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Cash, Accounts, and Central Bank Digital Currencies – A Transatlantic View on the Digitization of Retail Central Bank Money

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Abstract

The introduction of central bank money is actively considered in the United States and the Eurozone. This paper explores different design features of retail CBDC, compares them to incumbent forms of money and discusses legal questions regarding the implementation from a U.S. and European perspective.

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1. Introduction[1]

For the last couple of years, "crypto-assets" or "crypto-currencies" have attracted considerable interest in legal research. This is partly due to the fact that crypto-assets like Bitcoin are sometimes described as new, digital forms of money; in this context, their economic function as money as well as their overall effect on national economics are highly debated.[2] However, crypto-currencies are only one example of (potential) forms of money that do not possess – like coins and banknotes – a physical manifestation; digital (or, one might say, intangible) forms of money have existed for a long time, the most prominent example being "book money" commonly held in commercial bank accounts. Among the more recent developments in the ambit of the "digitization" of money are initiatives of private companies to issue their own forms of digital "currency" – here, special reference is to Facebook's/Meta's attempt to create a digital currency called libra/Diem[3] – as well as the debate on the introduction of so-called central bank digital currencies (CBDC). The introduction of CBDC is currently

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[1] This research is also connected to the project "Rechtsrahmen für Central Bank Digital Currencies in Österreich" (Legal framework for Central Bank Digital Currencies in Austria) which is funded by the Austrian National Bank's (OeNB) Jubliäumsfonds.

[2] *See*, *e.g.*, Board of Governors of the Federal Reserve System, *Financial Stability Report* 45-46 (2022), *available at* https://www.federalreserve.gov/publications/financial-stability-report.htm; *Bank of England*, Central Bank Digital Currency 7-8 (2020), *available a*t https://www.bankofengland.co.uk/-/media/boe/files/paper/2020/central-bank-digital-currency-opportunities-challenges-and-design.pdf; ECB, *Virtual Currency Schemes* 21-27 (2012), *available at* https://op.europa.eu/en/publication-detail/-/publication/71c215f0-8624-46ab-8f47-23c965f8253d/language-en/format-PDF/source-276521781; ECB, *Virtual Currency Schemes – a further analysis* 14-29 (2015), *available at* https://op.europa.eu/en/publication-detail/-/publication/96fe84e9-3d29-4790-a1a4-d89218c244ac/language-en; ECB Crypto-Asset Task Force, *Crypto-Assets: Implications for financial stability, monetary policy, and payments and market infrastructures* 7-28 (Occasional Paper Series No 223, 2019*), available at* https://www.ecb.europa.eu/pub/pdf/scpops/ecb.op223~3ce14e986c.en.pdf; *see also*, *e.g.*, Saifedean Ammous, *Can cryptocurrencies fulfil the functions of money?*, 70 The Quarterly Rev. of Econ. and Fin. 38 (2018); Sheila Dow, *Monetary Reform, Central Banks, and Digital Currencies*, 48 Int'l J. of Political Econ. 153 (2019); David Yermack, *Is Bitcoin a Real Currency? An Economic Appraisal* in *Handbook of Digital Currency: Bitcoin, Innovation, Financial Instruments, and Big Data* 31 (David Lee Kuo Chuen, ed. 2015).

[3] https://www.diem.com/en-us/updates/stuart-levey-statement-diem-asset-sale/ (last visited Dec. 2, 2022).

considered by central banks worldwide.[4] However, there remain several terminological and conceptual ambiguities regarding the different ways how a CBDC could be implemented. These ambiguities also complicate the legal assessment of a particular CBDC design. Therefore, the present paper discusses different terminological aspects of proposed retail CBDC models against the background of the status quo in the United States and the Eurozone, compares them to incumbent forms of money and considers their introduction from a legal perspective.

2. Terminological approaches to CBDC

CBDC are generally understood as a digital form of central bank money.[5] Apart from this baseline, a diverse terminology has developed to describe the various implementation models. On the one hand, one typically distinguishes between retail (or general purpose) CBDC and wholesale CBDC; retail CBDC is digital central bank money available to the general public, while wholesale CBDC would only be accessible to certain (financial) institutions.[6] On the other hand, one distinguishes between token-based (or value-based) CBDC and account-based CBDC. The distinction between these two forms of CBDC can be looked at from different angles; typically, the literature relies on at least three criteria that are, naturally, interrelated and possess several overlaps:

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[4] *See*, *e.g.*, ECB, *Report on a Digital Euro* (2020), *available at* https://www.ecb.europa.eu/pub/pdf/other/Report_on_a_digital_euro~4d7268b458.en.pdf; Board of Governors of the Federal Reserve System, *Money and Payments: The U.S. Dollar in the Age of Digital Transformation* (2022), *available at* https://www.federalreserve.gov/publications/money-and-payments-discussion-paper.htm; for an overview of several initiatives *see* Raphael Auer et al., *Rise of the central bank digital currencies: drivers, approaches and technologies* (BIS Working Papers No 880, 2020).

[5] *Cf.* Phoebus Athanassiou, *Digital Innovation in Financial Services* 185 (2018). *See also* ECB, *Report on a Digital Euro*, *supra* at 6 („In this report, the term digital euro denotes a liability of the Eurosystem recorded in digital form as a complement to cash and central bank deposits“).

[6] BIS, *Central bank digital currencies: foundational principles and core features* 3 (2020), *available at* https://www.bis.org/publ/othp33.htm; U.S. Department of the Treasury, *Future of Money and Payments* 4-5 (2022), *available at* https://home.treasury.gov/system/files/136/Future-of-Money-and-Payments.pdf.

First, one can refer to the CBDC holder's legal position: Account-based CBDC involve an "account-relationship" between the account holder and central bank; such a relationship would not exist in a token-based system.[7] Second, one can highlight the process of verification of payment and identification of the payer: While token-based money relies on the payee's ability to verify the validity of the payment object, account-based money depends on the ability to verify the account holder's identity.[8] An account-based system implies that the user's holding would be recorded by a third party that would also determine the validity of transactions and update the respective balances;[9] in turn, a token-based system ("bearer CBDC") means that all payment devices would require users to validate their identities by the use of technical means.[10] Account-based systems would include both centralized issuance and settlement of the CBDC, whereas in case of token-based CBDC, the settlement leg could remain decentralized with a centralized issuance and destruction of CBDC units.[11] The central bank would not offer custodial or transfer services for token-based CBDC, so that other commercial entities could step in to provide these services.[12] Third, one can put emphasis on the storage of data: In an account-based system, the data are stored in a central register and transfers require an amendment of the register; in contrast, a token-based system – also referred to as an "(electronic) note-based payment system" –

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[7] Wouter Bossu et al., *Legal Aspects of Central Bank Digital Currency: Central Bank und Monetary Law Considerations* 9, 12-13 (IMF Working Paper WP/20/254, 2020); *see also* ECB, Report on a digital euro, *supra* at 25.

[8] BIS, *Central bank digital currencies* 4 (2018), *available at* https://www.bis.org/cpmi/publ/d174.htm; *see also* Raphael Auer & Rainer Böhme, *The technology of retail central bank digital currency*, BIS Quarterly Review 85, 88 (March 2020); Bossu et al., *supra* at 11.

[9] *See also Athanassiou*, Digital Innovation, *supra* at 209 (focusing on the finality of payments and the central banks' corresponding liability risks).

[10] ECB, *Report on a digital euro*, *supra* at 29-30; *see also id*. at 29 n. 52 (highlighting that a "bearer digital euro" would not necessarily have to be based on a DLT).

[11] Hossein Nabilou & André Prüm, *Central Banks and Regulation of Cryptocurrencies*, Rev. of Banking & Fin. L. 1003, 1090 (2019-2020).

[12] Iris H. Y. Chiu, *Building out the crypto economy in Europe: a proposal for central bank digital* euros, 46 E.L. Rev. 435, 449 (2021).

would store the data locally (*e.g.*, in an app or on a card).[13] In this light, token-based CBDC are often associated with a physical device that must be used to transfer the digital tokens.[14] At the same time, decentralized circulation of CBDC tokens is often associated with the anonymity payments.[15]

Finally, one can distinguish single-tier and two-tier CBDC architectures, depending on whether a particular CBDC model involves intermediaries. Under a single-tier model, the central bank would be responsible for the ongoing management of the CBDC, interacting directly with the public.[16] In contrast, under a two-tier model, the central bank issues and redeems the CBDC; intermediaries (such as commercial banks) would be entrusted with the distribution of the CBDC and payment services.[17] Sometimes, this model is instead referred to as a "hybrid model", the two-tier form of CBDC ("synthetic CBDC") being understood as a liability which is issued by a commercial bank but which is at the same time fully backed with central bank liabilities.[18] However, a "synthetic CBDC" of this type would not – for the absence of a claim on the central bank – constitute a proper form of CBDC.[19]

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[13] Rosa María Lastra & Jason Grant Allen, *Virtual currencies in the Eurosystem: challenges ahead* 42 (2018), *available at* https://www.europarl.europa.eu/thinktank/en/document/IPOL_STU(2018)619020; *see also* Athanassiou, *Digital Innovation*, *supra* at 187.

[14] Banque de France, *Central Bank Digital Currency* 21 (2020) ("In token form, where digital currency units are linked to a physical medium, which may be, but does not have to be, dedicated (e.g. mobile phone, hard drive or payment card), and which characterises ownership"), *available at* https://publications.banque-france.fr/sites/default/files/media/2020/02/04/central-bank-digital-currency_cbdc_2020_02_03.pdf.

[15] Ulrich Bindseil, *Central Bank Digital Currency: Financial System Implications and Control*, 48 Int'l J. of Political Econ. 303, 304 (2019).

[16] U.S. Department of the Treasury, *Future of Money and Payments*, *supra* at 22-23 (underlining new AML/CFT obligations for the central bank).

[17] U.S. Department of the Treasury, *Future of Money and Payments*, *supra* at 23.

[18] Bossu et al., *supra* at 10.

[19] *BIS, Central bank digital currencies: foundational principles*, *supra* at 4 (describing this model as a form of "narrow-bank" money).

3. A brief overview of CBDC-related activities

Both in the United States and the Eurozone, CBDC are currently in what might be called a period of exploration and investigation. One the one hand, the Fed maintains that it "has made no decisions on whether to pursue or implement a central bank digital currency […]".[20] On the other hand, the ECB states: "Before taking a decision on whether to issue a digital euro we need to decide on its potential design and test its ability to meet the needs of end users. A number of steps will need to be taken before a digital euro can be introduced."[21] However, there is no doubt that the introduction[22] of CBDC is actively considered on both sides of Atlantic:

The Fed published a paper on the matter in early 2022.[23] While the Fed considers the U.S. payment system as "generally effective and efficient", it is considering "how a CBDC might fit into the U.S. money and payments landscape", thereby considering a "wide range" of possible design options.[24] Currently, the Fed plans to explore a CBDC that is "privacy-protected, intermediated, widely transferable, and identity-verified"[25] while highlighting that a digital dollar should be available to the general public.[26] At the same time, the Fed invited comments on the potential introduction of a U.S. CBDC.[27] Recently, the White House's Office of Science and Technology Policy

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[20] Board of Governors of the Federal Reserve System, *Central Bank Digital Currency (CBDC)*, https://www.federalreserve.gov/central-bank-digital-currency.htm (last visited Dec. 2, 2022); *see also* Board of Governors of the Federal Reserve System, *Money and Payments*, *supra* at 13.

[21] ECB, *FAQs on the digital euro*, https://www.ecb.europa.eu/paym/digital_euro/faqs/html/ecb.faq_digital_euro.en.html (last visited Dec. 2, 2022).

[22] As there are already central bank (wholesale) accounts, digital central bank money technically already exists, *cf.* Athanassiou, *Digital Innovation*, *supra* at 186; Bindseil, *supra* at 304; Bossu et al., *supra* at 41; Nabilou & Prüm, *supra* at 1003 (1088 f).

[23] Board of Governors of the Federal Reserve System, *Money and Payments*, *supra*.

[24] Board of Governors of the Federal Reserve System, *Money and Payments*, *supra* at 8 (referring to problems of financial inclusion and cross-border payments, however), 13.

[25] Board of Governors of the Federal Reserve System, *Money and Payments*, *supra* at 13.

[26] Board of Governors of the Federal Reserve System, *Money and Payments*, *supra* at 13.

[27] Board of Governors of the Federal Reserve System, *Money and Payments*, *supra* at 21.

published a technical report on the possible introduction of a U.S. CBDC[28] and the Department of the Treasury issued a report on the future of money and payments.[29]

In 2020, the ECB laid down its understanding and possible perspectives of a digital euro, focusing on a design of a "digital euro for use in retail transactions available to the general public",[30] as well as the potential role of intermediaries.[31] In 2022, the ECB confirmed that focus is put on retail CBDC[32] as well as the integration of intermediaries.[33] Also, the ECB highlights that two transfer mechanisms will be further explored: First, transactions that are made online and validated by a third party ("online third-party validated solution") and second, peer-to-peer validation of offline transactions ("offline peer-to-peer validated solution");[34] however, the first solution should not be delayed by the potential unfeasibility of the second.[35] The ECB announces that it "will review the overall design of a possible digital euro next year, once all choices have been made", also hinting at a possible move to a realization stage

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[28] Office of Science and Technology Policy, *Technical Evaluation for a U.S. Central Bank Digital Currency System* (2022), *available at* https://www.whitehouse.gov/wp-content/uploads/2022/09/09-2022-Technical-Evaluation-US-CBDC-System.pdf.

[29] U.S. Department of the Treasury, *Future of Money and Payments*, *supra*.

[30] ECB, *Report on a digital euro*, *supra* at 6.

[31] ECB, *Report on a digital euro*, *supra* at 36 et seq.

[32] ECB, *Progress on the investigation phase of a digital euro* 2 (2022) *available at* https://www.ecb.europa.eu/paym/digital_euro/investigation/governance/shared/files/ecb.degov220929.en.pdf (last visited November 15, 2022) ("A digital euro would be an electronic means of payment for retail payments, issued by the central bank and accessible to everyone in the euro area"); *see also* ECB, *The case for a digital euro: key objectives and design considerations* 1 (2022), *available at* https://www.ecb.europa.eu/pub/pdf/other/key_objectives_digital_euro~f11592d6fb.en.pdf.

[33] ECB, *The case for a digital euro*, *supra* at 2 ("[A digital Euro] would accompany the ongoing digital transition by leveraging synergies with the private sector. For instance, by allowing intermediaries to offer innovative services based on the digital euro, it would make it easier for payment solutions to be quickly scaled up to cover the entire euro area and for smaller firms to offer more technologically advanced services at competitive prices"). *See also* Fabio Panetta, *Building on our strengths: the role of the public and private sectors in the digital euro ecosystem* (speech given at Sept. 29, 2022), https://www.ecb.europa.eu/press/key/date/2022/html/ecb.sp220929~91a3775a2a.en.html (last visited Dec. 2, 2022) („The intermediaries that would distribute the digital euro have in-depth knowledge and unique insights into what users need. They are thus best placed to be the direct counterparts for the individuals, merchants and businesses that would use the digital euro. These intermediaries would open accounts and wallets. They would conduct know your customer and anti-money laundering checks. And they would provide the devices or technology needed to pay in physical stores, online or person to person").

[34] ECB, *Progress on the investigation phase*, *supra* at 5.

[35] ECB, *Progress on the investigation phase*, *supra* at 6.

in the following.[36] Nevertheless, this would not imply a decision on the introduction of a digital euro.[37] In parallel, the European Commission launched the initiative "A digital euro for the EU".[38] It plans to make a proposal for a regulation on the digital euro in 2023.[39]

4. Legal background of money in the United States and the Eurozone

4.1. General remarks

From an economic perspective, "money" is generally defined by three main characteristics: It functions as a means of payment, as a unit of account and a store of value.[40] From a legal perspective, the term "money" has not, neither in the U.S. or the EU, received a uniform definition. Whereas assets like bank deposits and bitcoins might be understood as "money" in certain contexts, the same might not be true in other contexts; here, it is important to distinguish economic and legal concepts, while there exist different conceptions of "money" also within the legal order. Thus, what can be considered money depends on the context one is referring to (*e.g.*, law of contracts, property, tax law or constitutional law).[41] For instance, the Uniform Commercial Code (UCC) contains a special definition of "money".[42] The act addresses bank deposits and collections as well as funds transfer in its articles 4 and 4A.

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[36] ECB, *Progress on the investigation phase*, *supra* at 10; Panetta, *Building on our strengths*, *supra*.
[37] ECB, *Progress on the investigation phase*, *supra* at 10.
[38] European Commission, *A digital euro for the EU* https://ec.europa.eu/info/law/better-regulation/have-your-say/initiatives/13392-A-digital-euro-for-the-EU_en (last visited Dec. 2, 2022).
[39] European Commission, *Call for Evidence for an impact assessment* 1 (Ares(2022)2567612), *available at* https://ec.europa.eu/info/law/better-regulation/have-your-say/initiatives/13392-A-digital-euro-for-the-EU_en.
[40] *See*, *e.g.*, John J. Chung, *Money as Simulacrum: The Legal Nature and Reality of Money*, 5 Hastings Bus. L. J. 109, 111 et seq. (2009); Dow, *supra* at 153. *See* for a detailed account Charles Proctor, *Mann on the Legal Aspect of Money* 7 et seq. (7th ed. 2012).
[41] *Cf.* Bossu et al., *supra* at 8.
[42] UCC § 1-201(b)(24); according to this provisions, money "means a medium of exchange currently authorized or adopted by a domestic or foreign government. The term includes a monetary unit of account established by an intergovernmental organization or by agreement between two or more countries".

Furthermore, important rules on electronic fund transfers are contained in the Electronic Funds Transfer Act of 1978.[43] In the EU, an important instrument of secondary law dealing with the different forms of money is the PSD II;[44] this directive is fundamentally based on the definition of "payment transactions" (art. 4(5) PSD II) which in turn rests on the definition "funds" (art. 4(25) PSD II) which means "banknotes and coins, scriptural money or electronic money". The E-Money-Directive II lays down the conditions for the activity of issuing "electronic money".[45]

On a general level, one can distinguish between central bank money, commercial bank money and nonbank money.[46] While the legal assessment of the different types of money can vary according to the applicable private law, commercial bank money (also scriptural money; book money) is generally understood as a claim against a bank, typically not entailing a property right in specific physical banknotes or coins.[47] In contrast, central bank money is generally defined as a liability of a central bank (Fed, ECB).[48] Both in the U.S. and the Eurozone, central bank money exists in the form of accounts at the central bank and physical currency (banknotes and coins); while the first is only available for certain institutions (especially banks), cash can be used by the

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[43] Pub. L. No. 95-630, 92 Stat. 3641; *see* especially 15 U.S.C. § 1693 et seq.

[44] Directive (EU) 2015/2366 of the European Parliament and of the Council of 25 November 2015 on payment services in the internal market, amending Directives 2002/65/EC, 2009/110/EC and 2013/36/EU and Regulation (EU) No 1093/2010, and repealing Directive 2007/64/EC, 2015 O.J. (L337) 35-127.

[45] Directive 2009/110/EC of the European Parliament and of the Council of 16 September 2009 on the taking up, pursuit and prudential supervision of the business of electronic money institutions amending Directives 2005/60/EC and 2006/48/EC and repealing Directive 2000/46/EC, 2009 O.J. (L267) 7-17; according to article 2(2), eletronic money „means electronically, including magnetically, stored monetary value as represented by a claim on the issuer which is issued on receipt of funds for the purpose of making payment transactions as defined in point 5 of Article 4 of Directive 2007/64/EC, and which is accepted by a natural or legal person other than the electronic money issuer."

[46] Board of Governors of the Federal Reserve System, *Money and Payments*, *supra* at 25-26.

[47] *Cf.* Bossu et al., *supra* at 8, 12. *See also* Jess Cheng & Joseph Torregrossa, *A Lawyer's Perspective on U.S. Payment System Evolution and Money in the Digital Age,* (FEDS Notes 2022), https://www.federalreserve.gov/econres/notes/feds-notes/a-lawyers-perspective-on-us-payment-system-evolution-and-money-in-the-digital-age-20220204.html (last visited Dec. 2, 2022).

[48] This does not mean that that the holder of a banknote has a private law claim against the central bank; *cf.* on the legal nature of banknotes Proctor, *Mann on the Legal Aspect of Money*, *supra* at 769-770; Hans Weenink, *The legal nature of Euro banknote*s, 18 J.I.B.L.R. 433, 437 (2003).

general public.[49] Despite the "direct" involvement of the central bank, it should be noted that central bank money is not – neither in the U.S. nor the Eurozone – synonymous with the concept of legal tender. Central bank money can (and very often is) legal tender but that does not have to be the case; a legal system might also decide to confer legal tender status on ("private") forms of money that do not entail a liability of the central bank or a liability against anyone at all.[50]

4.2. Overview of constitutional rules on money[51]

Article 3(1)(c) TFEU grants the Union the exclusive competence in the area of "monetary policy for the Member States whose currency is the euro".[52] For being an exclusive competence, member states may not enact legislation in this area (even absent legislation on the level of the Union), unless so empowered by the Union or for purpose of implementing Union acts (art. 2(1) TFEU).[53] With a view to articles 127(1) and 282(2) TFEU, the ECJ has held that the primary objective of the Union's monetary is to maintain price stability.[54] In order to determine whether a measure falls within the area of monetary policy, the court generally refers to the objectives of that measure.[55] Article 128(1) TFEU provides that the ECB has the exclusive right to authorize the issue of euro banknotes in the EU; the ECB and national central bank may issue such

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[49] Bindseil, *supra* at 303-304, 309-312 (also summarizing the historical development); Board of Governors of the Federal Reserve System, *Money and Payments*, *supra* at 13, 25; U.S. Department of the Treasury, *Future of Money and Payments*, *supra* at 19; Nabilou & Prüm, *supra*, at 1096.

[50] It is reported that El Salvador has conferred legal tender status upon bitcoins, for instance; *see*, *e.g.*, Arslanian et al., *El Salvador's law: a meaningful test for Bitcoin* (2021), *available at* https://www.pwc.com/gx/en/financial-services/pdf/el-salvadors-law-a-meaningful-test-for-bitcoin.pdf.

[51] *Cf.* Bruno de Witte, *EMU as Constitutional Law* in *The EU Law of Economic and Monetary Union* 278 (Fabian Amtenbrink & Christoph Herrmann eds., 2020).

[52] On the interpretation of the competences *see*, *e.g.*, *Pringle v. Government of Ireland,* C-370/12 (ECJ 2012); *Gauweiler v. Deutscher Bundestag,* C-62/14 (ECJ 2015); *Weiss,* C-493/17 (ECJ 2018).

[53] *Dietrich and Häring v. Hessischer Rundfunk,* C-422/19, C-423/19 ¶ 52 et seq. (ECJ 2021); de Witte, *EMU*, *supra* at 283 et seq.; Koen Lenaerts, Piet Van Nuffel & Tim Corthaut*, EU Constitutional Law* ¶ 5–022 et seq. (3rd ed., 2021).

[54] *Weiss,* C-493/17 at ¶ 50. *See also* Klaus Tuori, *Monetary Policy (Objectives and Instruments)* in *The EU Law of Economic and Monetary Union* 615, 618-621 (Fabian Amtenbrink & Christoph Herrmann eds., 2020).

[55] *Weiss,* C-493/17 at ¶ 53.

notes. Banknotes issued accordingly are the only banknotes that enjoy legal tender status.[56] Furthermore, member states may issue euro coins while the volume of the issue is subject to approval by the ECB (art. 128(2) TFEU). Together with the national central banks, the ECB – itself one of the Union's institutions (art. 13 TEU) – forms the European System of Central Banks (ESBC) (art. 282(1) TFEU). Further rules on the ECB and the ESCB are set forth in a protocol annexed to the EU treaties ("ECB/ESCB Statute"; *cf.* art. 129(2) TFEU).

The U.S. Constitution provides Congress with a wide variety of powers in the ambit of finance and currency matters, especially to "coin Money, regulate the Value thereof, and of foreign Coin, and fix the Standard of Weights and Measures" (U.S. Constitution art. I, § 8, cl. 5 – "Coinage Clause").[57] According to the Supreme Court's case law, the U.S. Constitution gives Congress wide discretion in monetary affairs.[58] Somewhat surprising in light of the fundamental importance of the issue for the U.S. financial system, the reach of the Congress's power in this area has not always been uncontroversial, however. A string of cases – often referred to as the "legal tender cases"[59] – dealt with the question whether Congress had the right to declare *paper money* legal tender. The Supreme Court eventually answered in the affirmative;[60] yet, while the conclusion reached by the court can be considered as generally accepted

[56] Art 16 ECB/ESCB Statute contains similar language. On the legislative history of these provisions *cf. René Smits*, The European Central Bank 204-206 (1997).
[57] *See also* art. I, § 10 cl. 1.
[58] *Cf. Norman v. Baltimore & O. R. Co.*, 294 U.S. 240, 302 et seq. (1935).
[59] *See*, *e.g.*, Chung, *supra* at 130 et seq.; Christopher P. Guzelian, *The Dollar's Deadly Laws That Cause Poverty and Destroy the Environment*, 98 Neb. L. Rev 2019, 56 (61 et seq.); James Willard Hurst, *A Legal History of Money in the United States, 1774-1970* 40 (1973); Robert G. Natelson, *Paper Money and the Original Understanding of the Coinage Clause*, Harv. J. L. & Pub. Pol'y, 1017 1019 n. 3 (2008).
[60] *Knox v. Lee* and *Parker v. Davis*, 79 U.S. (12 Wall.) 457 (1871). *See also Juilliard v. Greenman*, 110 U.S. 421, 448, 4 S. Ct. 122, 28 L. Ed. 204 (1884).

today,[61] the issue has not been entirely put to rest in the legal literature, as shown by critical publications that emerge from time to time.[62] One explanation might be that the issue relates to fundamental questions on the interpretation of the U.S. Constitution itself.[63] The Federal Reserve System is not established by the U.S. constitution but in the Federal Reserve Act.[64]

4.3. The concept of legal tender

The concept of legal tender possesses importance for the present purposes insofar as both the ECB and the Fed are studying the implications of CBDC that would have legal tender status.[65] On a general level, legal tender status is usually defined with regard to a debtor-creditor-relation: By using legal tender, a debtor can validly discharge of her monetary obligation.[66] This principle does not necessarily mean that legal tender is the only way to extinguish a monetary obligation, as there might other means of payments the law recognizes for this purpose; however, legal tender is the means of payment that the creditor must accept.[67] Thus, in many situations, legal tender can be understood as the form of payment the debtor can always *choose* to provide to her creditor. Yet, the concept legal tender possesses several more detailed

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[61] *Cf.*, *e.g.*, *Foret v. Wilson*, 725 F.2d 254, 254-55 (5th Cir. 1984) ("[The] argument, that only gold and silver coin may be constituted legal tender by the United States, is hopeless and frivolous, having been rejected finally by the United States Supreme Court one hundred years ago. ")

[62] *See*, *e.g.*, John Paul M. Callan, *Reexamining the Federal Monetary Powers*, 19 U. Miami Bus. L. Rev. 111 (2011).

[63] *See* on this issue, *e.g.*, Natelson, *supra*; see also Bickers, *Greenbacks, Consent, and Unwritten Amendments*, 73 Ark. L. Rev. 669 (2021).

[64] *Cf.* 12 U.S.C. § 226.

[65] Without legal tender status, a CBDC might not attract a sufficient number of users in practice, *cf.* ECB, *Report on a digital euro*, *supra* at 33; *cf. also* Hurst, *Legal History*, *supra* at 44 ("Lawmakers might confer legal-tender status to make particular money more acceptable"). However, no definitive decision on this matter has been taken, *cf.* Board of Governors of the Federal Reserve System, *Money and Payments*, *supra* at 22.

[66] *See* from an international perspective Bossu et al., *supra* at 31; *see also* Chung, *supra* at 113-114; Freitag, *Euro as Legal Tender (and Banknotes)* in *The EU Law of Economic and Monetary Union* 595, 596 (Fabian Amtenbrink & Christoph Herrmann eds., 2020); Proctor, *Mann on the Legal Aspect of Money*, *supra* at 74 et seq.; *Weenink*, *supra* at 437.

[67] *Cf.* George Nebolsine, *The Gold Clause in Private Contracts*, 42 Yale. L. J. 1051, 1052-53 (1933) ("Legal tender may be defined as money which cannot lawfully be refused by a creditor", references omitted).

nuances on a closer look. On the most basic level, one can ask what forms of money are recognized as legal tender. For instance, while banknotes and coins – important forms of central bank money – are recognized as legal tender in many jurisdictions, central bank book money generally is not.[68] On a more subtle level, one can ask what kind of obligations can be discharged by using legal tender.[69] The most obvious way to create a monetary obligation might be a contract: One party promises to provide the other party with money. Since the basis for this obligation is a contractual nature, private law doctrines apply and the law can employ different legal mechanism to make creditors comply with the obligation to accept legal tender.[70] Other forms of monetary obligations are created by order of the government, the most straightforward example being tax liabilities. Sometimes, the currency in which taxes are paid are distinguished from legal tender, being referred to as "functional currency".[71] Finally, the law can stipulate exceptions to the legal tender status, i.e., cases in which the creditor is not obliged to accept legal tender.[72]

The most common forms of legal tender are banknotes and coins, i.e. physical forms of money.[73] This is reflected by U.S. law, stating that "United States coins and currency (including Federal reserve notes and circulating notes of Federal reserve banks and national banks) are legal tender for all debts, public charges, taxes, and dues. Foreign gold or silver coins are not legal tender for debts".[74] On the other side of the Atlantic, article 128(1) TFEU states that the "banknotes issued by the European Central Bank and the national central banks shall be the only such notes to have the status of legal

[68] Bossu et al., *supra* at 39.
[69] *Cf.* Hurst, *Legal History*, *supra* at 40.
[70] Bossu et al., *supra* at 31-32.
[71] Guzelian, *supra* at 70.
[72] Clearly, the concept of legal tender implies an array of further issues that are beyond the scope of this paper. Reference can be made, *e.g.*, to the question whether legal tender may be used to settle debts expressed in foreign currency, *see* Freitag, *Euro as Legal* Tender, *supra* at 597-598.
[73] *Cf.* Board of Governors of the Federal Reserve System, *Money and Payments*, supra at 25.
[74] 31 U.S.C. § 5103; *see also* 12 U.S.C. § 411 (art. 16 of the Federal Reserve Act).

tender within the Union." While Art 128(2) TFEU does mention euro coins, it does not provide for legal tender status; rather, the legal tender status of euro coins is based on article 11 Council Regulation (EC) Nr. 974/98.[75] Thus, EU law regulates the legal tender status of banknotes – unlike U.S. law – on the constitutional level, while the legal tender status of coins is based on secondary law.[76] Conversely, there is no provision in EU law that declares commercial bank money legal tender status;[77] the same applies to electronic money that does not, similar to traditional commercial bank money, enjoy legal tender status in the Eurozone. However, this does not mean that monetary debts cannot be discharged with commercial bank in the Eurozone at all. In fact, the wording of article 128 TFEU was chosen precisely to provide the member states with some leeway to allow for other means to extinguish such a debt.[78] A frequently cited example is Dutch Law with regard to book money.[79] Therefore, in principle, one must look at the private law of the member states whether commercial bank money or other forms of money can lawfully be tendered to the creditor of a monetary debt. This does not contradict the concept of legal tender because a debtor has, based on EU law, the general option to rely on cash to discharge of her debt; in principle, the laws of a member states can, however, provide her with further options of how to settle a debt.

As for the types of debts that can be paid off by using legal tender, 31 U.S.C. § 5103 provides for a wide understanding, generally referring to "all debts", "public charges" and so on. Accordingly, it appears that the legal tender status refers to both monetary

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[75] Council Regulation (EC) No 974/98 of 3 May 1998 on the introduction of the euro, 1998 O.J. (L139), 1-5. Article 10 reaffirms the legal tender status of banknotes.
[76] *Cf. Dietrich and Häring*, C-422/19, C-423/19 at ¶ 47; *Weenink*, *supra* at 433 n. 14.
[77] Stefaan Loosveld, *The 5th Anti-Money Laundering Directive: virtual currencies and other novelties*, 33 J.I.B.L.R. 297, 301-302 (2018).
[78] *Smits*, The European Central Bank, *supra* at 207-208.
[79] *Smits*, The European Central Bank, *supra* at 207-208; *Weenink*, *supra* at 438.

debts that derive from private law, as well as those that stem from public law (like taxes, for instance).[80] The language of the EU law is less clear in this respect: Despites it fundamental importance, both article 128 TFEU and article 16 ECB/ESCB Statute refer "legal tender" without further specifying this concept; the situation is similar with regard to secondary law.[81] Thus, EU law regulates what legal tender is (banknotes and coins) but does not specify what legal tender means; from the language of the law, it is unclear what kind of monetary debts can be settled by using legal tender, or if the European concept refers to a debtor-creditor-relation in the first place. The ambiguities in EU law as to the term "legal tender" caused the Commission to issue a recommendation in 2010.[82] According to the recommendation, the term "legal tender" entails three elements: i) mandatory acceptance, meaning that the creditor of a payment obligation cannot refuse euro banknotes and coins (unless the parties have agreed on another means of payment), ii) acceptance at full face value, meaning that the monetary value of euro banknotes and coins is equal to the amount indicated on these notes and coins, and iii) power to discharge from payment obligations, meaning that a debtor can discharge himself from a payment obligation by tendering euro banknotes and coins.[83] In 2021, the ECJ confirmed important parts of the Commission's approach to the concept of legal tender.[84] Referring its the "ordinary sense", the court understood legal tender as a means of payment denominated in a currency unit that "cannot generally be refused in settlement of a debt denominated in the same currency unit, at its full face value, with the effect of discharging the debt".[85]

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[80] *See also* Chung, *supra* at 113-114.
[81] Freitag, *Euro as Legal Tender*, *supra* at 610.
[82] Commission Recommendation of 22 March 2010 on the scope and effects of legal tender of euro banknotes and coins (2010/191/EU), 2010 O.J. (L83), 70-71.
[83] *Id*. at point 1.
[84] *Dietrich and Häring*, C-422/19, C-423/19.
[85] *Dietrich and Häring*, C-422/19, C-423/19 at ¶ 46.

It follows from the ECJ's ruling that legal tender can be used to pay off debts of both a private law and public law nature.[86]

The question of exceptions to the legal tender status entails several sub-issues that should be distinguished. First, it should be noted that legal tender status of a means of payment does not necessarily mean that a person must accept this means of payment for goods or services she offers. In this vein, the U.S. Department of the Treasury states that "there is no federal statute which mandates that private businesses must accept cash as a form of payment. Private businesses are free to develop their own policies on whether or not to accept cash unless there is a state law which says otherwise."[87] Thus, on the one hand, the parties of a transaction are generally free to agree to exchange goods for other goods or services. Since in this case the parties do not agree on a monetary debt – no money is owed[88] –, such a transaction in fact does not concern the concept of legal tender and, therefore, does not, in a strict sense, concern an exception to the legal tender status of cash. On the other hand, the parties may agree to settle a monetary debt with forms of money that do not possess legal tender status. A practically relevant case is the (implicit or explicit) agreement to pay the debt with commercial bank money. Because the parties want to exclude the payment of cash, an agreement of this kind may be understood as a contractual limitation to legal tender status of cash, the permissibility of which depends on the

[86] The dispute in the main proceeding revolved around the prohibition by a member state to pay a radio and television license fees based on national law in cash, see *Dietrich and Häring*, C-422/19, C-423/19 at ¶ 15 et seq.; on payment obligations stemming from private law *see id*. ¶ 56.

[87] U.S. Department of Treasury, *FAQs*, https://www.bep.gov/currency/faqs (last visited October 31, 2022); *see also* Board of Governors of the Federal Reserve System, *Money and Payments*, *supra* at 25 n. 35 ("This statute means that these forms of U.S. money are a valid and legal offer of payment for debts when tendered to a creditor. Even still, consumers and businesses may agree to use other methods of payment unless there is a state or local law that says otherwise). *See*, however, *Guzelian*, *supra* at 58-59) ("First are legal tender laws. These laws require any creditor to accept payment in a fiat currency from the debtor, even if the original contract called for payment of equivalent value in some other form of currency or exchange").

[88] Failure to comply with a contractual obligation might ultimately still lead to a monetary claim (especially for damages).

applicable law.[89] While this question was not explicitly addressed by the ECJ in *Dietrich and Häring*, there should be no doubt that, *from the perspective of EU law*, the parties can freely agree on a monetary debt that can be settle with commercial bank money.[90] However, the ECB appears to apply a more restrictive reading to the legal tender status, stating that retailers must provide a "legitimate excuse" when refusing cash payments.[91] For at least two reasons – assuming that the parties actually agreed on a non-cash payment –,[92] this appears to be a too strict reading of article 128 TFEU. First, it excessively restricts the contractual freedom of the parties. Second, it is unclear why exactly *retailers* must provide an excuse and other parties not; there is no indication that article 128 TFEU specifically aims at regulating the dealings of retailers. A different question is whether the law itself limits the effects of the legal tender status, i.e., obliges a party to accept something other than legal tender for the payment of a monetary debt. In the EU, this also implies the question to what extent the member states may provide for rules of this kind. In *Dietrich and Häring*, the ECJ held that the legal tender status of euro notes and coins is not absolute and leaves room

[89] The law might also provide for express rules that cash payment must not be declined. As for the U.S., it has been reported that some municipalities, for instance, have prohibited certain businesses from refusing cash, *see* Bossu et al., *supra* at 33 n. 78.

[90] *Dietrich and Häring v. Hessischer Rundfunk,* C-422/19, C-423/19 (ECJ 2021), Opinion of AG Pitruzzella ¶ 124-125 ("[I]t is clear from the foregoing that, as EU law currently stands, the concept of legal tender as regards banknotes and coins must be understood as entailing an obligation in principle for the creditor of a payment obligation to accept banknotes and coins, *unless the contracting parties exercise their contractual freedom to agree on other means of payment*, or unless the legislation adopted by the Union or by a Member State in exercising their respective competences […]") (emphasis added); *see also* Loosveld, *supra* at 302; Martin Miernicki, *„Recht auf Barzahlung" – Zum Verbot der Begleichung von Rundfunkgebühren mit gesetzlichen Zahlungsmitteln*, ZFR 229, 230 (2021).

[91] ECB, *FAQ on cash*, https://www.ecb.europa.eu/euro/cash_strategy/html/cash-faq.en.html (last visited Dec. 2, 2022) („Displaying a label or posters indicating that the retailer refuses payments in cash, or payments made in certain banknote denominations, is not enough. The retailer must provide a legitimate excuse, such as a difficulty maintaining sufficient cash reserves to provide change or concrete physical security risks due to the presence of large amounts of cash"); here, the ECB refers to the Recommendation of the Commission mentioned above.

[92] Whether the creditor can lawfully refuse a cash payment *absent such an agreement*, is a different question; *see* section 6.3 below.

for the member states to introduce exceptions (*e.g.*, a monetary debt that can *only* be paid off with commercial bank money), provided they are duly justified.[93]

Finally, it should be noted that the concept of legal tender – very much like the concept of money – depends on the context it is used in. So far, reference has been made to the concept of monetary laws as well as their implication for contractual obligations. However, the term of legal tender can also be relevant, *e.g.*, in the context of tax law. This is illustrated by the ECJ's decision in *Hedqvist*, where the court deemed bitcoins "legal tender" within the meaning of article 135(1)(e) VAT-Directive,[94] mainly because it "has no other purpose than to be a means of payment and that it is accepted for that purpose by certain operators".[95] This deserve two immediate remarks: First, the decision only applies to the specific tax law context in which it is handed down; in the context of EU monetary law, bitcoins are not certainly not legal tender in the Eurozone (and the same applies to the U.S.).[96] Second, at least from today's perspective, the premise of the ECJ's decision must be questioned. This is because it is nowadays widely acknowledged that bitcoins (as well as many other crypto-assets) do

[93] *Dietrich and Häring*, C-422/19, C-423/19 at ¶ 55 et seq. *See also* Recital 19 Council Regulation (EC) No 974/98 of 3 May 1998 on the introduction of the euro 1998 O.J. (L139), 1-5 ("[…] whereas limitations on payments in notes and coins, established by Member States for public reasons, are not incompatible with the status of legal tender of euro banknotes and coins, provided that other lawful means for the settlement of monetary debts are available"); Helmut Siekmann, *Monetary Aspects of the Euro as Single European Currency – a German Perspective* in *The Euro as legal tender* 1, 43 et seq. (Robert Freitag & Sebastian Omlor eds., 2020).

[94] Council Directive 2006/112/EC of 28 November 2006 on the common system of value added tax, 2006 O.J. (L347) 1-118; art. 135 contains an exemption for „transactions, including negotiation, concerning currency, bank notes and coins used as legal tender, with the exception of collectors' items, that is to say, gold, silver or other metal coins or bank notes which are not normally used as legal tender or coins of numismatic interest".

[95] *Skatteverket v. Hedqvist*, C-264/14 ¶ 52 (ECJ 2015).

[96] *Atwal v. Nortonlifelock, Inc.*, 2022 U.S. Dist. LEXIS 19974 (United States District Court for the Western District of New York); Lawrence J. Trautman & Alvin C. Harrell, *Bitcoin Versus Regulated Payment Systems: What Gives?*, 38 Cardozo L. Rev. 1041, 1051 et seq. (2017)

have a purpose other than being used as a means of payment, namely their use as an object of speculation.[97]

5. CBDCs' conceptual issues: Incumbent forms of money and the complicated distinction of token- and account-based CBDC

5.1. On CBDC "tokens" and "accounts"

The main varieties of CBDC are often analogized to existing forms of money: A token-based CBDC might be seen as an – albeit digital – form of "cash" and account-based CBDC might be seen as a form of central bank book money; with the involvement of intermediaries, CBDC might be compared to payments using commercial bank money.[98] The distinction between book money and cash is indeed well established. Conversely, it has been observed that the distinction of token- and account-based CBDC is not as clear-cut as it might seem: In the first place, even if a token-based CBDC employs a form of DLT, the tokens and corresponding transactions are – very much unlike cash – based on and recorded in a ledger maintained by third parties, just like money in an "account".[99] Besides, token-based CBDC will very likely not provide the same level of anonymity as cash.[100] What is more, the level of protection against fraud and customer-service depends on the implementation of CBDC and does not constitute an inherent difference between CBDC "accounts" and "tokens".[101]

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[97] *See*, *e.g.*, Marc Gronwald, *Is Bitcoin a Commodity? On price jumps, demand shocks, and certainty of supply*, 97 Journal of International Money and Finance 86 (2019).
[98] *Cf.*, *e.g.*, Bindseil, *supra* at 304; U.S. Department of the Treasury, *Future of Money and Payments*, *supra* at 22-23; ECB, *Report on a digital euro*, *supra*, at 12; *Hockett*, *supra* at 484 et seq.
[99] John Crawford et al., *FedAccounts: Digital Dollars*, 89 Geo. Wash. L. Rev. 113, 151 (2021) (also referring to the Bitcoin-network).
[100] Crawford & et al., *supra* at 152.
[101] Crawford & et al., *supra* at 152-153.

While the foregoing arguments do have their merits and shed light on important technological characteristics of CBDC and DLT in general, it is doubtful whether the distinction between token- and account-based CBDC necessarily "breaks down under examination".[102] First, also the lines between long established forms of money can blur to a certain extent when looked at from a certain perspective or studied in certain situations. For instance, banknotes that are sent to the recipient by mail or delivery by a transport company are cash transactions, even though such transactions involve a third party; similar principles can be observed in connection with money remittance. Second, also cash payments that may have to be reported (and hence recorded) under applicable laws upwards a certain threshold remain cash payments.[103] Thus, the fact that cash transactions can have characteristics similar to transactions involving book money does not mean that these two forms of money should not be distinguished. On a conceptual level, there remains at least one difference that appears to be crucial for the distinction of CBDC "tokens" and "accounts" (and the different forms of money in general). This difference relates to a token-based CBDC's potential, depending on a corresponding technical implementation, to provide the token holder with a *level of control* over the tokens equivalent to the owner's *physical power* over banknotes or coins kept in her pocket;[104] this control is "direct" inasmuch no intermediary like a commercial bank is needed to initiate and process transactions.[105] While tangible tokens (paper, metal) have been the only way to allow a person to exercise direct

[102] Crawford & et al., *supra* at 151.
[103] *See also* on this question section 6.3 below.
[104] *Cf. also* recital 13 Regulation (EU) 2018/1672 of the European Parliament and of the Council of 23 October 2018 on controls on cash entering or leaving the Union and repealing Regulation (EC) No 1889/2005, 2018 O.J. (L284) 6-21 („One of the key concepts used in this Regulation is that of 'cash', which should be defined as comprising four categories: currency, bearer-negotiable instruments, commodities used as highly-liquid stores of value and certain types of prepaid cards"); *see also id.* art. 2(1)(a).
[105] *Cf.* Office of Science and Technology Policy, *Technical Evaluation*, *supra* at 13 ("P2P design with a bearer-asset type token could enable transactions without any intermediary […]").

control over money for the longest time, technological advances nowadays make an equivalent situation – at least in theory – possible for intangible tokens.[106] Within the realm of intangible tokens, one should distinguish between tokens that are blockchain/DLT-based and "regular" tokens that are stored on physical media.

5.2. Blockchain/DLT-based CBDC tokens

Blockchain/DLT-based CBDC tokens enable the users' direct control because, given a corresponding technical implementation (that would typically require a high degree of decentralization in the network), there is no single intermediary that has the *de facto* power to decline a transaction in the network and thus would have to be trusted.[107] From this perspective, the person who has the information (commonly called "private key") needed to initiate a transactions directly controls the tokens[108] – notwithstanding the involvement of the countless network nodes.[109] The opposite applies to book money that is analogized to account-based CBDC; here, the functioning of the payment system rests on the reliability of the intermediary insofar as this entity records and settles transactions. Hence, it seems that account-based models are inherently connected to recording transaction in a ledger, whereas token-based models are not.

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[106] *Cf.* Fairfield, *Bitproperty*, 88 S. Cal. L. Rev. 805, 839 (2015) (describing the physicality of assets as a mere proxy for rivalrousness).

[107] *Cf.* ECB, *Report on a Digital Euro*, *supra* at 40 ("A decentralised infrastructure could allow end users to transfer holdings of the bearer digital euro among them with no need to mandate a third party to play any role in the transaction. This approach could be implemented in two ways: either via distributed ledger technology (DLT) protocols or by means of local storage (e.g. using prepaid cards and mobile phone functionality, including in offline payments)").

[108] Due to the user's direct control (that does not depend on the involvement of an intermediary), it is questionable – for the tokens referred to in his section – whether one can meaningfully distinguish between "possession" regarding physical tokens and "knowledge" regarding digital tokens; *see*, however, Bossu et al., *supra* at 11 (also mentioning that holders of CBDC accounts or book money would have to identify in order to access the funds: "I am therefore I own"); *see also* Auer & Böhme, *supra* at 92 (distinguishing between "identification" for CBDC accounts and "knowledge" for token-based CBDC), 93 et seq. In practice, verification of the user's identity will often depend on the user's knowledge of certain pieces of information, such as passwords or log-in credentials; at the same time, it does not appear to be inconceivable that a blockchain/DLT solution relies on pieces of information other than a "classic" private key (*e.g.*, fingerprints) to initiate transactions.

[109] It deserves mention that the ECB currently does not actively explore transfer mechanisms with P2P validation of online payments (ECB, investigation phase, *supra* at 5-6); this seems to apply to transfer mechanisms that are currently known from networks like Bitcoin, for instance.

However, on a closer look, this is not the case: Transactions (also in "fully decentralized") blockchain/DLT-settings are continuously recorded in a ledger just like transaction in account-based settings, as demonstrated by well-known blockchain-networks like Bitcoin or Ethereum. The existence of a ledger where transactions are recorded is hence not an exclusive feature of account-based CBDC models. Rather, the difference lies in the way the ledger is kept and maintained. Against this background, it becomes apparent that blockchain/DLT-tokens possess characteristics of both cash and book money: While the user's direct control makes them comparable to cash, the recording in a ledger as well as their intangibility make them comparable to book money.[110] In fact, tokens (as understood in the present context) exhibit a hybrid nature, possessing both characteristics of chattels and ledger entries.[111]

Reverting to the current topic proper, a crucial difference that distinguishes token-based CBDC and account-based CBDC can therefore be seen in the CBDC holder's direct control over ledger entries.[112] For the concept of "direct control", it seems necessary from a technical standpoint that the implemented ledger solution possesses a sufficient degree of decentralization; if, in the most extreme case, only one entity (namely a central bank) controls the ledger, the ledger entries reflect traditional recording keeping rather than a user's direct control over CBDC. In such a case, the CBDC appears to be more comparable to book money than to cash, even if the CBDC should be called "tokens".[113] One could ask whether labelling such a model "token-based" should better be avoided, as this potentially leads to confusion with regard to

[110] *Cf. also* Kelvin FK Low & Ernie GS Teo, *Bitcoins and other cryptocurrencies as property?*, 9 Law, Innovation and Technology 235, 245 et seq. (2017) (on Bitcoin).

[111] I have made this point before in my habilitation thesis ("Kryptowerte im Privatrecht") that was accepted at the University of Vienna in 2022; publication is expected in 2023.

[112] *Cf. also* U.S. Department of the Treasury, *Future of Money and Payments*, *supra* at 24 (mentioning digital wallets); in principle, however, consumers could also use what might be called digital wallets to manage their funds in account-based CBDC.

[113] On the question of the legal position of the CBDC holder *see* below section 5.4.

the meaning of the concept of "token". A CBDC model with a *central* ledger where token balances are continuously recorded is in fact an account-based system.[114] Hence, it follows from the foregoing that a useful criterion to distinguish between token- and account-based CBDC is connected to the level of decentralization of the ledger infrastructure (number of network nodes);[115] by contrast, the mere fact that third parties (network nodes) are involved in the process of confirming transactions should not be overstated.

5.3. "Regular" CBDC tokens stored on physical media

As noted before, token-based CBDC are often conceptualized as data stored on a physical medium (*e.g.*, card, smart phone). Under this model, the user's direct control of the CBDC tokens is "indirectly" linked to the control of the physical storage medium, even though the device might have certain security features such as a password.[116] Such "regular"[117] digital tokens are inherently different from blockchain/DLT-based tokens because they are stored on a single device while the latter are stored in a decentralized ledger. This has important consequences: The decentralized ledger infrastructure ensures that tokens cannot be copied at will; the technology was developed precisely to solve the double-spending problem.[118] In contrast, "regular" digital tokens can be, in principle, be freely reproduced. This problem is by no means new and has occurred in earlier approaches to "digital

[114] *Cf.* Bossu et al., *supra* at 12-13 (distinguishing cash current accounts and ledger accounts; however, also stating that „token-based CBDC can be represented in centrally managed ledger accounts"); *see also* Chiu, *supra* at 449 (describing an "account-based" design where the central bank would generate a be "transferred out of the account to fund a dApp developer, who issues tokens in return, which may be kept at the same account").

[115] *See also* Bindseil, *supra at* 304) ("Alternatively, the central bank could offer a digital token currency that would circulate in a decentralized way without central ledger") (emphasis omitted); however, decentralization in the present context refers to the way the ledger is managed, and not only to the fact that transaction can be initiated without the involvement of an intermediary.

[116] *Cf.* ECB, *Report on a digital euro*, *supra* at 30 (focusing on technical means – like fingerprints or iris recognition – to ensure that only legally entitled users participate in a transaction).

[117] In the sense that they are not blockchain/DLT-based.

[118] This is already expressed in the „Bitcoin-Whitepaper", *see* Satoshi Nakamoto, *Bitcoin: A Peer-to-Peer Electronic Cash System*, https://bitcoin.org/bitcoin.pdf (last visited Dec. 2, 2022).

currencies"[119] but can also be observed in other contexts.[120] However, this implies that tokens of this kind are different from cash because banknotes and coins cannot be copied at the owner's discretion. Technical means can be implemented to prevent copying but this does not change the token's inherent properties; furthermore, there remains the problem of circumvention of the technical barriers. In this light, it is questionable whether a CBDC based on tokens stored on physical media would be feasible without the involvement of an intermediary. While the transaction (*e.g.*, copying the token to the payee's device and deleting it from payer's device) themselves might be decentralized (peer-to-peer), the system would likely require a certain type of ledger maintained by an intermediary (central bank);[121] in spite of the reproducibility of the digital tokens, the central bank must be in the position to control the total amount of circulating digital units and, at the same time, validating who owns what amounts of digital units must be possible.[122] Thus, to the extent tokens and transactions are recorded in a ledger under the control of the central bank to prevent double-spending, the model possesses a feature that makes it akin to account-based CBDC.

5.4. The legal relationship between account holder and central bank

As highlighted before, the (contractual) legal relationship between a CBDC holder and the central bank is frequently mentioned as a characteristic feature of account-based

[119] Primavera De Filippi & Aaron Wright, *Blockchain and the Law* 18 et seq. (2018).
[120] *Fairfield*, *supra* at 817 et seq.
[121] *Cf.* ECB, *Report on a digital euro*, *supra* at 30 („It is important to note that the absence of a central third party that can block a specific user or counterfeit digital euro units substantially increases the impact of potential hacking with potentially disruptive consequences for the economy, including the possible unwarranted expansion of the monetary base"); *see also* BIS, *Central bank digital currencies: foundational principles*, *supra* at 12 ("a centralised ledger could record only the total CBDC issued, with individual balances stored locally on a smartphone or card"); Adrian Dumitrescu-Pasecinic, *"An offer they can't refuse": reflections on the mandatory acceptance of a digital euro banknote*, 36 J.I.B.L.R. 249, 249-250 (2021),
[122] *Cf.* Filippi & Wright, *Blockchain*, *supra* 18-19. Corresponding issues cannot arise in connection with cash because it lacks endless reproducibility; clearly, however, there is the risk of counterfeit notes.

CBDC. This distinction mirrors the legal differences of cash and commercial bank money: Only the latter is based on a contractual relationship between the account holder and the bank with a corresponding claim to the payment of the account balance in central bank money (cash); this implies that the account holder bears the commercial bank's insolvency risk. These principles do not translate well to account- and token-based CBDC: A claim that could be derived from an account-based CBDC would be a claim to exchange the CBDC balance for other forms of central bank money and not for other assets, like gold for instance.[123] At the same time, it is quite possible that also token-based CBDC can be exchanged for other forms of central bank money. Since the debtor would be the central bank in any case, the insolvency risk associated with ("regular") commercial banks is not practically relevant.[124] Furthermore, if a central bank were to emit tokens, it would need to safeguard the transferability of these token – be it by use of a DLT or physical devices – even absent a direct contractual relation to the token holder because the emission of non-transferable CBDC-tokens would be a fruitless effort.[125] In this light, the existence of an "account-relationship" does not seem to be a criterion that is as compelling for the distinction of token-based and account-based CBDC as for the distinction of cash and commercial bank book money. In this connection, it has been argued that popular distinction between token- and account-based money "is thus less a distinction between kinds or types of money, in any natural kind sense of those words, than it is between layers in the same money hierarchy associated with public and private

[123] *Cf. Milam v. U.S.*, 524 F.2d 629 (9th Cir. 1974); *Juilliard v. Greenman*, 110 U.S. 421 (1884); Julian Langner *ESCB/Eurosystem/National Central Banks* in *EU law of economic and Monetary Union* 389, 399 (Fabian Amtenbrink & Christoph Herrmann eds., 2020); *see also* Hockett, *supra* at 469.
[124] *Cf.* Board of Governors of the Federal Reserve System, *Money and Payments, supra* at 13.
[125] *Cf.* Bossu et al., *supra* at 15.

obligees".[126] Absent intermediaries/commercial banks, the distinction between tokens and accounts becomes indeed less apparent.

However, there does remain a crucial difference that has already been elaborated upon before: The aspect of direct control and trust.[127] Even if owning cash and holding a central bank account ultimately imply a similar legal position vis-à-vis the central bank, these two form of money differ fundamentally with regard to how payment transactions are initiated and settled. The same applies to token- and account based CBDC. The existing differences between token- and account-based CBDC might also lead to a differing legal treatment under private law doctrines: For instance, CBDC tokens might be covered by the laws on property, while the holder of a CBDC account might not enjoy this protection. More special questions relate to potential acquisition of tokens in good faith or whether a mixing-up of tokens leads to the loss of property rights.[128]

6. The introduction of a retail CBDC from a legal perspective

6.1. General remarks

For the present purposes, the introduction of the CBDC raises two separate legal questions that should be distinguished.[129] The first question relates to the introduction of digital central bank itself: Does the central bank (or possibly, other authorities) have the power to introduce a particular form of a CBDC?[130] The second question relates to the legal qualification of a CBDC, especially with regards to its legal tender status.

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[126] *Hockett*, *supra* at 469.
[127] *Cf. Hockett*, *supra* at 470 (referring to privacy); on the anonymity of payments *see* below section 6.3.
[128] *Cf.*, *e.g.*, David Fox, *Cryptocurrencies in the Common Law of Property* in *Cryptocurrencies in Public and Private Law* 139 (David Fox & Sarah Green eds., 2019) (on crypto-currencies); *see also* ECB, *Report on a digital euro*, *supra* at 25.
[129] *Cf.* Banque de France, *Central Bank Digital Currency*, *supra* at 30.
[130] *Cf.* Bossu et al., *supra* at 14.

Yet, both questions are interrelated insofar as they imply the basic appraisal whether a particular form of CBDC falls within the concepts contained in the law as it stands or whether legislative amendments are required. This task is far from trivial, especially since the monetary laws relevant for the present purposes (still) often have (or, at least, originally had) physical forms of money in mind. Therefore, it might be doubtful – even if a certain form of CBDC functionally corresponds to an incumbent form of money – whether the existing laws cover the introduction of such a CBDC. At the same time, however, it cannot be denied that money, in general, has long been regarded as being dissociated from physical tokens.[131]

In this connection, for the sake of legal certainty, commentators recommend an unambiguous legal base for the introduction of CBDC.[132] Similarly, the Fed states the support for the introduction of a U.S. CBDC would come "ideally in the form of a specific authorizing law".[133] Somewhat in contrast, the ECB appears to apply a more lenient approach to the matter, noting that "neither the TFEU nor the Statute of the ESCB explicitly exclude the issuance by the Eurosystem of assets or obligations other than euro banknotes (for example ECB debt certificates) that might enjoy legal tender status".[134] The ECB then goes on to mention different provisions of primary law that might support the introduction of different forms of CBDC.[135] Whether this legal assessment is correct is open to discussion; certainly, however, the legal status quo is far from unambiguous. Presumably, one can explain the ECB's approach by the fact that an amendment of EU primary – that would explicitly allow for introduction of a certain of CBDC – might require a complex and potentially lengthy process that is

[131] *Cf.* Proctor, *Mann on the Legal Aspect of Money*, *supra* at 31, 257; Smits, *The European Central Bank*, *supra* 204 n. 225.
[132] Bossu et al., *supra* at 14, 26.
[133] Board of Governors of the Federal Reserve System, *Money and Payments*, *supra* 3.
[134] ECB, *Report on a digital euro*, *supra* at 25.
[135] ECB, *Report on a digital euro*, *supra* at 25.

unlikely to allow for a great of flexibility in view of constantly changing economic and technological developments.[136]

6.2. CBDC as a form of central bank accounts

As noted, central bank accounts are, for the time being, generally not available to the public. U.S. law enumerates several entities that are eligible for such accounts,[137] *e.g.*, U.S. depository institutions.[138] Thus, as summarized by the Fed, the "Federal Reserve Act does not authorize direct Federal Reserve accounts for individuals, and such accounts would represent a significant expansion of the Federal Reserve's role in the financial system and the economy".[139] In other words, providing retails retail access to Fed accounts requires additional legislation.[140] In the Eurozone, article 17 ECB/ESCB Statute states that, in order to conduct their operations, "the ECB and the national central banks may open accounts for credit institutions, public entities and other market participants and accept assets, including book entry securities, as collateral." Whether retail access to central bank accounts is compatible with the law as it stands hence depends on the meaning of the term "other market participants"; if one understands a consumer to be a "market participant", the law would support the introduction of retail accounts. The wording, even though not entirely unambiguous, seems to refer to financial market institutions and not the general public or households, however.[141] One can also observe that the provision does not refer to the "public" as

[136] *Cf.* Banque de France, *Central Bank Digital Currency*, *supra* 30 (also noting that amending article 17 ECB/ESCB Statute could be changed on the basis of art. 129(3) TFEU).
[137] These accounts are often referred to as "master accounts", *see* Cheng & Torregrossa, *supra.*
[138] 12 U.S.C. § 342; *see* for an overview of further eligible entities, *e.g.*, Crawford & et al., *supra* at 116; Hockett, *supra* at 404, 409-410.
[139] Board of Governors of the Federal Reserve System, *Money and Payments supra* at 13.
[140] Crawford & et al., *supra* at 171.
[141] Dumitrescu-Pasecinic, *supra* at 251. *See also* Banque de France, *Central Bank Digital Currency*, *supra* at 31.

such.[142] The ECB's understanding is somewhat unclear: On the one hand, the ECB considers article 127(2) TFEU in connection with article 17 ECB/ESCB Statute as a legal basis for the introduction of a digital euro available to households and other private entities; at the same time, the ECB states that this "cannot serve as the sole legal basis".[143] On the other hand, the ECB mentions article 127(2) TFEU and article 17 ECB/ESCB Statute (as well as article 20, 22 of the same statute) when referring to "the issuance of digital euro variants for limited uses, devoid of general legal tender status".[144] Thus, it seems that the ECB's opinion is as follows: While the introduction of retail central bank accounts can be based on existing provisions of primary law, conferring legal tender status to such a form of money would require further legislation. In this light, the ECB's opinion is in line with a purely textual reading of 17 ECB/ESCB Statute, whereas certain doubts about the meaning of the expression "other market participants" remain.

It should be noted that the question *who* can open an account with the central bank is not the only issue to be considered when discussing account-based retail CBDC. Even if existing provisions of U.S. or EU law were to be expanded to expressly include households or private entities, one would have to verify whether a certain form of CBDC fulfills the other requirements of these provisions. After all, article 17 ECB/ESCB Statute allows the ECB to "open accounts"; 12 U.S.C. § 342 refers to "deposits". In other words, one must not only ask *whom* the central bank may offer its services but also *what* it may offer. This is a relevant consideration in light of the

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[142] Hans Weenink, *Artikel 17* in *Europäisches Unionsrecht* Satzung ESZB/EZB at ¶ 2 (Hans von der Groeben, Jürgen Schwarze & Armin Hatje eds., 7th ed. 2015) also arguing that the term „other market participants" can be construed in accordance with article 22 ECB/ESCB Statute on "clearing and payment systems", as well as the ECB's Guideline ECB/2012/27, 2013 O.J. (L30) 1-93, *see id*. at ¶ 8. ECB guidelines are binding instruments, Michael Ioannidis, *The European Central Bank*, in *EU law of economic and Monetary Union* 353, 386 (Fabian Amtenbrink & Christoph Herrmann eds., 2020).

[143] ECB, *Report on a digital euro*, *supra* at 25.

[144] ECB, *Report on a digital euro*, *supra* at 25.

various different models for the implementation of CBDC. Consider, for instance, a CBDC design where private entities cannot directly access their CBDC accounts with the central bank but need to rely on the services of (new or incumbent) intermediaries; some proposals of CBDC are built around a ledger maintained by the central bank that only records anonymous balances while further data is within the control of intermediaries.[145] Since this way of maintaining "accounts" appears to be different from existing forms of central bank accounts, it might be unclear whether such CBDC models actually involve "accounts" within the meaning of the law as it stands.[146] The foregoing implies that an analysis is necessary if a given CBDC design fits within the meaning of the current statutory understanding. Should a particular CBDC design not be clearly covered by this understanding, an amendment of the law should, for the sake of legal certainty, not only expressly mention the accessibility of private entities but also the admissibility of the new form of central bank money.

To a certain degree, the present questions mirrors distinction between token- or account CBDC. As implied earlier,[147] the mere fact that CBDC balances are referred to as "tokens" should not rule out the existence of an "account" within the meaning of a provision like article 17 ECB/ESCB Statute. Moreover, it is doubtful whether a very narrow reading of a provision of this kind is warranted since this might confine the

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[145] *See*, *e.g.*, G7, *Public Policy Principles for Retail Cemtral Bank Digital Currencies (CBDCs)* 22 (2021*) available at* https://www.mof.go.jp/english/policy/international_policy/convention/g7/g7_20211013_2.pdf; *see also BIS, Central bank digital currencies: foundational principles*, *supra* at 12-15; Panetta, *Building on our strengths*, *supra* („We can design the digital euro to ensure that the Eurosystem only processes data to settle transactions with no possibility to track payments sent or received by any specific user. Strict segregation of data between intermediaries and the Eurosystem, as well as privacy-enhancing techniques, would ensure that the Eurosystem cannot link any visible data to the identity of a digital euro user").

[146] *See also* the definition of master account Cheng & Torregrossa, *supra*. In any event, account-based CBDC require the existence of a direct liability of a central bank as a basic requirement for central bank money, Bossu et al., *supra* at 10. It is doubtful whether one could speak of a central bank account if there is, through the involvement of intermediaries, an insolvency risk for the account holder. *See* above section 2.

[147] *See* above section 5.

options of central banks to flexibly respond the technological or economic developments. Nevertheless, CBDC that take the form of blockchain/DLT-based tokens or of "regular" tokens as described above would only uneasily satisfy the requirements for an "account". This is because, on the one hand, offering accounts typically implies that the central bank has the power to update the account balances and this is not the case for blockchain/DLT-based tokens; here, the central bank would rather provide a technical infrastructure, while the power remains with the token holder. On the other hand, accounts imply that transactions are continuously recorded in a ledger which is not (necessarily) the case for "regular" tokens stored on a physical media.

6.3. CBDC as a form of cash

It is common knowledge that the use of cash as a means of payment is not restricted to a particular group of persons. Thus, different from what was discussed above in connection with central bank account, it is not problematic whether a CBDC that can legally be regarded as cash may be accessible to the general public. Rather, the crucial issue boils down to under what circumstances a CBDC in fact can be regarded as cash under the law as it stands – or, put more generally, whether the same rules that apply to cash can also be applied to a certain form of CBDC. For this appraisal, two basic scenarios are conceivable. If one can establish that a certain rule refers to physical things (chattel),[148] thereby following a rather formalistic approach, the application of that rule to CBDC is not warranted at the outset. Conversely, if it is found that rule can be interpreted in a more flexible manner allowing for a functional reading, applicability will depend on a functional comparison of traditional forms of cash – that were known at the time of rule's enactment – and the CBDC design in question. With

[148] *Cf.* Proctor, *Mann on the Legal Aspect of Money*, *supra* at 30.

regard to the U.S. constitution, some have argued in support of a narrow reading of the Coinage Clause. In the 19th century, Justice Field stated in his dissent in *Juilliard v. Greenman*:

> The clause to coin money must be read in connection with the prohibition upon the States to make anything but gold and silver coin a tender in payment of debts. The two taken together clearly show that the coins to be fabricated under the authority of the general government, and as such to be a legal tender for debts, are to be composed principally, if not entirely of the metals of gold and silver. […] When the Constitution says, therefore, that Congress shall have the power to coin money, interpreting that clause with the prohibition upon the States, it says it shall have the power to make coins of the precious metals a legal tender, for that alone which is money can be a legal tender. […] Now, to coin money is, as I have said, to make coins out of metallic substances, and the only money the value of which Congress can regulate is coined-money, either of our mints or of foreign countries.[149]

While this interpretation is based on both textual and systematic arguments, it might be seen as formalistic insofar as it defines the forms of money covered by the Coinage Clause with reference to the material it is made of: Metallic substances or precious metal. However, via the limitation to metal tokens, *Justice Field* also highlights a functional aspect. This aspect is expressed as the "standard of value"-function of money that, according to his reasoning, cannot exist in things that do not have intrinsic value.[150] While it can be questioned whether or to what extent only things that possess intrinsic value can function as a standard of value, this approach reveals a crucial point that is also relevant for the current purposes: It is not enough to ask the general question if a certain form of CBDC is comparable to cash (coins) in one way or another. Prior to this appraisal, one must determine the characteristics of cash that are actually relevant for the provision in question; then, as a second step, one can determine whether another form of money has equivalent characteristics. The prevailing view in the United States on the Coinage Clause seems to be that aspect of intrinsic value – which is an important characteristic of precious metals – is not a

[149] *Juilliard*, 110 U.S. 421 at 464-465 (Justice Field, dissenting). *See* on the opinion Callan, *supra* at 134-135.

[150] *Juilliard*, 110 U.S. 421 at 462-463 (Justice Field, dissenting) ("Money is not only a medium of exchange, but it is a standard of value. Nothing can be such standard which has not intrinsic value, or which, is subject to frequent changes in value").

crucial feature of "money". Otherwise one could not reach the conclusion that paper money could be covered by the Coinage Clause because the paper's intrinsic value is negligible. Likewise, a (token- or account-based) CBDC does not have intrinsic value like precious metals. Thus, from this perspective, there are good arguments for treating CBDC like paper money under the U.S. Constitution's Coinage Clause.

At first sight, article 128 TFEU's wording appears to be, compared to the U.S. Coinage Clause,[151] broader because it expressly addresses both coins and banknotes; thus, there can be no doubt that banknotes are covered by the provision. However, at the same time, the wording is limited[152] insofar as it refers exclusively to two forms of money that have traditionally been represented by *physical* tokens.[153] Hence, two questions for the introduction of CBDC arise: First, can a banknote or a coin be of a non-tangible nature? Second, provided that physical tokens are not required, would a particular CBDC design qualify as a banknote or a coin under the TFEU?

With regard to the first question, it can be argued, that – based on the plain meaning of the words – "banknotes" and "coins" do not cover any type of CBDC.[154] According to this line of argumentation, a physical token made of paper, metal or comparable materials is a necessary requirement for banknotes and coins within the meaning of article 128 TFEU. However, other commentators reject a pure literal understanding of

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[151] It should be noted that this provision regulates the powers of the ECB while U.S. constitution referred to before regulates the powers of Congress; however, article 128 TFEU, among others, is understood to further specify the exclusive competence of the Union in monetary policy according to article 3(1)(c) TFEU, *see Dietrich and Häring*, C-422/19, C-423/19 at ¶ 33 et seq.

[152] However, also the U.S. Constitution uses the term to „coin" money; *see* on the possible historic meaning of term Natelson, *supra* at 1026 et seq., 1061 et seq.

[153] *Cf. also* Bossu et al., *supra* at 19.

[154] *Cf.*, *e.g.*, Siekmann, *Monetary Aspects*, *supra* at 49 ("The terms "banknote" and "coin" have been established for centuries and possess a clear meaning. Subsuming any kind of electronic instrument would be at its core an act of legislation and not of applying the law"); *see also* Athanassiou, *Digital Innovation*, *supra* at 204-205; from international perspective Bossu et al., *supra* at 16, 20. *Cf. also* Nabilou & Prum, *supra* at 1086.

the treaty and apply a functional reading.[155] The ECB states that "if the digital euro were to be issued as an instrument equivalent to a banknote, then the most expedient legal basis for its issuance would be Article 128 of the TFEU in conjunction with the first sentence of Article 16 of the Statute of the ESCB".[156] Again, the discussion comes down to what the relevant features that banknotes (and coins) are that must be compared with a particular CBDC design. In this connection, it is argued that a CBDC would have to be "functionally 100% equivalent to the existing cash, to say the least".[157] This would imply that the CBDC would have to be a) issued subject to the authorization of the ECB, b) denominated in euro, c) useable without disclosing or identifying its owner, d) transferable without involving an intermediary and additional costs, e) a permanent storage of value that is unlimited in volume, f) accepted by all government entities.[158]

Without doubt, a digital euro "banknote" would have to be denominated in euro and function as a storage of value. However, the other enumerated functionalities of banknotes deserve a closer analysis. With regard to point d) referenced above, it is one of the core features of decentralized DLT-networks that one does not has to rely an intermediary to carry out transactions. The holder controls her assets directly and – different to "regular" data – the tokens cannot be copied at will.[159] For that reason, "crypto-currencies", "blockchain-tokens" and the like are often compared to cash.[160]

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[155] Lastra & Allen, *Virtual Currencies supra* at 44-45 ("The issue of currency in the Eurozone is regulated by Article 108 TFEU, which provides that the ECB has the exclusive right to issue euro banknotes. In our view, this would include 'e-euro' VC tokens"); *see also*, *e.g.*, Chiu, *supra* at 452. *See* in general on the interpretation of EU monetary law F. Elderson, *Legal Interpretation within the ESCB: Is there Method in It?* in *Legal Aspects of the European System of Central Banks: Liber Amicorum for Paolo Zamboni Garavelli* 93 (ECB ed., 2005).

[156] ECB, *Report on a digital euro*, *supra* at 24.

[157] Siekmann, *Monetary Aspects*, *supra* at 49.

[158] Siekmann, *Monetary Aspects*, *supra* at 50. *See also* Dumitrescu-Pasecinic, *supra* at 252-253.

[159] *See* above section 5.

[160] Andrea Pinna & Wiebe Ruttenberg, *Distributed ledger technologies in securities post-trading* (ECB Occasional Paper Series No 172, 2016), *available at*

Thus, if a CBDC in question possesses these characteristics, it is reasonable to considered them equivalent to traditional forms of cash, *at least from this perspective*.[161] This would apply to blockchain/DLT-based token as described above, but potentially also to "regular" tokens stored on physical media provided there is an effective technical solution to prevent double spending while maintaining the user's direct control of the tokens. This argument is not called into question by the "additional cost" argument, since this is not an absolute feature of cash: If you go to your favorite restaurant around the corner, the cash payment will be fast and practically cost-free. However, what if a company located Athens wants to use its legal tender tokens to pay a Parisian contractor?[162] Transferring cash from Athens to Paris is both slow and comparatively expensive, as one would have to physically move the money to the location of payment, very likely by relying on third parties (especially postal services or money remittance providers). In fact, using blockchain/DLT-based CBDC would most likely be – in view of the costs alone – a more reasonable decision for the company, and would hence be even less costly than the cash alternative.[163] The point here is not claim that CBDC are always the more reasonable way of making payments; rather, it should be highlighted that the characteristics of cash as well as the advantages and drawbacks of this means of payments depends on the context one looks at. As a consequence, it is doubtful whether the involvement on intermediaries and the existence of "additional" costs is a useful criterion for the present purposes.

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https://www.ecb.europa.eu/pub/pdf/scpops/ecbop172.en.pdf („An UTXO may be seen as the digital representation of a banknote").

[161] This should not be confused with the psychological conceptions that humans might want to „see and feel the currency", *cf. Smits*, The European Central Bank, *supra* at 204.

[162] The contractual obligation to pay in Paris is assumed here.

[163] *Cf.* Athanassiou, *Digital Innovation*, *supra* at 185. It should also be noted that storing a large amounts of cash in one's home involves costs and risks; in this light, a CBDC potentially offer a more secure way to "store" (large amounts of) central bank money.

Point c) perhaps refers to the most prominent issue in the (public) discussion on CBDC. Whether anonymity can or should be guaranteed by digital central bank has been analyzed from different angles, often times with the express concern that the new form of money might be used for illicit purposes (especially money laundering and terrorist financing).[164] As many people are concerned about their privacy, this is not merely a technical or legal question but also one of fundamental importance for the general public's practical acceptance of a potential CBDC. Nevertheless, both the Fed and the ECB have made clear the "full" anonymity is not an option.[165] In this light, the equivalence of CBDC and cash is questioned already at the outset. Indeed, the ability to make anonymous payments is generally closely linked to cash. However, is anonymity[166] an inherent feature of cash payments? In fact, there is nothing stopping lawmakers from requiring every cash payment to be recorded and every payer's identity to be verified. [167] After all, there is nothing that would prevent lawmakers from granting completely anonymous access to commercial bank book money too. It seems relatively clear that neither of these two options would be desirable, but this is not the point. What is crucial from the legal point of view is that anonymity is not an inherent feature of neither cash nor book money (nor tokens recorded in a decentralized

[164] Board of Governors of the Federal Reserve System, *Money and Payments*, *supra* at 19 et seq.; ECB, *Report on a digital euro*, *supra* at 19 et seq., 36 et seq.; *see also* Auer & Böhme, *Technology*, *supra* at 93 et seq.; Morten Bech & Rodney Grarratt, *Central Bank Cryptocurrencies,* BIS Quarterly Review 55, 63 et seq. (September 2017).

[165] *Board of Governors of the Federal Reserve System*, Money and Payments *supra* at 14; ECB, *Progress on the investigation phase of a digital euro*, *supra* at 7; *see also* U.S. Department of the Treasury, *Future of Money and Payments*, *supra* at 26.

[166] The technical developments may, to a certain extent, blur the lines between anonymity and pseudonimity; in general, blockchain networks like Bitcoin are nowadays typically described as pseudonymous, not anonymous, *see*, *e.g.*, De Filippi & Wright, *Blockchain*, *supra* at 68-69.

[167] Reference is made here only to the concepts of article 128 TFEU; whether certain measures or CBDC implementations conflict with fundamental rights or the GDPR is a different issue and must be assessed separately.

ledger)[168] but rather a policy choice.[169] This is demonstrated by laws that require notification of cash payments upwards a certain threshold.[170] The law might even – quite contrary to the legal tender status – provide for an outright ban on cash payments of a certain size,[171] legislation of the kind that has been proposed by the European Commission.[172] Hence, anonymity is, again, a matter of perspective; the fact that the law might require a cash payer to verify her identity and record the transaction or even forbid certain transactions does not cause the banknotes or coins transferred to cease being banknotes or coins. What much "anonymity" discussion seems to refers to is instead the user's direct control of the tokens. This used to be an inherent feature of physical tokens but can nowadays, as explained, be replicated by technology for digital tokens.[173] There is, conversely, nothing inherent to cash payments that would require them to be legally anonymous. Thus, while anonymity is a very important aspect for the implementation of CBDC, it is – for the purposes of the present appraisal – not an

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[168] *Cf.*, however, Bindseil, *supra* at 304 ("[The absence of a central ledger] is often associated with anonymity, i.e. meaning that the central bank would not know who currently holds the issued tokens (like in the case of banknotes)").

[169] *Cf.* Crawford & et al., *supra* at 152; *see also* Hockett, *supra* at 345 (470) (privacy potentials as a "matter of system design"), 478 et seq.; *see* already section 5.1 above; *See*, however, Board of Governors of the Federal Reserve System, *Money and Payments*, *supra* at 14; ECB, *Report on a digital euro*, *supra* at 11.

[170] *See*, *e.g.*, Hockett, *supra* at 478 n. 558 (referring to 31 C.F.R. § 1010.311 that contains a filing obligation for transactions greater than 10.000 USD); art. 2(1)(3)(e), 11(c) Directive (EU) 2015/849 of the European Parliament and of the Council of 20 May 2015 on the prevention of the use of the financial system for the purposes of money laundering or terrorist financing, amending Regulation (EU) No 648/2012 of the European Parliament and of the Council, and repealing Directive 2005/60/EC of the European Parliament and of the Council and Commission Directive 2006/70/EC, 2015 O.J. (L141) 73-117; *cf.* Freitag, *Euro as Legal Tender*, *supra* at 607-609. *See also* art. 3 Regulation (EU) 2018/1672 ("Carriers who carry cash of a value of EUR 10 000 or more shall declare that cash to the competent authorities of the Member State through which they are entering or leaving the Union and make it available to them for control").

[171] *See* for an overview of euro zone member states that apply limits on cash transactions Matthias Schrothet al., *Should the use of cash be limited?*, Monetary Policy & The Economy 109, 112-113 (Q1-Q2, 2022), *available at* https://www.oenb.at/Publikationen/Volkswirtschaft/Geldpolitik-und-Wirtschaft/2022/monetary-policy-and-the-economy-q1-q2-22.html. The ECJ generally considers limits on cash payment compatible with the free movement of capital, *see Ecotex Bulgaria v. Teritorialna direktsia na Natsionalnata agentsia za prihodite*, C-544/19 (ECJ 2021).

[172] Art. 59(1) COM(2021) 420 final ("Persons trading in goods or providing services may accept or make a payment in cash only up to an amount of EUR 10 000 or equivalent amount in national or foreign currency, whether the transaction is carried out in a single operation or in several operations which appear to be linked").

[173] *See* section 5 above.

inherent feature of banknotes or coins. What is more, technical ways of implementation that allow for anonymity are actively considered, as so-called "anonymity vouchers" would potentially provide a certain level of anonymity for low-value payments.[174] Depending on the concrete implementation, this might lead to a situation similar to cash, where some transactions are, from a legal perspective, "fully" anonymous and some transactions – usually those of a certain size – that are not. In conclusion, the issue of anonymity does not, as such, rule out digital forms of banknotes or coins.

Point a) and f) might surprise at first glance. This is because they seem to describe legal consequences of the fact that something "digital" qualifies as a "banknote" rather than exploring the concept of "banknote" itself. Taking the implications of "digital banknotes" into account is an important consideration, however. A conceptually similar line of argument also refers to the status of cash as legal tender: Declaring CBDC "banknotes" would "automatically" lead to their status as legal tender; as a consequence, due to the legal tender's ability to discharge of debts,[175] creditors of a monetary debt would be obliged to accept CBDC which, in turn, would put on them "the obligation to use electronic technology".[176] Arguments of this kind should not be dismissed with the mere reference that there is no clear distinction between definition ("banknote", "coin") and legal consequence (legal tender status). This is because it seems hardly possible to fully separate the concept of these forms of money from their legal tender status. Rather, the legal tender status was conferred upon cash with the traditional concept of banknotes and coins – a physical piece of paper, metal or similar

[174] ECB, *Exploring anonymity in central bank digital currencies* 6 (2019) *available at* https://www.ecb.europa.eu/paym/intro/publications/pdf/ecb.mipinfocus191217.en.pdf ("anonymity vouchers"); ECB, *Progress on the investigation phase*, *supra* at 7-8 ("selective privacy").
[175] *See* section 4.3 above.
[176] *See* Dumitrescu-Pasecinic, *supra* at 252-253.

material – in mind, i.e., something that can in principle be transferred without any technical equipment or expertise. It could still be argued that digital banknotes and coins are compatible with the notion of legal tender, however. This is because the notion of legal tender is not absolute.[177] In the present context, this refers to the question under what circumstances a creditor may refuse cash even absent a contractual agreement on a non-cash payment. The private laws of the member states might very well come to the conclusion that a creditor of a monetary debt may – despite a potential digital banknote's or coin's legal tender status – refuse payment in digital legal tender tokens under circumstances in which the opposite would be considered as unacceptable.[178] This might be found as long as payments in CBDC are not widespread and the implementation costs for using CBDC are high. Thus, the legal tender status of a CBDC does not necessarily imply the general obligation to use electronic technology". Yet, the member states' laws will likely – at least in questions of detail – differ on this matter.[179]

Thus, while digital banknotes are, in principle, compatible with the TFEU's notion of "banknotes", the complications introduced by their "automatic" legal tender status casts some doubts on whether article 128 TFEU supports the introduction of a digital "banknote".[180] At the very least, there exists some legal uncertainty that is not conducive to a smooth introduction of a digital euro. A solution for this problem might lie in the introduction of a digital banknote while at the same time further specifying

[177] *Dietrich and Häring*, C-422/19, C-423/19 at ¶ 55-56.
[178] *Cf.* Freitag, *Euro as Legal Tender*, *supra* at 597.
[179] These thoughts concern the *payee's* perspective; an "obligation to use technology" for the *payer* would not arise unless cash would be abolished altogether; however, neither the Fed nor the ECB has accounted plans to this end.
[180] This applies *mutatis mutandis* to coins; *see* on the delineation from banknotes immediately below.

its legal tender status in an act of secondary law,[181] thereby addressing concerns associated with "the obligation to use electronic technology". This act could, for instance, provide for a general obligation to accept the CBDC only when the necessary equipment is readily available.[182] Governments of the euro zone member states should, in contrast, generally be obliged to accept payments (*e.g.*, based on tax law) and provide the necessary infrastructure for this purpose.

Having established that digital forms of cash can be – depending on the technical implementation – equivalent to physical forms of cash, the question remains how to distinguish between the latter. In other words, would a CBDC be a digital "banknote" or a digital "coin"? This issue especially pressing for EU law, as article 128 TFEU clearly distinguishes between these two forms of central bank money.[183] However, both banknotes and coins are based on physical tokens and both have a constant face value.[184] One obvious, albeit merely formal, distinction refers to the denomination of

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[181] Statutory specifications on the status of legal tender are not unprecedented in EU law. An example can be found in article 11 Regulation (EC) No 974/98 that refers to coins ("Except for the issuing authority and for those persons specifically designated by the national legislation of the issuing Member State, no party shall be obliged to accept more than 50 coins in any single payment"); *see also* Freitag, *Euro as Legal Tender*, *supra* at 600, 602-603. A secondary law act would also be necessary to specify technical details; the current rules on banknotes and coins (*see*, *e.g.*, Decision of the European Central Bank of 19 April 2013 on the denominations, specifications, reproduction, exchange and withdrawal of euro banknotes (ECB/2013/10) (2013/211/EU), 2013 O.J. (L118) 37-42; Council Regulation (EU) No 729/2014 of 24 June 2014 on denominations and technical specifications of euro coins intended for circulation, 2014 O.J. (L194) 1-7) clearly refer to physical tokens and do not fit CBDC.

[182] *Cf.* ECB, *Report on a digital euro*, *supra* at 33 ("The decision to assign legal tender status to the digital euro would in practice require that it be usable in any place and under all conditions, to allow the unconditional acceptance of payments. Legal tender status would require that users be able to receive incoming payments through means that are as user-friendly as banknotes, for example by using a simple physical device that can also be used offline […]"). The concrete implementation of such an instrument of secondary law would have to comply with primary law; in this connection, it should be noted that the legal tender status of banknotes is – different from coins –based on primary and not secondary law; *see* section 4.3 above. Article 16(2) of the ECB/ESCB Statute states that the „ECB shall respect as far as possible existing practices regarding the issue and design of banknotes". However, this provision does not seem to rule out digital forms of banknotes, *see* Banque de France, *Central Bank Digital Currency*, *supra* at 31; *see also* Dumitrescu-Pasecinic, *supra* at 252. On the different question how access to CBDC could legally be ensured *see* Nabilou & Prum *supra* at 1097-1088; on the advantages of cash over digital forms of payments *see* Siekmann, *Monetary Aspects*, *supra* at 47-48.

[183] Coins are not regulated in the ECB/ESCB Statute because their issue is not a competence of the ECB, *see* Smits, *The European Central Bank*, *supra* at 205.

[184] *Cf.* Dumitrescu-Pasecinic, *supra* at 252

banknotes and coins.[185] However, the denomination is based on secondary law[186] and it is questionable whether one can use these instruments to interpret primary law.[187] What is more, this would mean that article 128 TFEU contains a flexible concept of banknotes and coins that can be changed at any time, there "delegating" the task of defining banknotes and coins to secondary law. It is doubtful whether this is really the case.

Rather, article 128 TFEU mirrors the historical development of money: Among the first types of money were coins made of precious metals; later, paper money was introduced.[188] Both forms of money rely on physical tokens and can have varying denominations, but the crucial difference is that coins consist of tokens that have *intrinsic value*:[189] The metal that coins are made of possesses value in and of itself, simply because the copper, steel and so on can – in principle[190] – be used for different purposes regardless of whether it is also minted to become a form of money.[191] In contrast, the pieces of paper that are imprinted to become banknotes do not, practically, have any value if they had not been declared banknotes. Thus, article 128 TFEU can be read to functionally distinguish two forms of money that are both embodied in physical tokens: One form of money that consists in tokens with intrinsic

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[185] *Chiu*, *supra* at 451-452; *see also* Banque de France, *Central Bank Digital Currency*, *supra* at 31.

[186] It should also be noted that article 5 Regulation (EU) No 651/2012 of the European Parliament and of the Council of 4 July 2012 on the issuance of euro coins, 2012 O.J. (L201) 135-137 contains special rules with regard to (the denomination of) collector coins.

[187] Admittedly, the ECJ – though on an unclear methodological basis – relied on secondary law to give meaning to article 128 TFEU, see *Dietrich and Häring*, C-422/19, C-423/19 at ¶ 63 et seq. *Cf.* on the issue *also* Siekmann, *Monetary Aspects*, *supra* at 44 et seq.

[188] On the historical development of money *see*, *e.g.*, Christine Desan, *Money as a Legal Institution* in *Money in the Western Legal Tradition: Middle Ages to Bretton Woods* 18 (David Fox & Wolfgang Ernst eds., 2016).

[189] *Cf.* the discussion on the U.S. Constitution above.

[190] Admittedly, however, the intrinsic value may be (much) lower than the face value, *see* Bernd Krauskopf, *How Euro Banknotes Acquire th Properties of Money* in *Legal Aspects of the European System of Central Banks: Liber Amicorum for Paolo Zamboni Garavelli* 243, 246 et seq. (ECB ed., 2005) (fiduciary money).

[191] *Cf. also* Proctor, *Mann on the Legal Aspect of Money*, *supra* at 34 (distinguishing medium of exchange and object of exchange), 36 et seq., 257.

value and another form of money that consists in tokens that lack said value; the latter are called banknotes, the former coins.[192] In application of this reading, neither printing "paper coins" nor minting "golden banknotes"[193] would be compatible with article 128 TFEU. At the same time, datasets, tokens etc that would be used for "digital cash" lack intrinsic value;[194] this also applies to crypto-assets like Bitcoin.[195] These thoughts lead to the conclusion that CBDC tokens (that likewise lack intrinsic value) constitute, from a legal perspective, banknotes rather than coins.[196]

7. Conclusions

Both the United States and the Eurozone are considering the introduction of a digital dollar and a digital euro, respectively. However, the various ways of implementation of this new form of central bank money leads to terminological confusions. First and foremost, this relates to the distinction of token- and account-based CBDC; the different technical options of implementation can blur the lines of established forms of money which in turn complicates the legal assessment. The most convincing way to

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[192] Hence, since the intrinsic value matters, article 128 TFEU would arguably permit the introduction of non-metal coins (*e.g.*, made of gemstones). The same applies, *mutatis mutandis*, to banknotes made of plastic. At the same time, however, it seems indispensable that the note permanently displays its face value because otherwise it would fail to serve its purpose as a unit of account.

[193] The terms „printing" and „minting" are used in a non-technical sense and do not refer to the separate acts of physically producing banknotes or coins vis-à-vis putting them into circulation.

[194] From this perspective, the TFEU's „binary" distinction between banknotes and coins does not hinder the introduction of a CBDC; *see*, however, Marcelo M. Prates, *Money in the Twenty-First Century: From Rusty Coins to Digital Currencies*, 15 Ohio St. Bus. L. J., 164, 228 (2021) ("This binary distinction between paper currency and coins may hinder the creation of a "digital euro" if the legal framework is not adjusted. As the legal rules characterize the two forms of money that can be issued, adding a third one (the digital form) through interpretation could face pushback", footnotes omitted).

[195] *See*, *e.g.*, Ansgar Belke & Edoardo Beretta, *From cash to central bank digital currencies and cryptocurrencies: a balancing act between modernity and monetary stability*, 47 J. of Econ. Studies 911, 917, 929-930 (2020); *Sergii Shcherbak, How Should Bitcoin be Regulated, 7 European J. of L. Studies, 45, 50, 57 (2014).*

[196] One might also argue that the term "coin" should be interpreted narrowly vis-à-vis "banknotes", *cf.* Siekmann, *Monetary Aspects*, *supra* at 49 ("As the right of the Member States to issue coins appears as a historic reminiscence without economic justification, an electronic euro banknote, authorized by the ECB, would be the only debatable option if at all"); *cf. also* Bernd Krauskopf, *Euro Banknotes*, *supra* at 248 ("By contrast, the value of the material or the redemption commitment are meaningless. Distinguishing between coins and paper money within the same monetary legislation is no longer appropriate) (footnotes omitted).

distinguish between the token- and account-based CBDC is to refer to the user's direct control over the CBDC that exists in token-based settings but not in account-based models. From a legal point of view, the introduction of CBDC seems to be possible both in the United Sates and the Eurozone but additional legislation is likely required, especially in view of the CBDC's potential legal tender status. It should be highlighted that CBDC tokens can – depending on their technical design – functionally correspond to cash, regardless of whether payments can be made "anonymously". For the lack of intrinsic value, CBDC tokens would be comparable to banknotes rather than coins.