



WP/20/254

IMF Working Paper

Legal Aspects of Central Bank Digital Currency: Central Bank and Monetary Law Considerations

by Wouter Bossu, Masaru Itatani, Catalina Margulis,
Arthur Rossi, Hans Weenink and Akihiro Yoshinaga

IMF Working Papers describe research in progress by the author(s) and are published to elicit comments and to encourage debate. The views expressed in IMF Working Papers are those of the author(s) and do not necessarily represent the views of the IMF, its Executive Board, or IMF management.

I N T E R N A T I O N A L M O N E T A R Y F U N D

WP/20/254

IMF Working Paper

Legal Aspects of Central Bank Digital Currency: Central Bank and Monetary Law Considerations

by Wouter Bossu, Masaru Itatani, Catalina Margulis,
Arthur Rossi, Hans Weenink and Akihiro Yoshinaga

IMF Working Papers describe research in progress by the author(s) and are published to elicit comments and to encourage debate. The views expressed in IMF Working Papers are those of the author(s) and do not necessarily represent the views of the IMF, its Executive Board, or IMF management.

I N T E R N A T I O N A L M O N E T A R Y F U N D

IMF Working Paper

Legal Department

Legal Aspects of Central Bank Digital Currency: Central Bank and Monetary Law
Considerations

Prepared by **Wouter Bossu, Masaru Itatani, Catalina Margulis, Arthur Rossi, Hans
Weenink and Akihiro Yoshinaga**

Authorized for distribution by Yan Liu

November 2020

IMF Working Papers describe research in progress by the author(s) and are published to elicit comments and to encourage debate. The views expressed in IMF Working Papers are those of the author(s) and do not necessarily represent the views of the IMF, its Executive Board, or IMF management.

Abstract

This paper analyzes the legal foundations of central bank digital currency (CBDC) under central bank and monetary law. Absent strong legal foundations, the issuance of CBDC poses legal, financial and reputational risks for central banks. While the appropriate design of the legal framework will up to a degree depend on the design features of the CBDC, some general conclusions can be made. First, most central bank laws do not currently authorize the issuance of CBDC to the general public. Second, from a monetary law perspective, it is not evident that “currency” status can be attributed to CBDC. While the central bank law issue can be solved through rather straightforward law reform, the monetary law issue poses fundamental legal policy challenges.

JEL Classification Numbers: E42, E52, E58, F24, F33, O33

Keywords: Central Bank Digital Currency; CBDC; Blockchain; Cryptocurrency; Crypto assets

Author’s E-Mail Address: Wbossu@imf.org; masaru.itatani@boj.or.jp; Cmargulis@imf.org; ARossi@imf.org; Hweenink@imf.org; Ayoshinaga@imf.org

Contents

Page

| | |
|--|--------------------|
| Abstract | 2 |
| I. Introduction | 4 |
| II. CBDC: The Concept, Design Features and Legal Implications | 6 |
| III. Central Bank Law | 13 |
| A. What is “Central Bank Law” and why is it relevant for CBDC? | 13 |
| B. Central Bank Law and Token-based CBDC | 16 |
| C. Central Bank Law and Account-based CBDC | 22 |
| D. Central Bank Law Issues Common to Both Types of CBDC | 24 |
| E. The Need for Central Bank Law Reform | 26 |
| IV. Monetary law | 27 |
| A. What is Monetary Law and why is it relevant for CBDC? | 27 |
| B. CBDC under Monetary Law | 34 |
| C. The Need for Monetary Law Reform | 41 |
| V. Conclusions | 41 |
| Boxes | |
| 1. Currency, Money and Payment Instruments: What Is in a Legal Name? | 8 |
| 2. Cash Accounts v. Ledger Accounts: The Legal Distinction | 12 |
| 3. Central Banks and the Principle of Attribution of Powers | 13 |
| 4. Constitutional Provisions on Currency | 27 |
| 5. Should Central Banks be Granted a Monopoly for the Issuance of Digital Currency? | 36 |
| 6. Can Token-based CBDC Carry Interest? | 37 |
| Figures | |
| 1. Authorization to Issue Currency | 21 |
| 2. Power to Open Current Accounts | 24 |
| Annexes | |
| I. Draft Central Bank Law Provisions related to CBDC | 44 |
| II. Draft Monetary Law Provisions related to CBDC | 45 |
| III. Criminal law and CBDC | 46 |
| References | 50 |

“The study of money, above all other fields in economics, is the one in which complexity is used to disguise truth or to evade truth, not to reveal it.”

J.K. Galbraith

Money: Whence it came, where it went

I. INTRODUCTION¹

1. In reaction to digital ledger, blockchain and other technological developments, as well as the possible issuance of private virtual currencies (“stablecoins”), the central banking community is actively considering the merits of issuing so-called “central bank digital currency” (“CBDC”). Many central banks have started in-depth discussions on the appropriateness and feasibility of issuing such currency.² A survey concludes that “at this stage, most central banks appear to have clarified the challenges of launching a CBDC, but they are not yet convinced that the benefits will outweigh the costs.”³

2. International financial institutions are also contributing to this debate.⁴ In a Staff Discussion Note (“SDN”), IMF staff concluded that “CBDC could be the next milestone in the evolution of money,” while at the same time cautioning that staff finds “no universal case for CBDC adoption yet.”⁵ The leadership and staff of the Bank for International Settlements (BIS) have also issued thoughtful analysis and views.⁶ The Committee on Payment and

¹ This paper was written while Masaru Itatani was on secondment with the IMF. While the views expressed in this paper are to some extent based upon the authors’ experience as Fund counsels, the views expressed herein are their own and should not necessarily be attributed to the Fund or the institution an author belongs to. The authors are grateful to Jason Allen, Niels Andersen, Phoebus Athanassiou, Susanne Bohman, Ludovico Cardone, Cristiano Crozer, Jose Garrido, Lorenzo Gatti, Christopher Hunt, Barend Jansen, Monika Johansson, Naoto Katagiri, Christoph Keller, Benedicte Nolens, Rosa Lastra, Yan Liu, Manuel Monteagudo, Panagiotis Papapaschalis, Charles Proctor, Mario Tamez, Kristof Van Nuffel, and staff from the Peoples Bank of China, Central Bank of Ghana, Bank of Israel, Banco de Mexico, Central Bank of the Philippines, the Monetary Authority of Singapore and the Bank of Thailand, for their review and comments. This paper also benefitted greatly from comments of other IMF departments. Obviously, all errors and omissions are the authors’ alone.

² See *Central Bank Digital Currencies: Foundational Principles and Core Features: Report No. 1 in a series of collaborations from a group of central banks*, BIS, 2020.

³ Barontini, C., and Holden, H., *Proceeding with Caution—a Survey on Central Bank Digital Currency*, BIS Papers No. 101, January 2019, p. 12.

⁴ Think tanks are also formulating views: see Gnan, E., and Masciandaro, D., *Do We Need Central Bank Digital Currency? Economics, Technology and Institutions*, SUERF, 2018/2; Shirai, S., *Central Bank Digital Currency: Concepts and Trends*, VOX CEPR Policy Portal, 6 March 2019.

⁵ IMF Staff, *Digital Money Across Borders: Macro-Financial Implications*, IMF, 2020; IMF Staff, *Casting Light on Central Bank Digital Currency*, IMF, SDN/18/08; IMF Staff, *A Survey of Research on Retail Central Bank Digital Currency*, WP/20/104.

⁶ Carstens, A., *The Future of Money and Payments*, Central Bank of Ireland 2019 Whitaker Lecture, 2019; Barontini, C., and Holden, H., *o.c.*; Auer, R., Cornelli, G., and Frost, J., *Rise of the Central Bank Digital*

(continued...)

Market Infrastructures (CPMI), hosted by the BIS and composed of representatives of central banks, noted that “CBDC raises old questions about the role of central bank money.”⁷ A similar view was taken by staff of the Asian Development Bank Institute.⁸

3. As often highlighted by central banks and other policymakers, the introduction of CBDC would raise important legal questions. Some of these touch upon the very fundamental relationship between money, the State, and the law.⁹ Do central banks have the authority to issue digital “currency”? Can CBDC be real “currency”? Should digital currency be legal tender? These questions are highly relevant and practical: in the absence of a clear response, the monetary system will struggle to adopt CBDC widely and the digital space might become ‘populated’ by private alternatives.

4. This paper seeks answers to those legal questions, by analyzing the two most important public law aspects of CBDC, namely the legal foundations of CBDC under central bank law and its treatment under monetary law. The issuance of CBDC will naturally also raise questions under tax law, private law (including property law), contract law, payment systems and settlement finality law, insolvency law, privacy and data protection law, and private international law. Moreover, CBDC needs to be carefully designed to ensure the effective implementation of the AML/CFT framework. While acknowledging their importance, this paper will not address those other issues, except where directly relevant under monetary law.¹⁰ Finally, the purpose of this paper is not to advocate for the issuance of CBDC—this is a policy and political matter—but merely to ensure that, when and if CBDC is issued, it enjoys a robust legal basis.

Currencies: Drivers, Approaches and Technologies, BIS, WP No. 880, August 2020; and Bech, M., and Garratt, R., *Central Bank Cryptocurrencies*, in BIS, *Quarterly Review*, 2017, p. 55-70.

⁷ CPMI, *Central Bank Digital Currencies*, BIS, March 2018, p. 1.

⁸ See ADB Institute, *Central Bank Digital Currency and Fintech in Asia*, 2019, and Section 3.3.1. on “legal certainty” in particular.

⁹ For a public law perspective on the relations between money, central banks, the State and the law: see Lastra, R., *Legal Foundations of International Monetary Stability*, Oxford University Press, 2006, chs. 1 and 2 and Lastra, R., *International Financial and Monetary Law*, Oxford University Press, 2015, chs. 1 and 2.

¹⁰ While monetary and central bank law are reasonably harmonized among jurisdictions, legal frameworks and traditions vary considerably in their likely treatment of CBDC under private law and tax law. The complexities raised by the various private and tax law issues deserve a separate space and attention. See Perkins, J., and Enwezor, J., *The legal aspect of virtual currencies*, *Butterworths Journal of International Banking and Financial Law*, November 2016, p. 569; Zilioli, C., *Crypto-assets: Legal Characterization and Challenges under Private Law*, *EL Review*, April 2020; Allen, J.G., *Property in Digital Coins*, (2019) 8(1) *European Property Law Journal* 64; Fox, D., and Green, S., (eds.), *Cryptocurrencies in Public and Private Law*, Oxford University Press, 2019; and Waerzeggers, C., and Aw, I., *Difficulties in Achieving Neutrality and other Challenges in Taxing Crypto Assets*, in Chris Brummer, ed, *Cryptoassets: Legal, Regulatory and Monetary Perspectives* (New York: Oxford University Press, 2019) 219.

5. This paper is structured as follows. The first section will briefly present definitions, the concept and design features of CBDC, and lay down the key legal implications. The next two sections will discuss in detail the central bank and monetary law aspects of CBDCs respectively. A final section will conclude. Draft sample legislation aimed at providing a sound legal basis to CBDC under central bank and monetary law is included in the annex.

II. CBDC: THE CONCEPT, DESIGN FEATURES AND LEGAL IMPLICATIONS

CBDC: What's in a Name? CBDC is certainly *Digital*...

6. Despite the lively debate on the merits of CBDC, no widely accepted definition of CBDC has yet emerged.¹¹ Over the past few years, the CPMI and IMF staff have provided some guidance on key features and a definition of CBDC.

- The CPMI highlighted that “*CBDC is not a well-defined term. It is used to refer to a number of concepts. However, it is envisioned by most to be a new form of central bank money. That is, a central bank liability, denominated in an existing unit of account, which serve both as a medium of exchange and a store of value.*”¹²
- In the above-referenced SDN, IMF staff defined CBDC as “*a new form of money, issued digitally by the central bank and intended to serve as legal tender.*”¹³

Even though the definition of CBDC is not yet settled, a key distinctive feature of CBDC is that it is *digital*.

7. If CBDC is digital, could it qualify as “electronic money?” The answer will depend on jurisdiction-specific circumstances. This said, electronic money is commonly defined as electronically stored monetary value represented by a claim on the issuer that is issued on receipt of funds for the purpose of making payment transactions and is accepted by natural or legal persons other than the issuer. In most jurisdictions, electronic money does not enjoy legal tender status. It is issued at par on receipt of funds (and the monetary value can be redeemed at par) by electronic money institutions that are licensed to provide specific payments services. Its regulatory framework generally consists of rules on the licensing of electronic money institutions, their required initial capital and own funds, general prudential rules, oversight, as well as rules safeguarding funds received in exchange for electronic

¹¹ On definitional issues, see Allen, J., and Lastra, R., “Virtual Currencies in the Eurosystem: Challenges Ahead”, *The International Lawyer*, Vol. 53, No. 2, 2019, pp. 177-232. They further consider these as well as border issues in “Border Problems: Mapping the Third Border”, *Modern Law Review*, 2020, DOI:10.1111/1468-2230.12506, <https://onlinelibrary.wiley.com/doi/abs/10.1111/1468-2230.12506?af=R>

¹² CPMI, *o.c.*, p. 3.

¹³ IMF Staff (2018), *o.c.*, p. 7.

money.¹⁴ In most countries, the legal framework contemplates the issuance of electronic money by private institutions, and not by the central bank—in the EU, issuance by central banks is actually excluded from the scope of the directive.

...but can it legally also be *Central Bank Currency*?

8. While the digital nature (the “D”) of CBDC is relatively easy to grasp, its two other key features (the “CB” and the “C”) raise fundamental legal issues.

- ***Issuance by the Central Bank***—As correctly highlighted in the definition used by the CPMI quoted above, to qualify as real (as opposed to “synthetic” CBDC discussed below) CBDC, this type of money should be issued in the form of a liability of the central bank. This is what differentiates central bank money from private money, such as credit balances on accounts in commercial banks (i.e. liabilities of the latter) or cryptocurrencies (which are potentially no liability at all, such as Bitcoin). However, as any other activity of the central bank, the creation of central bank liabilities is regulated in detail by so-called “central bank laws” (as defined below). Do ***central bank laws*** authorize the creation of central bank liabilities, and the issuance of “currency” in particular, in digital form? In the absence of a clear answer, CBDC would not have a robust legal basis, and its issuance should be reconsidered.
- ***Currency***—The “C” suggests that this “new form of money” is “currency.” (For the difference between “currency” and “money,” see Box 1 below) But is that so? To qualify as currency, a means of payment must be considered as such by ***monetary law*** (as defined below). Can monetary laws consider CBDC to be currency? If so, what are the legal consequences of CBDC issuance? If not, what does this entail for CBDC? The answers to those questions are equally critical, in particular to discern the role which CBDC could play under the legal framework as a means of payment, i.e. to extinguish monetary obligations.

These two legal issues are the subject of the analysis in the remainder of this paper.

¹⁴ Examples of such regulations are the Central Bank of Kenya’s 2013 E-money Regulation, the EU’s Directive on electronic money institutions (2009/110/EC), and the State Bank of Pakistan’s 2019 Regulations for electronic money institutions.

Box 1. Currency, Money and Payment Instruments: What Is in a Legal Name?

Over the past centuries, the law and banking practice have developed three, legally very different “tools” for making payments. Importantly, the legal nature of those tools does not exactly overlap with the economic conception of money (unit of account, means of payment and store of value): in answering legal questions about money, “economic theory is unlikely to assist the lawyer to any appreciable extent.”¹ This said, there are some links, such as the “unit of account” being the “official monetary unit” under monetary law (see below).

The delineation between these three legal concepts can be summarized as follows:

“**Currency**” can be defined as the official means of payment of a State/monetary union, recognized as such by “monetary” law. Most monetary laws reserve currency status to banknotes and coins, issued by the central bank (or coins issued by the State). Currency is always denominated in the official monetary unit. “Legal tender” status is a key attribute of currency: it entitles a debtor to discharge monetary obligations by tendering currency to the creditor.

While there is no universally accepted legal definition of money, it is widely accepted that the legal concept of “**money**” is broader. In addition to currency (banknotes, coins), in many (but not all) jurisdictions, it also includes certain types of assets or instruments that are readily convertible or redeemable into currency. This include first and foremost central bank and commercial bank “book money” (credit balances on accounts). Such book money can be converted into currency (subject to contractual stipulations) or transferred through payment systems or payment instruments (see below). At any rate, book money is not currency and enjoys legal tender status only in a few jurisdictions. This said, increasingly jurisdictions have given some form of legal recognition to this type of money, for instance as an authorized form of paying taxes or other legal obligations. In some jurisdictions,² “electronic money” is also classified as a type of money. Some assets (e.g., Bitcoins) may be considered as money under one body of law (e.g., VAT law), but not under another (e.g., financial law).

“**Payment instruments**” are a third means of payment: they are neither currency nor money but are legally used to effect payment in commercial bank book money or in currency. Cheques, bills of exchange and promissory notes are payment instruments.

1/ Mann, F., *The Legal Aspect of Money*, 4th Ed., p. 5.

2/ See e.g. the EU’s E-Money Directive.

CBDC: Design Features and Legal Implications

9. The legal treatment of CBDC under central bank and monetary law will very much depend on its operational and technical design features. As of the publication date of this

paper, very few central banks have officially and formally issued CBDC.¹⁵ At this stage, many central banks are transitioning from general research to more concrete proof-of-concepts and next to hands-on pilot phases. In that context, they are often still debating some key design features, which are also more widely discussed in the central banking and academic communities.

10. At any rate, the design features contemplated by central banks can be plotted on four axes: (i) account-based v. token-based, (ii) wholesale v. retail, (iii) direct v. indirect, and (iv) centralized v. decentralized. Most of these dichotomies raise important legal issues, which will be briefly mentioned in preparation for the more detailed discussion below.

Account-based vs. Token-based CBDC

11. Some central banks intend to structure the CBDC in a manner that digitalizes balances in cash current accounts in the books of the central bank. Other central banks are exploring the design of CBDC in the form of a digital token, not connected to an account-relationship between the central bank and the holder.

12. From a legal perspective, this distinction is fundamental. Balances in current accounts in the books of central banks are as old as central banking—they were developed by the Amsterdamse Wisselbank, arguably the first central bank. Their legal status under private and public law is well developed and understood. For instance, book money is transferred between account holders by debits and credits of their current accounts. Digital tokens, in contrast, do not benefit from a long history and their legal status under public and private law is currently unclear.

Wholesale v. Retail/General Purpose CBDC

13. Some central banks contemplate to issue CBDC only to their existing account holders and participants in their RTGS payment systems. These are mainly (big “clearing”) banks and public bodies (“wholesale”). Other central banks cast the web much wider and are looking to offer CBDC to the general public (“retail”), without offering it to their wholesale clients. Finally, some central banks consider that their CBDC should be “general purpose” and be available to both wholesale and retail counterparties.

14. From a legal perspective, this distinction would be very relevant where the CBDC is designed as account balances in current account. As will be discussed in detail below, many central bank laws limit the categories of entities and persons that can open such accounts.

¹⁵ To date, the Central Bank of The Bahamas has issued a digital “Sand Dollar” and the Central Bank of Lithuania launched a commemorative digital currency (LBCOIN). Pilot projects cannot be considered as official launches, including because often there is no sufficient legal basis for the issuance. However, some countries, such as China, have been developing the legal basis in preparation for issuing CBDC.

Other critical legal issues are the Anti-Money Laundering rules and competition law, but these issues will not be discussed in this paper.¹⁶

Direct/1-tier v. Indirect/2-tier CBDC

15. Some central banks contemplate to issue CBDC in direct or a 1-tier form: they would issue the CBDC and administer its circulation themselves. Other central banks contemplate issuance in indirect, 2-tier form (also called “synthetic”), whereby the liability is issued by a commercial bank but is fully backed with central bank liabilities. A hybrid form would consist of direct claims on the central bank, with intermediaries handling payments.

16. From a legal perspective, two important issues arise. First, to qualify as a real CBDC, the “currency” needs to be a direct liability of the central bank; this is what makes them risk free.¹⁷ 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.¹⁸ Second, in case of token-based CBDC, the question arises as to whether, and under which conditions, the legal framework allows to “deposit” the CBDC in the books of commercial banks (discussed in detail below).

Centralized v. Decentralized CBDC

17. Central banks are discussing whether CBDC transfers will be settled in a centralized fashion—as in their current RTGS—or in decentralized fashion, especially by way of distributed ledger technology (DLT). As to the latter, an additional variable is whether the DLT will operate on a permissioned or permission-less basis. Given the impact that a permission-less DLT may have on the functioning of the CBDC, including potentially complicating the central bank’s ability to manage the money supply,¹⁹ it is highly probable that central banks will opt for a permissioned DLT. The legal ramifications of this choice still have to fully crystallize. This paper will focus below on one specific legal aspect of DLT.

18. While all these design features have some legal relevance, the distinction between account-based and token-based CBDC has the most significant legal implications. (This is the case even if in practice some forms of CBDC may be hard to distinguish, especially for the general public.) Therefore, this paper will structure its analysis around this distinction,

¹⁶ In the case of a retail CBDC directly operated by the central bank, the central bank itself may need to implement AML/CFT measures, including those on customer due diligence. This may require additional resources and expertise for the central bank.

¹⁷ See *Central Bank Digital Currencies: Foundational Principles and Core Features: Report No. 1 in a series of collaborations from a group of central banks*, Box 1 (“Synthetic CBDC is not a CBDC”).

¹⁸ In case of insolvency of the issuing commercial bank, holders will only have a claim on the latter, and not the central bank. This is so even if the credit balance in the books of the central bank is reserved for the holders. In case the 100% reserve requirement was not met, this could lead to losses. This is not the case of real CBDC.

¹⁹ AML/CFT and privacy/anonymity concerns will also be relevant in this regard.

while referring to other design features where legally relevant. In any event, to facilitate a focused legal analysis, the analytical approach of this paper must be stylized and may not completely map with the actual manifestations of CBDC.

Does the technology used for token-based CBDC shape its legal nature as currency?

19. As discussed above, the legal status of token-based CBDC is not clear. Various approaches for its conceptualization have been proposed. One very compelling approach is to distinguish the forms of CBDCs and traditional central bank money along the lines of the *identification* requirement for using the money:²⁰

- For book money in general, including account-based CBDC, the identity of the account holder allows the holder to access the funds: “I am therefore I own”;
- For money in the form of physical tokens, the physical possession of the banknotes and coins allows the holder to dispose of the funds “I possess therefore I own”;
- For digital tokens, the knowledge of a password (often referred to as “private key”) allows the holder to transfer the funds “I know therefore I own.”

20. In turn, this allows this paper to analytically approximate token-based CBDC with banknotes and coins, i.e. “currency” (see below) for the following three, related reasons.

- First, token-based CBDC amounts to a (*sui generis*) claim on the central bank incorporated in an, albeit immaterial, token, and will circulate in the economy by transfer of the token. What it has in common with banknotes and coins is that the transfer of the token equals transfer of the claim. This is what distinguishes banknotes, coins and token-based CBDC from book money and bills (debt securities), which are transferred by debit and credits between cash current accounts and securities accounts respectively.
- Second, for both the physical and digital token forms of currencies, the holder seeking to make a payment must either be in the possession of the banknotes/coins or know the password allowing to dispose of the currency. If the holder loses either the banknotes/coins or the password, he/she cannot use the currency anymore. In contrast, for book money, even if the holder loses the password, he or she will still be able to dispose of the funds as long as that person can prove his or her identity to the entity maintaining the account.
- Third, in the taxonomy of central bank liabilities, token-based CBDC is neither book money nor a bill. Especially in case the CBDC would be issued to the general public,

²⁰ The identification criteria to distinguish between account and token-based CBDC was articulated in a number of publications, including: Auer, R., and Bohme, R., *The Technology of retail central bank digital currency*, BIS, 2020; and Kahn C, *How are payments accounts special?*, Federal Reserve Bank of Chicago, 2016.

it would have this feature in common with banknotes and coins which are also issued to circulate widely. (At least from a legal perspective, it would make a lot of sense to issue wholesale CBDC in the account-based form.)

21. Do technological methods used to transfer token-based CBDC challenge this approach? Many central banks are considering the issuance of token-based CBDC on DLT, which would entail that the currency is booked in some form of ledger. What are the legal consequences of this approach? This issue certainly requires further attention, as token-based CBDC is being developed. At this stage, the use of DLT does not alter this paper's assumption that token-based and account-based CBDC are different forms of money. This is mainly because the booking of token-based CBDC in a register or ledger operated by the central bank is legally not the same as the booking of a credit balance in a cash current account. This is explained in more detail in Box 2. This entails in turn that the legally robust issuance of token-based CBDC requires special provisions in central bank and monetary law that are different from the ones needed for the issuance of account-based CBDC.

Box 2. Cash Accounts v. Ledger Accounts: The Legal Distinction

To adequately assess the legal distinctions between account-based CBDC and token-based CBDC processed in a centralized manner or through permissioned DLT, the legal distinction between cash current accounts and (general) ledger accounts must be highlighted.

- **Cash current accounts**—These accounts are a banking technique and represent a *sui generis* contractual legal relationship between a financial institution and an account holder. By consequence, the rights and obligations of the parties are mainly provided by the contractual terms and conditions governing the account. Legislative provisions and general legal principles may also be applicable. In most jurisdictions, cash current accounts operate on the basis of the Roman law *mutuum* contract: even though the moneys credited to the account are called “deposits,” the financial institution is not required to safekeep those monies, but is authorized to use them by lending them onwards. Credit balances in cash current accounts are called “book money” (see above) and are transferred by debits and credits between such accounts.
- **Ledger accounts**—These accounts are an accounting technique and not a contractual concept: they represent a financial situation of a reporting entity based on sub-accounts established by the entity's chart of accounts. Ledger accounts can represent an asset, a liability, an income or an expense. Ledger accounts do not establish or represent per se a legal relationship between the reporting entity and a third party and do not create rights and obligations between the reporting entity and other parties. (But nothing prevents the reporting entity and third parties to enter into a contractual relationship.)

Importantly, these two distinct concepts are not completely disconnected. For instance, the total amount of credit balances held by counterparties in cash current accounts in the books of the central bank should be represented in the appropriate general ledger account. Also, this general ledger account can technically be subdivided in sub-accounts per account holder, representing for each of the latter the credit or debit balance that is the balance of the cash current account. These connections do not, however, change the fundamental distinction between the two concepts.

Box 2. Cash Accounts v. Ledger Accounts: The Legal Distinction (cont'd)

The ultimate legal consequence of the distinction is that, while token-based CBDC can be represented in centrally managed ledger accounts by the central bank, it is not a credit balance in current account. This entails that no contractual relationship exists between the central bank and the holder of token-based CBDC, except for the (admittedly very *sui generis*) claim incorporated in the token, very similar to the legal status of banknotes.

III. CENTRAL BANK LAW

A. What is “Central Bank Law” and why is it relevant for CBDC?

22. The activities of all central banks are governed by so-called “central bank laws” (which in the case of monetary unions can take the form of a treaty). These laws—often called “organic”—establish (or authorize to establish) central banks, provide for their decision-making bodies, lay the foundations for their autonomy, and prescribe their mandate. The key concept here is the *mandate*. Actions of a central bank beyond its mandate are vulnerable to political and legal challenges, in particular on grounds of general principles of administrative law (such as the “attributed powers” or “specialty” principles). Box 3 explores these concepts in some more detail.

Box 3. Central Banks and the Principle of Attribution of Powers

The principle of the attribution of powers means that a public entity—such as a central bank—may only conduct, or participate in, those operations for which it has received a mandate, either explicitly or, in some legal orders, implicitly (“implied powers”). The legitimacy of the delegation of powers to an autonomous central bank is enhanced by requiring the autonomous central bank to be accountable and transparent about the way it exercises its clearly defined mandate. Clearly defined mandates enhance legal certainty and are a precondition for entrusting sensitive technical policy decisions to an autonomous central bank.

A central bank’s objective(s), functions and powers constitute its mandate. The requirement of a clear mandate means that a central bank should have clearly defined functions and the associated powers to achieve its objective(s).

The concept of attribution of powers is found in federal states, supranational organizations like the European Union,¹ but also in central bank laws. For example, Chapter 1, Section 1 of the Swedish

Central Bank Act, provides that the Riksbank “*may only conduct or participate in such activities for which it has been authorized by Swedish law.*”

¹ Article 5 of the Treaty of the European Union provides that “the limits of Union competences are governed by conferral”. See also Jacqué, J.P., *Droit Institutionnel de l’Union Européenne*, 2010, par. 215.

23. In light of the principle of *attribution of powers*, the issuance of CBDC will require a firm anchor in the mandate established by the central bank law. This is especially important because the issuance of CBDC is a novel and potentially contentious activity. Without a clear and explicit mandate to issue CBDC, questions can arise as to whether a central bank is legally authorized to issue such currency, which is ultimately a liability, i.e., a debt, of the central bank. The issuance of non-authorized debt by a central bank would in turn give rise to serious legal, financial and reputational risks for the central bank and (the members of) its decision-making bodies. The importance of this principle is illustrated by the fact that today most central bank laws are explicit on the powers of central banks to issue their three standard liabilities, to wit (i) banknotes and coins, (ii) book money (i.e. credit balances on current and other (e.g. minimum reserves) accounts, and usually also (iii) bills.

24. Whether the issuance of CBDC falls under the mandate of a central bank requires an analysis of the central bank law’s provisions concerning two aspects of its mandate,²¹ namely its *functions* (sometimes also called “*tasks*” or “*duties*”)—“what” a central bank must do to achieve its objectives—and its *powers*—“how” a central bank can act to implement its functions.²² The link between those two legal concepts is important. On the one hand, statutory functions can in many instances only be executed through the exercise of legal powers. On the other hand, a central bank can only exercise its legal powers in the context of the exercise of its statutory functions. As will be seen, the relevance of a particular function or power varies depending on the design features of the CBDC that would be issued.

Central Bank Functions

25. Noting that most central bank laws include a single provision stating the functions of the central bank—this is indeed a good practice—there are two typical central bank functions that are particularly relevant for the issuance of CBDC.

- *Currency Issuance Function*: This is the traditional function of central banks to issue currency to the national economy. This function is relevant for token-based CBDC.

²¹ On the legal concept of “central bank mandate,” see Bossu, W., and Rossi, A., *The Role of Board Oversight in Central Bank Governance: Key Legal Design Issues*, WP/19/293, p. 10-11. It is noted that not all central bank laws make a sufficiently clear distinction between objectives, functions and powers. On the evolution of the functions and objectives of central banks as well as on the need for central bank accountability, see Lastra, R., *International Financial and Monetary Law* (Oxford University Press, 2015), chapter 2 and Goodhart, C., *The Evolution of Central Banks*, MIT Press, 1985.

²² Consideration should also be given to the third legal component of the central bank mandate: the objectives. Today, this aspect may appear less relevant, as the issuance of currency constitutes only a minor element of pursuing price stability. Going forward, central banks contemplating the issuance of CBDC will need to justify how such issuance contributes to the pursuit of their objectives, which may in some jurisdictions require compliance with a “proportionality test.” In that regard, the impact of the issuance of CBDC on the stability of the banking sector and the possibility to charge (including negative) interest on CBDC may influence this assessment. For instance, the latter may establish a very direct link between the central bank’s objectives and the functions of the issuance of currency and the formulation and implementation of monetary policy.

Whether the issuance of token-based CBDC is authorized depends on the issuance function of the central bank: does this function authorize to issue *all types* of currency or only banknotes and coins?

- *Payment Systems Function:* This is another traditional function of central banks to operate and oversee payment systems. What does this function entail for the issuance of CBDC? Naturally, any design of a form of money must inherently include a manner to transfer that money between economic agents. For money that is not a physical token, such transfer must almost by definition occur through some form of a “system.” For token-based CBDC, an argument could hence be made that the technology and procedures to be used to transfer the CBDC, say on a permissioned distributed ledger, could amount to a payment system. For retail account-based CBDC, it could similarly be argued that the issuance of this type of CBDC results in the establishment of a payment system open to the general public. If that would be case, the question arises whether the central bank has the legal authorization to open access to its payment systems to the general public.

Central Bank Powers

26. Similarly, two typical central bank powers are relevant for token- and account-based models of CBDC respectively:

- *Power to issue certain types of currency:* Many central bank laws include a specific power to issue currency. Moreover, to enable such issuance, several central bank laws include specific powers pertaining to the production, circulation and withdrawal of banknotes and coins. Do these powers extend, or should they be extended, to token-based CBDC?
- *Power to open accounts in the central bank’s books:* Many central bank laws include a specific power to open and hold for clients cash current accounts in their books. Such a power has many purposes: allow the central bank to act as banker to banks and to State, support the payment system function, and serve the implementation of monetary policy. Because account-based CBDC is essentially book money, its issuance will only be authorized for those entities for whom the central bank has the legal power to open cash current accounts.

27. By reviewing current practice, this paper will seek to answer the questions noted above, by applying the widely accepted textual, historical, teleological and contextual legal interpretation methods. However, it does not attempt to answer what is allowed and prohibited under any specific central bank law.

B. Central Bank Law and Token-based CBDC

Most Central Bank Laws only authorize the issuance of cash currency, i.e., banknotes and coins.

28. To ascertain whether a central bank law authorizes token-based currency, a two-step approach must be taken.

- First, it is necessary to analyze whether the central bank law explicitly and directly authorizes the issuance of currency, through an issuance function or power. This will allow to apply a textual interpretation to determine what is allowed or not.
- When that is not the case, other, more indirect legislative provisions pertaining to the issuance of currency will need to be considered with a view to establish contextual, teleological, and historical interpretations of the central bank law.

Direct Issuance Function or Power

29. Central bank laws display two variants in respect of the wording of the **function of the issuance of currency**.

- The first variant consists of central bank laws that explicitly limit the function of issuance of currency to banknotes and coins only.²³ There are cases where the wording of the function has recourse to broad language (“currency”), but where the central bank law includes separately a **definition** limiting “currency” to “banknotes and coins.”²⁴ At any rate, it is uncommon to define “banknotes and coins.” Thus, those concepts must be given their plain reading. In many, if not most, legal orders this will be limited to paper (or plastic) banknotes and metallic coins.²⁵
- The wording of the second variant is broader and authorizes the central bank to issue “currency,” without limiting it to banknotes and coins.²⁶

²³ Article 4 (B). 7 of the Central Bank of Jordan Law provides the central bank with the function “to issue banknotes and coins in the Kingdom.” Article 3 of the Dutch Central Bank Law mentions that DNB’s functions include “to provide for the circulation of money as far as it consists of banknotes.”

²⁴ Such a definition could also be included in a “monetary” or “currency act.”

²⁵ In some countries, the argument is actually more straightforward: banknotes are legally equated with promissory notes and these notes must always be “in writing” (see, e.g., Section 83(1) of the UK’s Bills of Exchange Act 1882).

²⁶ Article 7 of the National Bank of Ukraine Law provides the central bank with the function of “solely issuing the domestic currency of Ukraine and to organize its circulation.” Section 2(b) of the Central Bank of Nigeria Act 2007 prescribes a “principal object” of the central bank to “issue legal tender currency in Nigeria.”

30. The **power to issue currency** can also vary in central bank laws.

- On one side of the spectrum, there are some central bank laws with *no power*, given that the currency issuance *function* is clear enough and offers a sufficient legal basis to issue currency.²⁷
- At the other side of the spectrum, there are central bank laws that include *only a power*, but *no function*, related to the issuance of currency. This can be because the central bank law does not include a list of functions.
- In between, there are central bank laws with *both a function and power* related to the issuance of currency. Under this approach, the legal interaction between the power and the function must be interpreted following the principle that “*lex specialis derogat legi generali*,” namely the more specific of the two concepts prevails.

31. As with the function, the central bank’s currency issuance powers will sometimes be general—authorizing the issuance of “currency” or “other forms of currency”²⁸—and in other cases specific—authorizing only the issuance of banknotes and coins.²⁹

Indirect Provisions pertaining to the Issuance of Currency

32. Many central bank laws include **specific ancillary powers** to the issuance of currency, and more specifically, banknotes and coins. These powers are ancillary in that they do not authorize the issuance as such, but rather authorize a number of activities that are conducive to, or necessary for, the issuance of currency. Typically, these specific powers pertain to the printing and minting of respectively banknotes and coins, the planning of their circulation, and the withdrawal, demonetization and destruction of banknotes.

33. Some central bank laws require an “**asset cover**” for the currency put into circulation. This requirement is a remnant of the gold standard, when central banks were required to maintain a sufficient amount of gold coin or bullion to satisfy demands for conversion *in*

²⁷ In line with the principle of implied powers (see Box 3), the function of issuance of currency may be taken to include all the powers – such as the printing and minting of banknotes and coins, bringing them into circulation, or withdrawing them from circulation, and defining rules on their reproduction—that are necessary to enable the issuance of banknotes and coins. To hold otherwise would undermine the function of issuing banknotes and coins. See Smits, R., *The European Central Bank Institutional Aspects*, 1995, p. 206.

²⁸ As an example of a general power, Article 37 of the National Bank of Rwanda Act states that “Banknotes and coins issued by NBR are sole legal tender on the territory of the Republic of Rwanda. However, NBR may issue other forms of currency being legal tender.”

²⁹ Article 17 of the Organic Law of the Central Bank of Argentina states that “The Bank shall be empowered to conduct the following operations – a) Issue bills and coins pursuant to the powers delegated by the National Congress.” In Brazil, Article 10 of Law 4595/1964 states that the Central Bank of Brazil has the exclusive power to “I - issue paper money (*moeda-papel*) and metal money (*moeda metálica*)”. Similarly, Article 28 of the Organic Constitutional Law of the Central Bank of Chile establishes that “the Bank has the exclusive power to issue banknotes and to mint coins in accordance with the provisions of this section.”

specie from holders of banknotes. Today, those provisions typically require a central bank to maintain a combination of official foreign reserve assets and local government bonds in an amount equal to the currency in circulation. Those provisions are relevant for this paper in that their wording will give an indication of which type of currency is contemplated by the law (to the exclusion of other types).³⁰ A variant of those provisions are rules on the ***definition of monetary liabilities***, especially under currency board arrangements.³¹ This definition is important because under such arrangement the central bank will be obligated to ensure a 100% backing of the defined monetary liabilities in a specific foreign currency.³²

34. A third type of indirectly relevant provision is one that seeks to grant the central bank the so-called “**monopoly of issuance**.” This is a typical monetary law provision (to be discussed in detail below) which grants the central bank the exclusive right to issue currency within its jurisdiction or currency area. Often, this provision is combined with another provision prohibiting other private or public institutions or persons to issue currency or notes or tokens that by general public could be mistaken for currency due to a resemblance to the latter.³³ In some countries, this prohibition is enforced by criminal sanctions on the issuance of banknotes by other entities.³⁴ Importantly, the purpose of “monopoly of issuance” provisions is to limit the issuance of currency to the central bank only, and not to limit the types of currency that the central bank may issue. In other words, if the central bank law states that the central bank has the exclusive right to issue banknotes and coins, this does not automatically entail that the central bank can only issue banknotes and coins.

35. Finally, some central banks enjoy *broad* so-called ***incidental or ancillary functions and powers***. Their central bank laws contain explicit provisions mandating the central bank

³⁰ Section 19 (1) of the Bermuda Monetary Authority Act illustrates this point: “The Authority shall at all times maintain a reserve of external assets which—shall be in value not less than an amount equivalent to 50% of the total liabilities of the Authority in relation to the face value of currency notes in circulation; and shall consist of all or any of the following—”

³¹ On the matter of currency boards, see of Lastra, R., *International Financial and Monetary Law*, Chapter 2.

³² This is illustrated by Article 31 of the Law of the Central Bank of Bosnia Herzegovina, which states that “For the purposes of this Law: a. The aggregate amount of the monetary liabilities of the Central Bank shall be at any time the sum of: (A) all outstanding banknotes, coins put in circulation by the head office, main units, and other branches of the Central Bank.”

³³ See Section 17 of the Central Bank of Nigeria Act: “The Bank shall have the sole right of issuing currency notes and coins throughout Nigeria and neither the Federal Government nor any State Government, Local Government, other person or authority shall issue currency notes, bank notes or coins or any documents or tokens payable to bearer on demand being document or token which are likely to pass as legal tender.”

³⁴ See Art. 4.3 of the Law concerning Currency, the Central Bank of Kuwait and the Organization of Banking Business.

to exercise those functions or powers that are normally accorded to central banks,³⁵ or even commercial banks. This is different from the concept of implied powers mentioned in Box 3, in that these central bank laws contain explicit, broad wording that provides a legal basis allowing a central bank to undertake central bank activities, without having to list them specifically in the central bank law. This allocation of *incidental* functions or powers to a central bank is not unlimited, in that such functions or powers are those that are commonly undertaken by central banks. Also, these incidental functions or powers do not allow to undertake what is otherwise prohibited by the central bank law, or to undertake activities in a different fashion than as prescribed in detail by the central bank law. Other central bank laws include an explicit provision on broad *ancillary* powers (which must be distinguished from the specific currency-related ancillary powers discussed above).³⁶

What does this mean with regard to the issuance of token-based CBDC?

36. ***Issuance of Token-based CBDC is authorized:*** On the basis of the types of legal provisions discussed above, the issuance of token-based CBDC could be considered as legally authorized in the following two cases (that is of course in addition to cases where the issuance of token-based CBDC would be explicitly authorized: see below):

- (a) The central bank law includes a broadly worded currency issuance *power* (a) enabling the central bank to issue domestic “currency,” without limiting this to banknotes and coins, and the currency issuance function is equally open or absent,³⁷ or (b) referring explicitly to other means of payment than banknotes and coins.
- (b) The central bank law does not include a currency issuance power, but a broad *function* to issue “currency,” without limiting this to banknotes and coins, and the law does not include specific ancillary powers or other indirect provisions that (seem to) restrict the currency issuance to banknotes and coins.

³⁵ Article 4(B)15 of the Central Bank of Jordan Law enables the central bank to “carry out any other functions and transactions normally performed by central banks as well as any duties entrusted to it under this law”. Section 26 of the Reserve Bank of Australia Act states that “The Reserve Bank: (a) is the central bank of Australia; (b) shall carry on business as a central bank; and (c) subject to this Act and to the Banking Act 1959 shall not carry on business otherwise than as a central bank.”

³⁶ Article 8 (1.11) on the Law on the Central Bank of the Republic of Kosovo clarifies that the central bank may “carry out any ancillary activities incidental to the exercise of its tasks under this Law or under any other Law.”

³⁷ A possible counter argument could be that token-based CBDC may have different design features from the traditional characteristics of paper money (e.g., as regards interest accrual, the degree of availability to users, or limits to anonymity). The consequence would be that, however broad the language used by the law, it would not necessarily warrant that all conceivable designs of CBDC would be encompassed by the broad legal authorization to issue currency.

These conclusions hold, even if the central bank law includes specific ancillary powers that only refer to the printing, circulation, and withdrawal of banknotes and coins.³⁸

37. ***Issuance of Token-based CBDC is not authorized:*** In the following cases, the central bank would not be authorized to issue token-based CBDC:

- (a) The central bank law includes a narrow *function* to issue “banknotes and coins” and no power to issue “currency.”
- (b) The central bank law includes a broad power to issue “currency” but a narrow *function* to issue “banknotes and coins” (in such case the power must be read in light of the function).
- (c) The central bank law includes a narrow *power* to issue currency only in the form of “banknotes and coins.” As discussed above, those terms must be given their plain meaning: banknotes refer to paper or plastic notes and coins to metallic coins. Admittedly, in some jurisdictions, it could be argued that the existing legal concept of “banknotes” includes *digital* banknotes³⁹—these would be “banknotes” in digital, not material form—but in many countries, this might be a stretched legal interpretation.⁴⁰ A narrow issuance power would be an obstacle to issuance of token-based CBDC when there is (i) no issuance function, (ii) a broadly worded issuance function, (iii) a narrowly worded issuance function or (iv) no issuance function but incidental powers.
- (d) The central bank law includes no, or broadly worded, issuance function or power, but includes an “*asset cover*” rule that directly, or indirectly through the *definition* of “monetary liabilities,” restricts the currency to be issued to “banknotes and coins.”
- (e) The central bank law includes no issuance function or power, and only provides for the *monopoly of issuance* and *specific ancillary powers*, and those provisions are limited to banknotes and coins. A contextual and historical interpretation of those

³⁸ The role of specific ancillary powers deserves consideration. The legal question is whether the drafting of these specific powers could be extended to token-based CBDC? Of course, similar to banknotes and coins, token-based CBDC is also produced, put into circulation and can be withdrawn; after all the central bank will determine the total amount of pre-paid values to be transferred, and stored on a device, card, or an app. Therefore, these specific ancillary powers can also be relevant for token-based CBDC. The only difference would be the specific powers for printing and dealing with counterfeit banknotes and coins, which are not needed as token-based CBDC cannot be printed or counterfeited (at least not in the traditional sense of the word). Nevertheless, a central bank would have to determine how it would legally deal with faulty devices, cards and apps and falsified token-based CBDC.

³⁹ The Central Bank of Uruguay is justifying the issuance of token-based CBDC on the basis of this argument.

⁴⁰ This option is discussed in Banque de France, *Central Bank Digital Currency*, 2020, p. 31.

provisions allows to conclude that the central bank is only authorized to issue those specifically mentioned forms of currency.

38. ***Issuance of Token-based CBDC is unclear:***

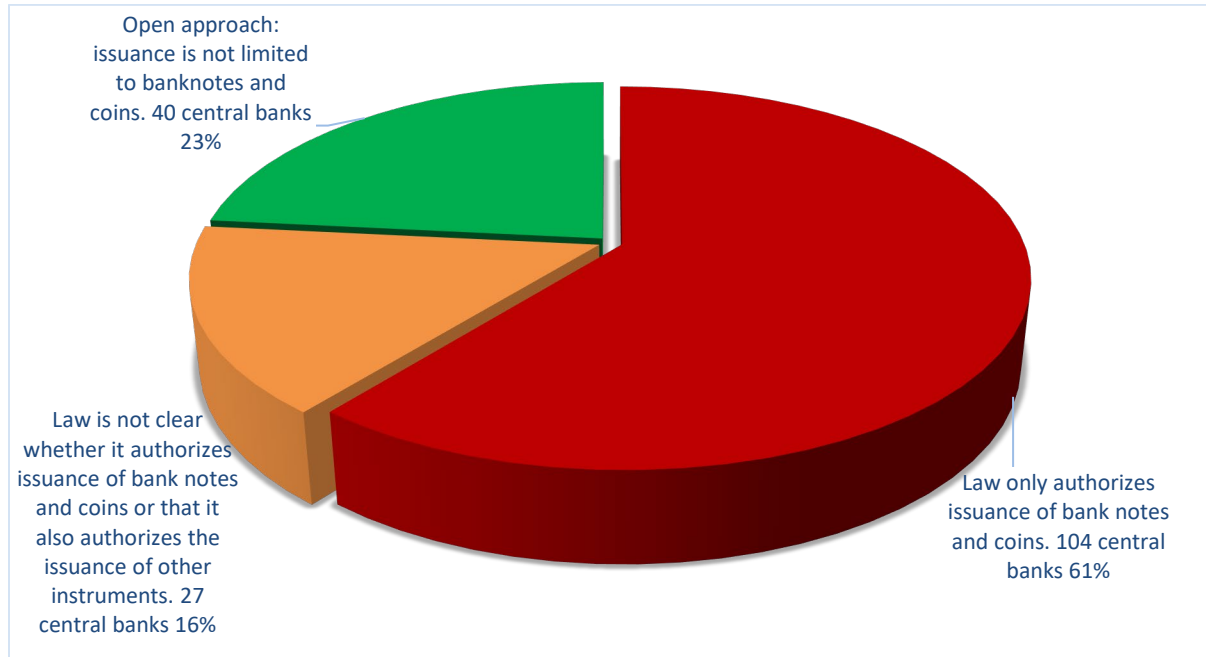
It is unclear whether the central bank is allowed to issue token-based CBDC when:

- the central bank law does not provide for an issuance function or power, or specific ancillary powers, but includes broad *incidental functions or powers*;
- the central bank law includes a broad *function* to issue “currency,” without limiting this to banknotes and coins, albeit with specific ancillary powers or other indirect provisions that (seem to) restrict the currency issuance to banknotes and coins.

Country Practice

39. Among the 171 central banks of the IMF membership, 61% of central bank laws limit the authority of issuance of currency to banknotes and coins. 23% of central bank laws allow directly for the issuance of currency in a digital format. 16% of central bank laws are unclear as to whether they authorize the issuance of a digital version of central bank currencies.

Chart 1. Authorization to Issue Currency



Source: IMF Staff

C. Central Bank Law and Account-based CBDC

Many central bank laws will support the issuance of account-based CBDC to financial institutions, but its issuance to the general public will often lack a sufficient legal basis.

40. Many central bank laws include legislative provisions on the *power* of the central bank *to open cash current accounts* in its books. As with the issuance of currency, practices among the IMF membership differ.

- One group of central bank laws restricts the power of the central bank to open cash current accounts to a closed group of institutions, which typically are limited to the State, public institutions and financial institutions, or even narrower to banks.⁴¹
- Another group of central bank laws does not restrict the opening of cash current accounts to a closed group of institutions. In some cases, the law will simply not impose any restrictions.⁴² In other cases, offering cash current accounts to natural persons is explicitly allowed.⁴³ In rare cases, opening cash current accounts to the general public is allowed, but only under certain circumstances.⁴⁴
- In a third category of laws, restrictions on the type of account holders can be lifted by decision of the central bank’s board of directors or the minister of finance.⁴⁵

41. In the absence of an explicit authorization to open cash current accounts, the central bank might be deemed to have such a power as a result of the implied powers doctrine in jurisdictions where this doctrine is accepted. In the same situation, wording allowing a

⁴¹ Section 28 (c) of the Reserve Bank of Malawi Act lists the powers of the RBM, which include to “open accounts for, and accept deposits from the Government, funds, corporations and institutions controlled by the Government, banks and other financial institutions in Malawi.” Article 55 of the Organic Constitutional Law of the Central Bank of Chile allows the Bank to “open current accounts for banking and financial entities, the General Treasury of the Republic, and to other public institutions, organisms or State companies when necessary to conduct operations with the Bank, according to the qualification of the majority of the Board.”

⁴² Article 60 of the Law of the Central Bank of Costa Rica states that “the Central Bank is authorized to receive deposits in current account or at term, in national or foreign currency.” Article 10 of the Law of the Central Bank of Curacao and Sint Maarten states that “the Bank is also authorized to perform the following activities: 2. to receive funds in trust, on deposit or in a current account.”

⁴³ Article 55 (4) in the Statute of the Bank of Greece gives the BoG the power to “keep an account for the State, as well as for public entities, credit institutions, legal entities, natural persons, and other market participants”.

⁴⁴ Article 48, 2nd para, of the Central Bank of the Russian Federation Act stipulates that “the Bank of Russia shall be entitled to provide services to clients other than credit institutions in regions where there are no credit institutions.”

⁴⁵ Section 75 of the Central Bank of Malaysia Act lists Bank Negara Malaysia’s general powers which include the power to “open accounts for (...) (i) the Government, any State Government, public authority or financial institution; or (ii) any other person in Malaysia with the prior approval of the Minister”.

central bank to undertake central bank activities incidental to the performance of its functions could be helpful in this regard. The same applies to ancillary powers.

What does this mean with regard to the issuance of account-based CBDC?

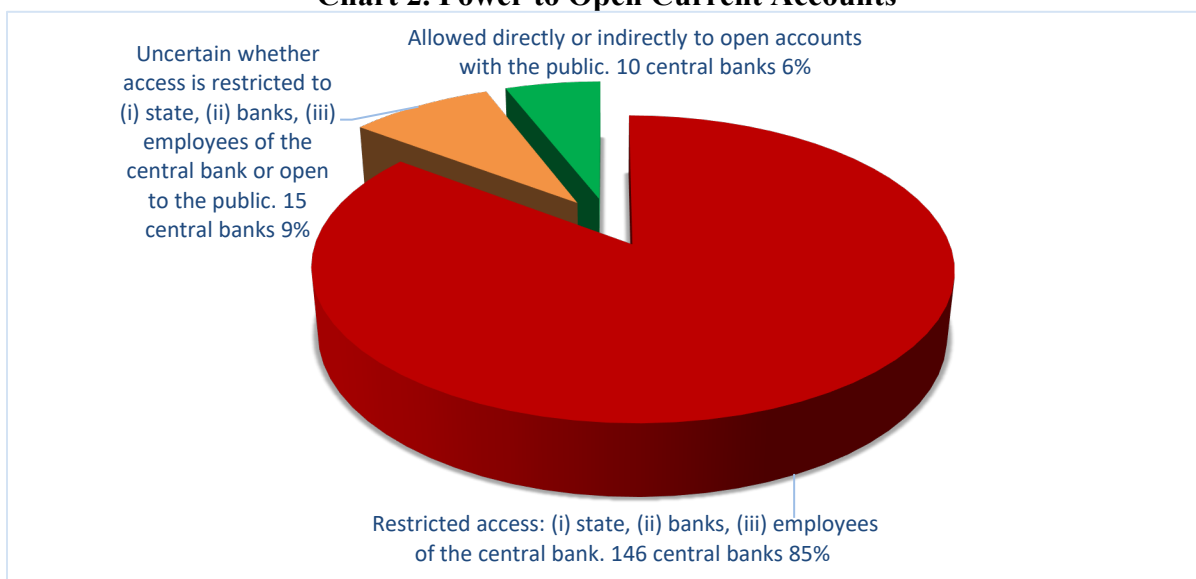
42. ***Issuance of Account-based CBDC is authorized:*** Those central bank laws which include an explicit power to open cash current accounts for the State and banks, can be considered to be authorized to offer account-based CBDC to the State and banks. Where the central bank is also allowed to open cash current accounts to physical persons—as the case may be, by special decision—the central bank is, or can be, authorized to issue account-based CBDC also to the general public. Where the central bank law is silent on the opening of current accounts, the same conclusion may apply to central banks with implied or incidental functions and powers (for the latter, at least once a critical mass of central banks will have issued account-based CBDC to the general public).

43. ***Issuance of Account-based CBDC is not authorized:*** Central bank laws that only grant the power to open cash current accounts to the State, public bodies and banks, but not to physical persons, do not authorize to issue account-based CBDC to the general public.

44. ***Issuance of Account-based CBDC is uncertain:*** In case the law is silent on opening current accounts, and the central bank does not enjoy implied or incidental powers, there is substantial uncertainty as to whether the central bank is authorized to issue account-based CBDC to the general public. In such case, it could however be argued that the central bank is authorized to issue this form of CBDC to its existing accountholders.

Country Practice

45. Among the IMF membership, 85% of central bank laws limit the power to open cash current accounts to a limited category of institutions, while a minority of central bank laws (10 central banks corresponding to 6% of the total) allow for the opening of current accounts to a broader public. 9% of central bank laws include some form of provision on the opening of current accounts, but it is not clear whether accounts can be opened to the general public.

Chart 2. Power to Open Current Accounts

Source: IMF Staff

D. Central Bank Law Issues Common to Both Types of CBDC

46. What is the legal impact of *the payment system function*?⁴⁶ Central bank laws differ in the manner in which they establish this function.⁴⁷

- Many central bank laws limit this function to payment systems in the strict sense of the word, i.e., a specific payment infrastructure.⁴⁸ Among those central bank laws, there are a few which limit the payment system even further to “interbank” payment systems only.⁴⁹
- Other central bank laws are more general and charge the central bank with overseeing and promoting the soundness of “the (national) payment system.”⁵⁰ This is a much

⁴⁶ In some central bank laws (e.g., Mexico), this is actually an objective of the central bank.

⁴⁷ National payment system acts can also be relevant in this regard.

⁴⁸ Article 5 of the Federal Act on the Swiss National Bank mentions the SNB’s function of “facilitating the operation of cashless payments systems.” Section 4A (1) of the Central Bank of Kenya Act states that “the Bank shall: (d) formulate and implement such policies as best promote the establishment, regulation and supervision of efficient and effective payment, clearing and settlement systems.”

⁴⁹ An example can be found in Article 7 of the Law on the National Bank of Cambodia, which counts among the functions of the central bank: “to oversee payment systems in the Kingdom and to enhance interbank payments.” Article 18 of the Bank Indonesia Law states that “Bank Indonesia shall arrange the final settlement of interbank payment transaction both in rupiah and or foreign currencies.”

⁵⁰ Chapter 1, Section 2 of the Swedish Riksbank Act states that “The Riksbank shall also promote a safe and efficient payments system.” Article 3.3 of the Law on the National Bank of Georgia similarly declares that:

(continued...)

broader concept than the “payment systems” discussed above and refers to the ensemble of institutions (banks, payment institutions) and infrastructures (payment and securities settlement systems, central securities depositories, central counterparties, clearing houses) that, taken together, are used to transfer monetary value within an economy.

47. What is the relevance of those provisions for CBDC? Irrespective of the exact circumscription of the payment system function, the payment systems which central banks operate today are almost all *interbank* payment systems, in that the participation in those systems is limited to banks—and often only sizeable banks.⁵¹ The establishment of token-based or account-based CBDC will inevitably entail the creation of a technical, operational and legal infrastructure that will transfer monetary value between users. This infrastructure can arguably be considered as a “payment system.” As long as only banks (and similar financial institutions) participate in such a system, there is no problem. But if CBDC would be made available to the general public, the central bank could be considered to operate a payment system with almost the entire population as participants. For those central banks with a payment system function formulated in a general wording, this should not raise major legal issues. But for those central banks that are only mandated to operate *interbank* payment systems, that mandate may be too narrow. This is because the adjective *interbank* denotes that the payment systems operated by the central bank only should serve to execute payment between banks, and not between broader categories of users, let alone the general public.⁵²

48. Also, a few central bank laws include specific wording that the central bank has the ***function to promote technological innovation*** in the banking system.⁵³ Sometimes, the relevant provisions include an explicit link with the payment system function.⁵⁴ Such a type of provision can be relevant for CBDC. Specifically, when the legal basis is otherwise relatively weak, such a provision can be an additional argument to support the legal basis for the issuance of CBDC. At the same time, its usefulness should not be exaggerated, as such a

“The functions of the National Bank shall be to: f) facilitate secure, sustainable and effective functioning of the payment system.”

⁵¹ The participation of FMIs is the exception that confirms the rule, as FMIs do not make payments on their own behalf but on behalf of their clients, which are also mostly banks.

⁵² A similar conclusion can be reached for the oversight powers of central banks, which can also entail the establishment of a legal infrastructure for payment transfers via such “interbank” payment systems.

⁵³ In Mexico, this requirement is actually enshrined in the “fintech law.”

⁵⁴ Article 7(7) of the Law on the National Bank of Ukraine provides a function to: “shap(e) the development of modern electronic banking technologies, establishing payment and accounting systems, promoting their smooth and efficient operation, and ensuring development of payment and record-keeping systems created by the NBU; controlling the creation of payment instruments, banking automation systems and banking data protection systems”.

provision cannot overrule specific limitations in the powers to issue currency or offer current accounts to the general public.

E. The Need for Central Bank Law Reform

49. The absence of an explicit and robust legal basis for the issuance of token-and/or account-based CBDC can be relatively easily remedied through targeted central bank law reform. ANNEX I contains draft provisions to this effect. (Of course, it is accepted that other legal issues, such as for instance private law, may need to be addressed as well in the same context, which may in some cases complicate this exercise.)

50. ***Token-based CBDC***: To provide a firm legal basis for the issuance of this type of CBDC, the following amendments might need to be made to central bank laws.

- i. The central bank law should include an explicit *function* “to issue currency” generally, without limiting the issuance of currency to banknotes and coins only.
- ii. The associated *powers* to implement this function should be drafted, where appropriate,⁵⁵ with an explicit reference to the issuance of currency in the form of banknotes (and possibly coins) as well as in the form of a digital token.

The main argument for introducing such an explicit legal basis is that, depending on the intended design, such an amendment would support the more innovative CBDC features (e.g., limited privacy and general availability).

51. ***Account-based CBDC***: To provide a firm legal basis for the issuance of this type of CBDC to the general public in particular, an amendment should be made to central bank laws to add a specific *power* to open current accounts for the general public. This can be done directly—by mentioning the general public in the central bank law—or indirectly by allowing the competent decision-making body of the central bank to decide on the categories of persons and entities that have access to current accounts in the books of the central bank.

52. ***Both Types of CBDC***: If the wording of the payment system function were to be restricted to *interbank* payment systems, this restriction would best be removed.

⁵⁵ For instance, there is no need to extend the provisions on the printing of banknotes to token-based CBDC.

IV. MONETARY LAW

A. What is Monetary Law and why is it relevant for CBDC?

53. Monetary law is the legislative and regulatory framework that provides the legal foundations for the use of monetary value in society, the economy and the legal system.⁵⁶ The basic principle of monetary law provides that it is for a sovereign State to determine and establish its own currency system.⁵⁷ (The sovereign power may of course be ceded to a monetary union, in which case this power is exercised collectively by the monetary union on behalf of the member states.) Central bank laws often include key provisions of monetary law: the distinction in this paper between central bank and monetary law is *substantive* (i.e. focuses on the issues the respective bodies of law seek to regulate), not *formal*. This being said, many countries also have a formal “monetary” or “currency act.”

54. In many countries, the Constitution lays down the basic rules governing the interaction between the State and the monetary system. As can be seen from Box 4, the main purposes of those constitutional provisions are (i) to allocate the competency to adopt monetary law in federal states to the federal level and (ii) to confirm that the issuance of currency is a State matter.

Box 4. Constitutional Provisions on Currency

The issuance and circulation of currency is a core element of sovereign power. Therefore, many Constitutions contain general provisions on this power, which is subsequently detailed in primary legislation, such as central bank laws.

Section 51 of the Australian Constitution provides that “*Parliament shall have the power to make laws for the peace, order and good government of the Commonwealth with respect to*”, *inter alia*, “*xii. Currency, coinage and legal tender.*” Article 99.1 of the Swiss Constitution clarifies that “*the Confederation is responsible for money and currency*”. A third example is provided by Article 227.1 of the Polish Constitution which says that “*the National Bank of Poland shall have the exclusive right to issue currency*”.

It is instructive to note that the language used in various Constitutions is such that it might raise questions about the power to issue CBDC.

⁵⁶ Hahn, H., Häde, U., *Währungsrecht*, 2010, §2. The concept of another country’s “monetary law” is often referred to by legislation. For example, 31 USC § 5151 provides rules on “conversion of currency of foreign countries”. Also, private international law rules usually refer to the country of issuance as *locus* of monetary law issues: see e.g. Swiss Federal Code on Private International Law, Section 147(3).

⁵⁷ The Permanent Court of International Justice recognized that the *lex monetae* determines the value of the currency, albeit that it is for the *lex contractus* to determine the effect of a devaluation on contractual obligations; Judgments in the Serbian and Brazilian Loan Cases, July 12, 1929, Series A No. 20 and 21.

Box 4. Constitutional Provisions on Currency (Cont'd)

For example, Section 91 of the Canadian Constitution declares that “*the exclusive legislative authority of the Parliament of Canada extends to all Matters coming within the Classes of Subjects next hereinafter enumerated (...) 15. Banking, Incorporation of Banks and the Issue of Paper Money.*” Similarly, Article 4 of the Israel Basic law on the State Economy specifies that the “*printing of legal tender currency notes and the minting of legal tender coins, and the issue thereof, shall be done under Law.*” A third example is Article 83 of the Peruvian Constitution according to which “*the Law determines the monetary system of the Republic. Issuance of bills and coins is under the exclusive power of the State.*”

As these and other Constitutional provisions explicitly refer to only banknotes and coins, constitutional scholars would have to assess whether the existing provisions could be interpreted to cover the issuance of digital currency as well.

55. Building upon those international and constitutional law principles, monetary law basically seeks to regulate two issues:

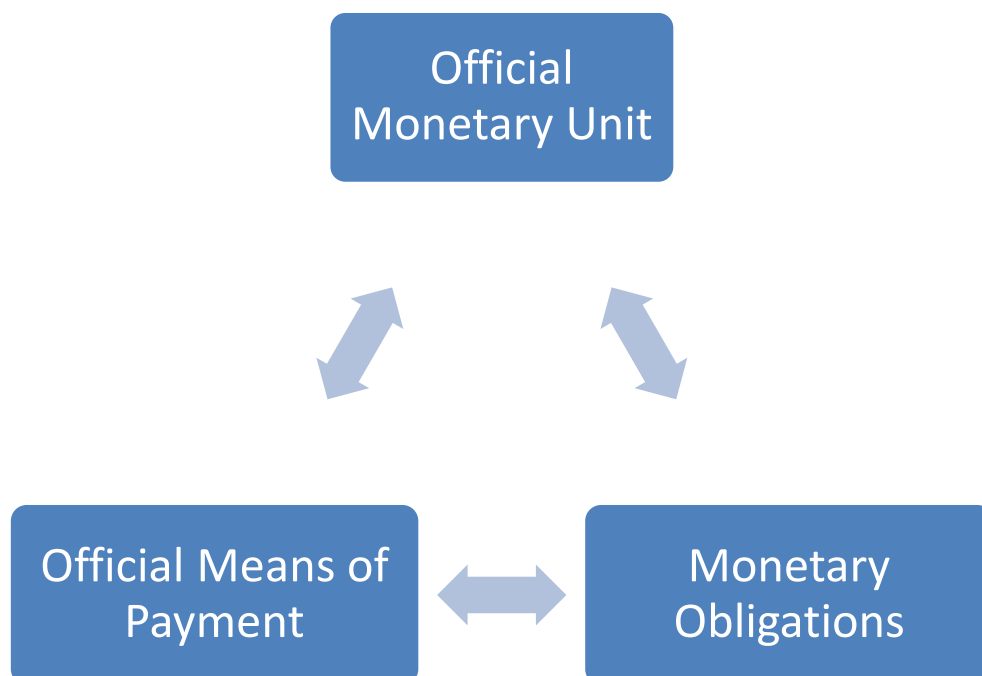
- a) What is the **official monetary unit** (*unité monétaire*) of the country/monetary union and how is its value determined or defined?
- b) What are the **official means of payment** (*signes monétaires*) of the country/monetary union?⁵⁸

All States/monetary unions define in legislation both the official monetary unit and official means of payment valid on their territory.

56. There is a very strong legal link between the two legal concepts. In one direction, the official means of payment must, by law, be expressed in the official monetary unit. In the other direction, monetary obligations expressed in the official monetary unit can, in principle, always be paid by tendering official means of payment. Monetary obligations are obligations to pay an amount of “money” and must in principle be expressed in an official monetary unit.⁵⁹ Monetary obligations can arise out of contracts, torts and public law obligations (e.g., taxes, fines). The obligor of a monetary obligation must, by law, satisfy his/her obligation by a transfer of money.

⁵⁸ We cite the French terms here because the English language is particularly confusing in the loose use of the term “currency,” which in common language is often used to denote both aspects, although strictly speaking the synonym for the official monetary unit should be “currency unit.”

⁵⁹ Mann, F., *The Legal Aspect of Money*, 4th Ed., p. 80.



57. The ultimate unifying principle between those concepts is the one of “nominalism.” This principle means that any monetary obligation must be satisfied by paying the exact amount stipulated in the contract or law.⁶⁰ In other words, absent contractual provisions to the contrary, the loss of value of the official monetary unit, either domestically through inflation or externally through depreciation of the exchange rate, is at the risk of the creditor.

58. With respect to CBDC, the fundamental questions that arise under monetary law are:

- i. Is CBDC a new official monetary unit and/or a new official means of payment?
and
- ii. In function of the response to (i), what are CBDC’s essential monetary law attributes?

To respond to those questions, we need first to analyze in some degree of detail what those two legal concepts entail.

Official Monetary Unit

59. Monetary law establishes the official monetary unit of a State/monetary union.⁶¹ It is this aspect that economists refer to when they mention the “unit of account” role of money.

⁶⁰ Mann, F., *o.c.*, p. 84.

⁶¹ Monetary law will also define the subdivision of the official monetary unit, for instance that 100 cents equal a Dollar or a Euro.

Examples of official monetary units are the Dollar in the USA, the Euro in the Euro Area, and the Yen in Japan. These monetary units are clearly established by relevant legislation and must be distinguished from non-official quasi-monetary units (such as BTC (Bitcoin), ETH (Ethereum) and XRP (Ripple)) which are not established by law.

60. Moreover, monetary law often prescribes how the value of the official monetary unit is established.⁶² Historically, many monetary units were defined by reference to either another monetary unit or, more commonly, a quantity of gold. Since the end of the Bretton Woods system, the external value of many official monetary units is determined by the foreign exchange market—naturally, domestic economic policies (monetary, fiscal) will shape the internal value (price level) of the monetary units.

Official Means of Payment: “Currency”

61. Monetary law also establishes which means of payment are officially sanctioned as such by the State/monetary union. Almost all States/monetary unions legally and officially sanction one or more types of means of payment.⁶³ The reason for this is that the use of means of payment and sovereignty are historically two closely connected concepts, as illustrated for example by the presence of the emperor’s or king’s face on coins and banknotes. The main types of official means of payment are banknotes and coins. These are in the English language commonly called “currency.”

62. The State has sanctioned the use of currency essentially through five important legal mechanisms: (i) the monopoly of issuance by the State or its agent, (ii) *cours forcé*, (iii) legal tender status, (iv) privileges under private law, and (v) protection under criminal law.

Issuance Monopoly of the State

63. Nowadays, in almost all countries, the official means of payment are issued by the State, and in particular its agent—the central bank.⁶⁴ (For the few jurisdictions where that is

⁶² Kenyan law provides a good example of how those two principles of monetary law are actually enshrined in legislation. Section 19 of the Central Bank of Kenya Act provides that “the unit of currency of Kenya shall be the Kenya shilling, which shall be divided into one hundred cents.” In turn, Section 20 of the same Act states that: “The external value of the Kenya shilling shall be determined by the market.”

⁶³ This does not preclude the existence and use of non-official means of payment. Specifically, the use of commercial bank book money as a means of payment is in many countries more widespread than that of the official means of payment. But ultimately commercial bank book money is (unless contractually otherwise stipulated or limited) a claim to receive officially issued banknotes and coins.

⁶⁴ This point is nicely illustrated by Article 42 of the Law of the Central Bank of Peru: “the issuance of banknotes and coins is the exclusive capacity of the State, which exercises it through the central bank.” In most cases, these means of payment are issued by a country’s central bank, and coins in some countries by the Treasury. An important quid pro quo for this official sanction is that the issuer pays (part of) the income generated by the issuance of the monetary instruments to the State: this is the so-called seignorage.

not the case, the issuance of “currency” must at least be sanctioned by the State.⁶⁵) This is the monopoly of issuance, discussed above, which was established in reaction to the distress caused in the 19th century to monetary systems around the world by commercial banks issuing their own banknotes representing gold deposits and insufficient gold cover, which often caused bank runs and financial instability. However, not all claims on the central bank are “currency:” central bank book money and central bank bills do not qualify as currency under law, because they lack the other features discussed below.

Cours Forcé

64. The second mechanism through which States sanction a means of payment is through *cours forcé*. The contemporary meaning of this concept is that the value of a banknote is the amount of official monetary unit printed upon it by the issuer. Banknotes are to be accepted in payment for that value, without convertibility into gold coins.⁶⁶ It is this feature that leads economists to call banknotes “fiat money.”

65. *Cours forcé* must be distinguished from convertibility in other monetary liabilities of the central bank. The general public can in principle only convert banknotes into banknotes. However, current account holders of the central bank can convert banknotes into central bank book money, in principle without limitation. Conversely, current account holders of the central bank can also in principle convert without limitation central bank book money into banknotes.⁶⁷ These two features flow from a combination of the central bank law, central bank policies on current account holders, and the central bank’s current account rules.

Legal Tender Status

66. The third legal mechanism is by granting by law to currency the power to validly and definitively extinguish monetary obligations: this power is called “legal tender status.” By tendering a means of payment with legal tender status to the creditor, the debtor of a monetary obligation validly discharges his/her obligation. Jurisdictions, however, differ in

⁶⁵ This is the case of banknotes issued by private banks in Scotland and Northern Ireland.

⁶⁶ This term referred originally to the suspension and eventually the abolition of the convertibility in specie of banknotes issued by the central bank—the concept is not relevant for coins. Banknotes used to incorporate a claim for restitution of an amount of deposited gold (or silver) coin (or bullion). In the first half of the 20th century (often in response to the first World War), most countries suspended the convertibility of their banknotes, to avoid a panic run on the gold reserves and thus the bankruptcy of the central bank. This is a benefit of which ordinary claims on deposited gold (e.g. with goldsmiths) did not enjoy. This suspension was eventually made permanent and today all countries have no longer convertibility of banknotes in gold. As discussed above, there are still some central bank laws that require the central bank to back issued banknotes with foreign currencies, gold, government securities: see e.g. Art 109 Central Bank of Egypt Law. While this is a legacy from the convertibility under the gold standard, such provisions are no longer necessary (absent a currency board) nor good practice.

⁶⁷ Under negative interest rates, some central banks try to limit this convertibility, but this is done more through the cost structure of conversion than by restricting the principle itself.

how this is legally achieved. In some, this may entail that the creditor's claim deriving from that obligation is extinguished by his/her failure to accept a means of payment with legal tender status. In such a case, when the creditor refuses the payment in legal tender and brings a suit to the court, the court will consider that the debtor has validly paid.⁶⁸ In some other jurisdictions, this may merely grant certain privileges to the debtor. Under either approach, the creditor is indirectly forced to accept legal tender. Some countries even impose administrative- or criminal sanctions on creditors when they refuse to accept legal tender currency in payment.⁶⁹ Legal tender rules will apply unless, where this is permitted by law, there is a special contractual provision stipulating otherwise between the parties to the transaction. If parties to a contract establishing a monetary obligation do not make a special agreement regarding a different payment currency where that is allowed by law,⁷⁰ the debtor always has the option to pay in legal tender means of payment.

67. It is prevailing practice that a State/monetary union designates by legislation the means of payment it has issued—its banknotes and coins—as legal tender.⁷¹ Some countries with an official dollarization or euroization policy designate foreign means of payment as legal tender either unilaterally or bilaterally and with or without parallel issuance of their own currency.⁷² This illustrates that legal tender designation is a matter of State policy.

68. Legal tender status is merely one of the means of sanctioning, but not an essential feature, of official means of payment. Hence, the link between the official status of a means of payment and legal tender status is not absolute.⁷³ This has two consequences. First, not all means of payment with legal tender status are “currency”: there are countries that have attributed legal tender status, albeit under certain restrictive conditions, to commercial bank

⁶⁸ This type of dispute has been observed in many countries when the creditor faced significant depreciation of local currency after the contract was entered into.

⁶⁹ Section 19 (5) of the Central Bank of Nigeria Act punishes criminally a “person who refuses to accept the Naira as a means of payment.” In the past, Article 8, Paragraph 6 of the Japan's National Bank Ordinance (1872) stipulated also a criminal violation. Very recently, China's central bank issued a circular stating that cash payments must not be refused in regular transactions (Circular 10, 2018).

⁷⁰ Most jurisdictions allow up to a degree to choose the monetary unit of the contractual monetary obligation and the corresponding means of payment. There are, however, jurisdictions with more restrictive rules that authorize exclusively the use of the national monetary unit and means of payment.

⁷¹ A State can also restrict the scope of legal tender status. For example, several laws limit the amount of banknotes and coins to be used in one transaction for the convenience of recipient parties or for AML purposes.

⁷² For example, Section 19 of the Central Bank of Liberia Act provides that: (1) “The Liberian Dollar shall be the currency of Liberia and legal tender” (2nd sentence); and (2) “Currency of the United States of America shall be legal tender in Liberia” (1st sentence).

⁷³ Over time, other legal rules have been added to legal tender rules, which make the legal status of legal tender status quite complex. For instance, many countries actually forbid cash payments over a certain amount (for tax and AML concerns). In some cases, payment of a large sum by coins is also forbidden.

book money and cheques.⁷⁴ Second, some banknotes do not enjoy legal tender status, but can still be considered as “currency.”⁷⁵

69. In respect of the possible legal tender status of CBDC, the following (“natural law”) question arises: is the sovereign’s power to attribute by legislation (“positive law”) legal tender status to a means of payment unlimited? The answer is open to discussion, but it is fair to say that the State can only meaningfully attribute legal tender status to a means of payment when that instrument is easily receivable by the vast majority of the population. (This explains why the legal tender status of banknotes and coins is so self-evident: basically, the entire population can accept these forms of payment, including the visually impaired through special braille features.) In other words, attributing legal tender status to a means of payment that cannot be received by the majority of the population might be legally possible but it raises fundamental questions, including from a fairness perspective.⁷⁶ This is recognized by countries that have attributed legal tender status to means of payment that are not currency: the designated group of creditors that are obligated to accept payment in the said means of payment must also take steps to ensure that payment can effectively be received.⁷⁷

70. This perspective of protecting disadvantaged social groups in the use of currency has also inspired countries and subnational entities to adopt consumer protection rules that restrict the freedom of merchants to contract away the right to pay in currency.⁷⁸ While this type of rules must be distinguished from legal tender proper, it has a similar—if not stronger—effect in that it grants the general public an almost absolute right to make payments in legal tender currency.

⁷⁴ This is, for instance, the case of the Belgian Royal Decree Nr. 56 of 10 November 1967 “to promote the use of book money.” Between merchants, payments in book money or cheque cannot be refused for amounts above 250 EUR (Art. 3).

⁷⁵ This is the case today of Scottish and Northern Irish banknotes issued by private banks.

⁷⁶ The Riksbank recently raised this issue clearly in the context of a discussion on declining usage of cash within the country. The Riksbank considers that there may be a need to make legal tender status technology-neutral, so that electronic means of payment issued by itself could also become legal tender. However, it also stressed the need to assess possible consequences of such legislation for the general public, including older people, disabled people and people who are financially or digitally excluded. See Riksbank, “The state’s role on the payment market” (2019) <https://www.riksbank.se/en-gb/press-and-published/notices-and-press-releases/press-releases/2019/the-riksbank-proposes-a-review-of-the-concept-of-legal-tender/>

⁷⁷ Art. 1 of the Belgian Royal Decree mentioned in footnote 60 requires all merchants to open a current account in the books of a bank and the account number must be mentioned on all invoices.

⁷⁸ Recently in the US, some municipalities (New Jersey, Philadelphia, New York City, and San Francisco) have introduced ordinances which prohibit certain retail businesses from declining acceptance of cash tendered by consumers.

Privileges under Private Law

71. The fourth legal mechanism through which States have officially sanctioned payment instruments is by granting them privileges under private law with a view to favor the circulation of “currency” relative to other possible means of payment.⁷⁹ However, currency is not the only means of payment that benefits from private law privileges: the check and bill of exchange, the original payment instruments, also enjoy certain privileges as “negotiable instruments.”⁸⁰ As mentioned in the introduction, a full discussion of these private law aspects goes beyond the scope of this paper, but it is important to bear this aspect in mind.

Criminal Law Protection

72. The State has protected officially sanctioned means of payment by imposing criminal law sanctions on those who counterfeit, damage, or destroy those instruments. So far, national as well as public international law focus on the suppression of counterfeit or altered banknotes and coins.

B. CBDC under Monetary Law

CBDC and Official Monetary Unit

73. In principle, the introduction of CBDC would change nothing in regard of a State/monetary union’s establishment of its official monetary unit. In other words, CBDC is not expected to be a new “currency unit.” When the definitions above refer to CBDC being a “new form of money,” they do not refer to this aspect of monetary law, irrespective of design features of CBDC. Rather, if the central bank is authorized to issue CBDC, the central bank will simply digitally issue a liability denominated in the official monetary unit, as are (almost) all its other monetary liabilities (banknotes and coins, book money and bills). This feature will also, in principle, guarantee constant convertibility at par of CBDC in other central bank monetary liabilities, in particular banknotes and book money (see below).

74. In theory, a country’s monetary law could establish a new, second monetary unit in which CBDC would be expressed. However, such legislation would also have to establish the mechanism for determining the exchange rate with the country’s existing monetary unit.

⁷⁹ As one example, Art. 2279, second para., of the Belgian civil code extends the good faith protection to the acquirer of banknotes issued by the central bank: the rule that allows a victim of loss or theft of a movable to revendicate during a 3 years period does not apply. As another example, Art. 14 of the Law on the Statute of the National Bank of Romania provides that “legal provisions regarding lost or stolen bearer certificates do not apply to banknotes and coins issued by the National Bank of Romania.” Art. 64 of the Law on the Central Bank of Mauritania has a similar provision.

⁸⁰ The Doctrine of Negotiable Instruments or similar doctrines (*valeurs mobilières*, *Wertpapiere*) basically enshrine the once revolutionary idea that contractual claims can be incorporated in a piece of paper and be transferred by, i.a., the mere physical transfer of that piece of paper—and thus depart from the fundamental rules and procedural requirements of the Roman law *cessio* (assignment).

Historical experience shows that the population is likely to consider and use the original monetary unit as the one monetary unit for their activities,⁸¹ which obviates the need for a second monetary unit. More generally, what would be the added value of establishing such a parallel domestic monetary unit? The formulation and execution of monetary policy would also unnecessarily be complicated by a purely domestic dual-currency system.

CBDC as Official Means of Payment

75. The fundamental question under monetary law is thus whether CBDC could be considered and established as an officially sanctioned means of payment, i.e. “currency”. The answer to that question will depend on the design features of CBDC.

Token-Based CBDC

76. *Issuance by the State* – Provided that the central bank law adequately authorizes its issuance, token-based CBDC is to be considered as a valid central bank liability. In such a case, token-based CBDC can unqualifiedly be considered as issued “on behalf of the State.”

77. The issue of whether the central bank is allowed to issue digital token-based currency immediately also raises the question whether the central bank should be the only entity authorized to issue such currency. This is discussed in more detail in Box 5.

⁸¹ This was the experience of Belgium, where from 1926 to 1946 the traditional *franc* and the newly introduced *belga* coexisted legally at a rate of 5 *francs* for 1 *belga*. In fact, the *belga* was never widely accepted, not even on the exchange markets. By habit and for convenience’s sake the Belgians continued to calculate in *francs* and never wanted to use the new name. See: <https://www.nbbmuseum.be/en/2007/03/belga.htm> Also in Brazil, during four months in 1994, two different monetary units coexisted as a step in the Real stabilization plan. At that time, the central bank published daily the conversion rates of the old monetary unit (Cruzeiro) to the new monetary unit (URV, acronym for “real unit of value” in Portuguese), up to the moment of the Cruzeiro’s extinction.

Box 5. Should Central Banks be Granted a Monopoly for the Issuance of Digital Currency?

As discussed above, many central bank laws grant to the central bank a legal monopoly for the issuance of banknotes. This monopoly entails a prohibition for anybody else (including commercial banks) to issue “bearer on demand” notes and coins that are akin to, and could be confused with, banknotes and coins issued by the central bank. Often, the law protects the central bank’s monopoly by imposing criminal law sanctions on the non-authorized issuance of notes or coins that resemble currency. For those rare cases where issuance of banknotes by private banks is still allowed, the central bank exercises firm oversight over such issuance.

Thus, if CBDC is to be equated with “currency,” the fundamental question arises as to whether central banks should similarly be granted the monopoly for the issuance of digital currency? This would mean that private issuers, and commercial banks in particular, would not be authorized to issue digital tokens that incorporate “bearer on demand” claims on currency. (Those tokens would be different from crypto-currencies such as Bitcoin, which do not incorporate such claims, and are legally more akin to a commodity.)

Whether a central bank monopoly for digital currency is desirable or appropriate, is ultimately a question of political and policy choice. This being said, the issuance of private digital tokens that resemble CBDC could give rise to very much the same problems, including a severely disrupted monetary system, caused in the 19th century by the issuance of banknotes by private banks that subsequently could not honor their obligations to convert those notes in real currency.

As a legal matter, extending the current issuance monopoly to digital currency is not complicated. The existing monopoly provisions need only be expanded to cover: “bearer on demand notes, in paper and any other material *or immaterial (including digital) form.*” Related criminal provisions will also need to be reviewed, as such provisions should be narrowly interpreted, under general principles of criminal law.

78. *Cours Forcé and Convertibility*—It will be very important to define legally what token-based CBDC exactly is. In contrast to central bank book money and bills, which are typically issued pursuant to a detailed contractual framework, the legal status of token-based CBDC will need to be established mainly by legislation. Legislation can grant token-based CBDC *cours forcé* status, similar to banknotes: the value of CBDC will be the amount that is digitally—how this can technically be achieved is another matter—attributed to the token.

79. Into which other central bank liabilities is token-based CBDC convertible? One would expect banknotes and token-based CBDC to be mutually fully convertible as “bearer on demand” claims on the central bank.⁸² Under most legal systems, this would be the case, absent specific rules to the contrary. This would of course pre-suppose that banknotes and token-based CBDC have the same value. In principle, this should be the case, unless token-based CBDC would carry interest. Whether that is legally possible is discussed in Box 6.

⁸² See *Central Bank Digital Currencies: Foundational Principles and Core Features*, p. 11.

Box 6. Can Token-based CBDC Carry Interest?

Economists have for long discussed the possibility of charging interest on banknotes. With CBDC, this question has regained interest. However, what is economically desirable is not necessarily legally feasible. From a central bank and monetary law perspective, the answer is not straightforward.

As long as central bank banknotes were (and in some legal systems still are) promissory notes, they could not carry a coupon and any interest would need to come from the price differential between face value and issue price (above or below par) at the time of issuance. Even though this is technically possible, it has never been put in practice: banknotes are always issued at par.

Since *cours forcé*, the value of banknotes and coins lays in the face value printed/minted upon the means of payment. As a legal matter, they do not any longer represent a loan of metallic coins camouflaged as a (irregular) deposit, but instead a *sui generis* legal relationship between holder and the issuing central bank. As contractual interest is legally the remuneration for a loan, without a loan there is no contractual interest. This makes it legally very questionable that banknotes can carry interest.

With respect to token-based CBDC, the question arises whether the digital nature of the “currency” changes anything to that conclusion? The answer lies in “first principles.”

In respect of the legal relationship that is embedded in the “currency,” token-based CBDC follows the same logic as banknotes with *cours forcé*: it is a means of payment for the amount of its face value. Making this form of “currency” subject to interest would break the link between face value and the actual value of the “currency.” This would make its use as a means of payment extremely difficult: how can token-based CBDC extinguish monetary obligations at face value if the real value is different in function of interest? The same problem would complicate convertibility of token-based CBDC in banknotes and central bank book money, and thus hinder its circulation. Similarly, to banknotes, charging interest on token-based CBDC does not appear to be a legally robust course of action.

This conclusion is different for account-based CBDC, where the charging of interest, including negative interest, would be legally possible if policymakers would wish to do so. The interest rate for account-based CBDC would be the same as for similar credit balances held on current account in the books of the central bank.

80. This conclusion is different for convertibility into central bank book money. For those central banks that are allowed to open current accounts in their books only for the State, public bodies and banks, the general public will not be authorized to convert token-based CBDC in central bank book money, but the authorized account holders will be.

81. *Legal Tender Status*—Legislation could in principle grant legal tender status to any means of payment, including token-based CBDC. However, does this make sense if large

parts of the population are not technically in a position to receive token-based CBDC as payment?⁸³ Moreover, to operationalize legal tender status would require the State imposing on its population the acquisition of the technical infrastructure to hold and transfer this form of “currency.” Such an approach might raise political as well as legal challenges, such as proportionality, fairness and other legal concerns (e.g., financial inclusion). An intermediate solution may be to grant legal tender status to token-based CBDC only for certain types of recipients, such as the State, public bodies and merchants beyond a certain size (in terms of balance sheet total or number of employees) or for certain private entities that are authorized to perform specific activities (e.g., banks).

82. *Private Law Privileges*—Since in most countries the private law legal status of token-based CBDC is unclear, this issue merits deeper analysis and discussion beyond this paper. As with banknotes, consideration could be given to granting to token-based CBDC a hybrid property law status, whereby this means of payment is considered as an intangible for some issues, and a tangible for others (e.g., *nemo plus* and conflict of laws rules).⁸⁴ However, the question also arises whether, if the technological infrastructure always allows for tracing (e.g. in a distributed ledger), token-based CBDC should not be considered as a full-fledged intangible, in which many of the private law privileges of banknotes make little sense.⁸⁵

83. The private law status of token-based CBDC is extremely important to determine whether such CBDC can be lent by its owner to a commercial bank. Such lending⁸⁶ is the legal basis for what in common language is mis-labelled a “bank deposit.” If that would be the case, token-based CBDC could be “deposited” on a bank account with a commercial bank and be deposited by the latter on its current account in the books of the central bank, so that the CBDC is fully integrated in the fractional reserve banking system. (For the account holder, this would of course transform his claim on the central bank into a claim on the commercial bank, as is the case with the “deposit” of banknotes today.) If this would not be the case, token-based CBDC would basically exist outside the banking system, which would have major monetary and financial implications. The problem is that legal traditions may struggle with countenancing a *mutuum*-type of lending for intangible goods. This issue will need to be thoroughly analyzed by monetary and private law specialists.

84. *Criminal Law Protection*—Most jurisdictions will not be able to apply their counterfeiting rules to token-based CBDC: current law focuses on material forms of currency (banknotes and coins) and criminal law incriminations must be interpreted narrowly,

⁸³ See also Banque de France, *o.c.*, p. 32.

⁸⁴ See Perkins, J., and Enwezor, J., *o.c.*, p. 570, who refer to “virtual choses in possession.”

⁸⁵ At the same time, it must be acknowledged that even banknotes can, up to a degree, be traced by a serial number, but this does not prevent the legal system from applying absolute protection to the *bona fide* acquirer.

⁸⁶ Lending in the Roman law sense of *mutuum*, not *commodatum*: the bank can use the currency lent and only needs to reconstitute a same amount of similar currency.

following the foundational criminal law principle that no crime exists and can be punished without a law (*nullum crimen, nulla poena sine lege*). The use of distributed ledger technology may ease this concern. This being said, cyber security law is an existing body of national and public international law, which could be used to regulate the digital counterfeiting of CBDC. This issue goes beyond the scope of this paper and needs to be further investigated by specialists. Annex III includes more details on this issue.

85. *Conclusion*—Under current law, it will be difficult to fully recognize token-based CBDC as an official means of payment, i.e., as “currency.” In that sense, it will be legally situated in the taxonomy of central bank monetary liabilities between, on the one hand, banknotes and coins (i.e. currency) and, on the other hand, bills. Well-designed token-based CBDC (including with the appropriate legal authorization for issuance) will certainly be able to circulate more widely and be used as a means of payment than central bank bills, but it is unlikely to attain, absent law reform, the same status as banknotes.

Account-Based CBDC

86. *Issuance by the State*—The issuance of account-based CBDC to banks raises few central bank law issues, and thus issued CBDC will be considered as a valid central bank liability. In the absence of a robust legal basis, the opposite would be true for account-based CBDC issued to the general public. This can, however, be remedied through targeted reform of the central bank law (see above).

87. *Cours Forcé and Convertibility*—As book money, account-based CBDC needs not be granted *cours forcé* status. In contrast to banknotes, the current accounts in the books of central banks are typically governed by detailed contractual rules (often called “current account rules”). By consequence, the central bank can stipulate in those contractual rules the convertibility of account-based CBDC to the extent special rules are needed. In general, there appears no argument why full convertibility into banknotes should not be allowed. The current account rules will also need to stipulate how account-based CBDC can be transferred to other account holders in the books of the central bank and, through the use of payments systems, to accounts in the books of commercial banks (thus transforming it into commercial bank book money), to effect payments.

88. *Legal Tender Status*—Central bank book money does not usually have legal tender status.⁸⁷ Thus, account-based CBDC need not be granted legal tender status, at least not as long as this means of payment is only used between financial institutions. This conclusion might be different for account-based CBDC issued to the general public, but the same principles apply as for token-based CBDC: while it is in theory legislatively possible to grant legal tender status to account-based CBDC, this raises fundamental fairness and public policy concerns if large parts of the population are technically not in a position (e.g., not in the

⁸⁷ An exception is Article 2 c) of the Swiss Federal Act on Currency and Payment Instruments.

possession of a computer or smartphone) to receive this type of CBDC as payment.⁸⁸ Legally, it may not be possible either, because the creditor without access to the technology cannot accept the payment even if he wants to.

89. *Private Law Privileges*—To grant privileges under private law to account-based CBDC would make little sense. The legal nature of book money is clear under private law: it is an intangible that is transferable through the banking technique of debits and credits of the accounts on which it is held. For intangibles, because of perfect traceability, there is no such thing as protection of the good faith acquirer and the *nemo dat* rule will apply. The conflict of laws treatment is similarly the same as for other intangibles (*lex contractus*).

90. There is, however, one element of private law that calls for attention. A creditor's action against a debtor's CBDC account may create a conflict with an existing protection for the central bank. The creditor may seek to attach a debtor's CBDC account balance, but the debtor's access device does not contain monetary value in itself. Rather, an attachment order issued by the court should thus be directed to the central bank to apply to the specific current account linked to the CBDC. However, central banks are often protected from such judicial actions, which are likely to interfere with central banks' mandate to facilitate smooth payments and settlements. Many central bank laws articulate this type of legal protection.⁸⁹ Should this protection from attachment also apply to accounts held by the general public and non-financial firms in the books of the central bank? While this question merits further consideration, at first sight the argument of financial stability does not apply.⁹⁰

91. *Criminal Law Protection*—As with token-based CBDC, the criminal law rules on counterfeiting will not apply: book money cannot be counterfeited—of course this does not prevent the application of criminal law on fraud. Yet another question is whether cyber security law would provide special protection to the integrity of the central banks' IT systems that are being used to issue this type of CBDC, for instance by criminalizing hacking.

92. *Conclusion*—Under current law, it will be difficult, but not impossible, to consider account-based CBDC as an official means of payment. Furthermore, it is hard to imagine how law reform can turn this digital claim on the central bank into “currency.” This is not a

⁸⁸ In Switzerland, this is solved by limiting the obligation to accept Swiss franc sight deposits at the Swiss National Bank in payment without restriction to “any person holding an account there” (Article 3.3). Moreover, “the National Bank shall specify the conditions under which institutions offering payment transaction services may maintain Swiss franc sight deposits” (Article 10).

⁸⁹ See for instance Article 9 of the Belgian “Settlement Finality Law” (of 28 April 1999), which prohibits attachment of a “settlement account of a designated (payment or settlement) system.” It is unlikely that current accounts held by the general public for account-based CBDC would qualify as such.

⁹⁰ If the central bank decides to give access to individuals and firms and attachment and garnishment of accounts in its books is prohibited, there is a real risk that recalcitrant debtors will open these accounts, which would be impossible to seize by creditors.

problem. In most countries, central bank book money plays today a central role in the monetary system without having currency status.

C. The Need for Monetary Law Reform

93. In contrast to central bank law, it will be much more challenging to remedy monetary law obstacles to CBDC. In particular, and in contrast to the need for central bank law reform, some of the issues mentioned below raise very fundamental and conceptual legal policy questions that will require careful analysis and discussion in policy preparation circles and within the competent political bodies. Moreover, as discussed above, the capabilities of a State to engage in monetary law reform to accommodate the issuance of CBDC may be constrained by provisions in the Constitution.

- ***Token-based CBDC***—To legally equate token-based CBDC with banknotes—to the extent this is even possible—will require significant monetary law reform. Countries will first need to consider whether this type of CBDC should and could be granted legal tender status. One option in this respect is to limit the legal tender status to a closed category of sophisticated entities (the State, public bodies and merchants beyond a certain size and/or firms with authorized activities, such as banks). ANNEX II contains draft provisions to this effect. As a next step, countries will need to analyze the private law classification of token-based CBDC and whether this new form of money should be given privileges under private law, in particular with a view to promote its circulation. As a third step the authorities would have to review the definitions of cybercrime offences so as to ensure that they clearly cover cybercrime offences against CBDC.
- ***Account-based CBDC***—At this stage, no monetary law reform is recommended for account-based CBDC.

V. CONCLUSIONS

94. CBDC raises important questions under central bank and monetary law. The legal treatment under those bodies of law will considerably depend on the design features of CBDC. At any rate, token-based and account-based CBDC are legally very different concepts and forms of money. Legally speaking, token-based CBDC would truly be a new form of money: a central bank liability incorporated in a digital token and transferred by transfer of that token. In contrast, account-based CBDC is not a new form of money, but merely book money expressed in digital form.

95. The issuance of CBDC should be founded on a robust, ideally explicit, legal basis in the central bank law. Absent such a basis, the issuance of CBDC may expose central banks to legal and political challenges. Applying textual, contextual, historical and purpose-based interpretation methods, the paper concludes that few central bank laws today offer a sufficiently strong legal basis.

- In respect of token-based CBDC, the question is whether central banks are legally authorized to issue this new type of liability incorporated in a digital token. Most central bank laws currently only authorize the issuance of currency in the form of (paper or plastic) banknotes and metallic coins, and not in the form of a digital token.
- As account-based CBDC is “book money,” it can only be offered to entities for whom the central bank is authorized to offer cash current accounts. Many central bank laws currently do not authorize the central bank to offer accounts to the general public.

In either case, this lack of legal basis can be remedied through rather straightforward amendments to the central bank law.

96. Even if the issuance of CBDC enjoys a sound legal basis under central bank law, its status under monetary law raises many complex issues. Importantly, neither form of CBDC would constitute a “new monetary unit.” Rather, CBDC would be a form of a means of payment expressed in the official monetary unit. Hence, this paper focuses on the inherent capability of CBDC to acquire the status of *official* means of payment, i.e. currency.

97. In that regard, token-based CBDC raises many questions. Under current law, it would in most countries not qualify as currency, as this legal category is hitherto typically reserved to physical banknotes and metallic coins. In theory, monetary law could through law reform establish token-based CBDC as currency, but this will be subject to a number of challenges and complexities.⁹¹

- First, allocating to it legal tender status—which admittedly is not a *sine qua non*—is not obvious as long as broad layers in the population are not in a position to technically receive such a means of payment.
- Second, because token-based CBDC has no clear status under private law, it will be difficult to extend to it the private law privileges that legal systems attribute to currency with the aim to promote its circulation.
- Third, providing criminal law protection against electronic counterfeiting will raise fundamental questions, including whether electronic counterfeiting is a legal concept that fits into the broader criminal law system.

By consequence, even if token-based CBDC were to be legislatively labelled “currency,” it is doubtful that it will be able to fully enjoy the same privileged legal status as traditional currency in the broader legal system. This is not *per se* problematic, as in many countries,

⁹¹ Rogoff, K., *The Curse of Cash*, 2016, p.213.

commercial bank book money is the most widely used means of payment, despite the fact that legally it does not qualify as currency.

98. In turn, account-based CBDC is actually not currency at all. There is nothing wrong with that—it would have the same legal status as other central bank book money, which as risk free asset plays an important role in the financial system. Therefore, no reforms to monetary law legislation are necessary to make this form of book money legally operational.

99. Finally, the “meta-message” of the paper is that countries should carefully consider the legal foundations of CBDC when and if they decide to introduce this digital means of payment. In some jurisdictions, there will be an ostensibly easier route of simply providing broad interpretations to existing legal provisions. However, a comprehensive review of the central bank and monetary law framework will ensure that the legal aspects of the intended public policy choices are well understood and codified in law. Ideally, this exercise takes place within a broader endeavor to also review other legal issues, including (but not limited to) private law and tax law.

ANNEX I: DRAFT CENTRAL BANK LAW PROVISIONS RELATED TO CBDC**Central Bank Functions***Art. Xx. Functions*

With a view to achieving its objectives, the Central Bank has the following functions:

- i. to define and implement monetary policy;
- ii. ...
- iii. to issue currency;
- iv. to promote a sound and efficient payment system;
- v.

Central Bank Powers*Art. Xx. Currency*

The Central Bank is authorized to issue banknotes, coins and currency in digital form.

[Art. Xx. Powers Ancillary to the Issuance of Currency

The Central Bank is authorized to produce, acquire, distribute, withdraw and destroy banknotes, coins and currency in digital form and to adopt measures to ensure the storage of value and transaction processing of currency in digital form.]

Art. Xx. Current Accounts

The Central Bank is authorized to open current and other accounts in its books for the State, public bodies, banks, and other categories of accountholders established by the [Executive Board/Board of Directors].

The credit balances on those accounts may be remunerated.

ANNEX II: DRAFT MONETARY LAW PROVISIONS RELATED TO CBDC*Art. Xx. Legal Tender of Currency*

The banknotes and coins issued by the Central Bank are legal tender in [name country].

The currency issued by the Central Bank in digital form is legal tender for payment of monetary obligations to the State, municipalities, banks and [to be determined]. The Government is authorized to expand these entities by Decree.

Art. Xx. Monopoly of Issuance of Currency

The Central Bank has the sole right of issuing metallic coins and bearer on demand notes, in paper and any other material *or* immaterial (including digital) form.

Any person or entity who issues coins, bearer on demand notes, in paper and any other material or immaterial (including digital) form, or any other document or token which is likely to pass as currency or means of payment will be punishable by [TBC].

[This provision applies without prejudice to the issuance of electronic money pursuant to {legislation}.]

ANNEX III. CRIMINAL LAW AND CBDC

So far national laws only focus on the suppression of counterfeit banknotes and coins; i.e. not explicitly on the counterfeiting of CBDC.

Box 1. National Law on Counterfeiting and Mutilating Legal Tender

Whereas the definition of counterfeiting and the appropriate sanctions are commonly set out in criminal codes, various central bank laws do contain relevant provisions, as the following example of Article 64 of the Organic Constitutional Law of the Central Bank of Chile (as amended) demonstrates: “Whoever manufactures or sets in circulation objects whose shape resembles banknotes of legal tender in a manner that such forged banknotes are easily accepted in place of the real ones, shall be penalized with 541 days to 5 years of imprisonment.”

Various countries also have criminal law provisions prohibiting the mutilation of banknotes and coins. This is to protect issued legal currency. For example, in the USA 18 USC 333 prescribes criminal penalties against anyone who “mutilates, cuts, defaces, disfigures or perforates, or unites or cements together, or does any other thing to any bank bill, draft, note...”. Similarly, Section 28(1) of the Reserve Bank of New Zealand Act provides that “no person shall, without the prior consent of the Bank, willfully deface, disfigure or mutilate any banknote”. A contravention of this probation qualifies as an offence and makes the perpetrator liable on conviction to a fine not exceeding \$ 1000.

The same focus on the suppression of counterfeit banknotes and coins is found in public international law.

Box 2. Geneva Convention for the Suppression of Counterfeiting

The Geneva Convention for the Suppression of Counterfeiting of April 20, 1929 aims to harmonize the national criminal substantive law elements of offences in counterfeiting. This Convention is still in force.

Article 2 of the Convention defines currency to mean “paper money (including banknotes) and metallic money, the circulation of which is legally authorized”.

Article 3 provides that member countries should ensure that the following acts are punishable as ordinary crimes:

- (i) the fraudulent making or altering of currency, whatever means are employed, (ii) the fraudulent uttering of counterfeit currency,
- (iii) introducing, receiving, or obtaining currency with a view to uttering the same and with knowledge that it is counterfeit,
- (iv) attempts to commit, and intentional participation in the foregoing and
- (v) the fraudulent making, receiving or obtaining of instruments or other article peculiarly adapted for counterfeiting or altering currency.

Each of the aforementioned acts should be considered as a distinct offence if they are committed in different countries.

The Convention also establishes a mechanism for international cooperation against counterfeiting. Article 12 requires the member countries to centralize, within the framework of their domestic laws, investigations about counterfeiting in a Central Office. Such central office must be in close contact with the central bank issuing currency, the national police and the Central Offices in other countries. ICPO-Interpol acts as the International Central Office for the Suppression of Currency Counterfeiting (Article 15).

An important point is that the counterfeiting provisions in central bank laws (or criminal laws) do not explicitly address cybercrimes affecting digital currencies. Nevertheless, cyber security law is an existing body of law which could—with due observance of the principle of *nullum crimen sine lege, nulla poena sine lege*—be used to regulate digital counterfeiting of CBDC. Indeed, on November 23, 2001 the Council of Europe adopted the first international treaty on cybercrime: the Budapest Convention on Cybercrime.⁹²

⁹² European Treaty series No. 185. The Convention has been signed and ratified primarily by member countries of the Council of Europe, but it is open for accession by non-member countries. As a result, a number of important non-members such as Australia, Canada, Israel, Japan and the USA have also signed and ratified this Convention.

Box 3. Budapest Convention on Cybercrime

Like the Geneva Convention, the Budapest Convention aims to harmonize the national criminal substantive law elements of offences in cybercrime and it also establishes a mechanism for international cooperation against cybercrime.⁹³ The Budapest Convention does not explicitly mention offences against central bank digital currencies.

However, it lists several offences which consist in interfering with, the misuse of, forgery, or fraud related to computer data. Article 1 of the Budapest Convention defines computer data to mean “any representation of facts, information or concepts in a form suitable for processing in a computer system, including a program suitable to cause a computer system to perform a function”. This definition could reasonably be taken to include data incorporated in a central bank digital currency. Therefore, the following substantive criminal law offences, which are harmonized by the Budapest Convention, are drafted in a broad manner and are therefore particularly relevant to the forgery, fraud and interference with central bank digital currencies:

- (i) intentionally damaging, deleting, deteriorating, altering or suppressing computer data without right (Article 4),
- (ii) Intentionally (seriously) hindering without right the functioning of a computer system by inputting, transmitting, damaging, deleting, deteriorating, altering or suppressing computer data (Article 5),
- (iii) intentionally producing, selling, procuring for use, import, distribution or otherwise making available devices, including computer programs, designed or primarily adapted for the purpose of cybercrime (Article 6),
- (iv) committing intentionally and without right, the input, altering, deletion, or suppression of computer data, resulting in inauthentic data with the intent that it be considered or acted upon for legal purposes as if it were authentic, regardless whether or not the data is directly readable and intelligible (computer-related forgery) (Article 7),
- (v) causing the loss of property to another person by any input, alteration, deletion or suppression of computer data (computer-related fraud) (Article 8), and
- (vi) the infringement of copyright and related IP rights (Article 10).

Note that the wording of the cybercrime offences is broad enough so that it does not seem necessary to define mutilation as a criminal offence (as is the case for legal tender banknotes and coins). Indeed, the wording of “intentionally damaging, deleting, deteriorating, altering or suppressing computer data without right” in Article 4 would cover intentional mutilation of central bank digital currency.

⁹³ ICO-Interpol’s Global Cybercrime Strategy for 2016 to 2020 outlines the organization’s support to member countries to combat cybercrime by coordinating and delivering specialized police capabilities in this regard.

While the wording of the Budapest Convention's cybercrimes is in principle broad enough to cover offences to CBDC, the principle of *nullum crimen sine lege, nulla poena sine lege* would require the authorities to precisely define the cybercrime offences against CBDC. Therefore, most jurisdictions will not be able to apply their counterfeiting rules to token-based CBDC. Also, as already noted, the criminal law rules on counterfeiting will not apply to account-based CBDC as book money cannot be counterfeited. Of course, cyber security law could provide special protection to the integrity of the central banks' IT systems that are used to issue this type of CBDC.

REFERENCES

- ADB Institute, 2019, *Central Bank Digital Currency and Fintech in Asia*.
- Allen, J., 2019, Property in Digital Coins, 8(1) *European Property Law Journal*, 64.
- Allen, J., and Lastra, R., 2019, Virtual Currencies in the Eurosystem: Challenges Ahead, *The International Lawyer*, Vol. 53, No. 2.
- Allen, J., and Lastra, R., 2020, Border Problems: Mapping the Third Border, *Modern Law Review*, 83(3).
- Auer, R., and Bohme, R., 2020, *The Technology of retail central bank digital currency*, BIS.
- Auer, R., Cornelli, G, and Frost, J., 2020, *Rise of the Central Bank Digital Currencies: Drivers, Approaches and Technologies*, BIS, WP No. 880.
- Bank of Canada, ECB, Bank of Japan, Sverige Riksbank, Swiss national bank, Bank of England, Board of Governors of the Federal Reserve System and BIS, 2020, *Central Bank Digital Currencies: Foundational Principles and Core Features: Report No. 1 in a series of collaborations from a group of central banks*.
- Banque de France, 2020, *Central Bank Digital Currency*.
- Barontini, C., and Holden, H., 2019, *Proceeding with Caution-a Survey on Central Bank Digital Currency*, BIS Papers No. 101.
- Bech, M., and Garratt, R., 2017, *Central Bank Cryptocurrencies*, BIS Quarterly Review.
- Bossu, W., and Rossi, A., 2019, *The Role of Board Oversight in Central bank Governance: Key Legal Design Issues*, WP/19/293.
- Carstens, A., 2019, *The Future of Money and Payments*, Central Bank of Ireland 2019 Whitaker Lecture.
- CPMI, 2018, *Central Bank Digital Currencies*, BIS.
- Fox, D., and Green, S., (eds.), 2019, *Cryptocurrencies in Public and Private Law*, Oxford University Press.
- Gnan, E., and Masciandaro, D., 2018, *Do We Need Central Bank Digital Currency? Economics, Technology and Institutions*, SUERF.
- Goodhart, C., 1985, *The Evolution of Central Banks*, MIT Press.
- Hahn, H. and Häde, U., 2010, *Währungsrecht*.
- IMF Staff, 2018, *Casting Light on Central Bank Digital Currency*, IMF, SDN/18/08.

- IMF Staff, 2020, *A Survey of Research on Retail Central Bank Digital Currency*, WP/20/104.
- IMF Staff, *Digital Money Across Borders: Macro-Financial Implications*, IMF, 2020.
- Jacqué, J.P., 2010, *Droit Institutionnel de l'Union Européenne*.
- Kahn C, 2016, *How are payments accounts special?*, Federal Reserve Bank of Chicago.
- Lastra, R., 2006, *Legal Foundations of International Monetary Stability*, Oxford University Press.
- Lastra, R., 2015, *International Financial and Monetary Law*, Oxford University Press.
- Mann, F., *The Legal Aspect of Money*, 4th Ed.
- Perkins, J., and Enwezor, J., 2016, The legal aspect of virtual currencies, *Butterworths Journal of International Banking and Financial Law*, November 2016.
- Riksbank, 2019, *The state's role on the payment market*.
- Rogoff, K., 2016, *The Curse of Cash*.
- Shirai, S., 2019, *Central Bank Digital Currency: Concepts and Trends*, VOX CEPR Policy Portal, 6 March 2019.
- Smits, R., 1995, *The European Central Bank Institutional Aspects*.
- Waerzeggers, C., and Aw, I., 2019, Difficulties in Achieving Neutrality and other Challenges in Taxing Crypto Assets, in Chris Brummer, ed, *Cryptoassets: Legal, Regulatory and Monetary Perspectives*, New York: Oxford University Press.
- Zilioli, C., 2020, Crypto-assets: Legal Characterization and Challenges under Private Law, 46 *EL Review*.