it to be the object of the legal mechanisms underlying these transactions. By looking at the core legal requirements usually underpinning these mechanisms, this note has deduced that virtually all common banking services should be possible for token-based CBDC if supported by enabling legislation and/or corresponding contractual terms. It has offered views on some of the core issues that need to be considered and addressed in such a legislation/terms with respect to each of these mechanisms. Perhaps most crucially will be the establishment of token-based CBDC as a fungible asset with some degree of the legal characteristics of tangibility by legislation.

Finally, to support its cross-border circulation, there will also be a need in most countries to clarify the private international law treatment of token-based CBDC, particularly in relation to its proprietary aspects. Specifically, it will be necessary to clarify how existing rules would apply in respect of token-based CBDC. For the issuing country, the contractual or regulatory framework for CBDC could be very helpful in shaping the applicable private international law rules, including those governing ownership and holding. Other countries—mainly those where financial intermediaries are established—will not enjoy this advantage. While case law might eventually provide clarity, it will likely take time for clear and predictable rules to develop. Hence, in some cases, it might be beneficial to enact the private international law rules of token-based CBDC in legislation. In that regard, there is a strong argument for international coordination.

This note has highlighted some of the broad challenges concerning the private law treatment of token-based CBDC and potential avenues for solutions. Some of the private law issues highlighted in this note could to some extent be addressed through contractual freedom. But in most jurisdictions, the private law regime for token-based CBDC will likely need to be augmented by a comprehensive legislative intervention to provide a sufficiently robust and predictable legal foundation for this new digital currency. In designing such a legislative framework, countries will need to consider carefully whether to anchor it in a broader framework for digital money or assets or provide a targeted legal reform for CBDC only.

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Box 8: Key Questions for Developing a Private Law Framework for Token-Based CBDC

1. What is the legal nature of token-based CBDC under property law? *Does the CBDC fit into any of the existing categories? Is there any guidance to be found in digital assets legislation or case law?*

2. Building upon its property law categorization, how are ownership rights in token-based CBDC held and evidenced? *What is the legal role of ledgers, registries and wallets in which the CBDC may be held?*

3. When is a transfer of token-based CBDC "final" between payor and payee? *What is the impact of the insolvency of the payor?*

4. Does the payee of token-based CBDC enjoy "good faith" protection?

5. Can the token-based CBDC be subject to legal arrangements for custody? What is the impact on the rights of holders if financial intermediaries hold in turn such CBDC through omnibus accounts with the central bank?

6. Are holders of token-based CBDC protected against the insolvency of their intermediary? *Are the terms and conditions and operating practices of financial intermediaries adequate in this regard?*

7. Can the token-based CBDC be "deposited" with commercial banks?

8. Can token-based CBDC be used as "cash collateral"? Would pledge rules apply?

9. Can the token-based CBDC be held in a cross-border context and, if so, is the private international law "fit for purpose" for governing transactions in such CBDC?

10. What can the central bank do through its contractual and regulatory frameworks to shape adequate private law rules for token-based CBDC?

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