*Šime Jozipović**
*Marko Perkušić***
*Nina Mladinić****

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A COMPARATIVE REVIEW OF THE LEGAL STATUS OF NATIONAL CRYPTOCURRENCIES AND CBDCs: A LEGAL TENDER OR JUST ANOTHER MEANS OF PAYMENT

Summary: *This paper analyses the legal framework of national virtual currencies and so-called Central Bank Digital Currencies (CBDCs) from a comparative law perspective. The authors define the meaning of the terms "means of payment" and "legal tender" and determine the legal consequences of classifying certain means of payment as legal tender. Building on this, the authors present new developments in the field of sovereign virtual currencies and shed light on their evolution through a comparative legal analysis of various national virtual currencies. In this context, the authors present developments in various African countries, Venezuela's initiative to introduce the first state-backed crypto token, the first CBDC pilot projects in Uruguay and China, and considerations to introduce a CBDC in the EU. Based on the analyzed systems, problems regarding privacy, user protection and effective regulation of transactions are highlighted in order to present the legal challenges for the establishment of a fully functional (supra-)national euro CBDC.*

Keywords: *virtual currency, CBDC, payment, legal tender, digital euro*

* Šime Jozipović, PhD, Assistant Professor, Faculty of economics, business and tourism, University of Split, Cvite Fiskovića 5, 21000 Split, E-mail address: sjozipov@efst.hr. ORCID: https://orcid.org/0000-0002-8050-5134.

** Marko Perkušić, PhD, Assistant Professor, University Study Center for Forensic Sciences, University of Split, Ruđera Boškovića 33, 21000 Split, E-mail address: mperkusi@forenzika.unist.hr. ORCID: https://orcid.org/0000-0002-5845-2961.

*** Nina Mladinić, PhD, Assistant Professor, University Study Center for Forensic Sciences, University of Split, Ruđera Boškovića 33, 21000 Split, E-mail address: nmisic@forenzika.unist.hr. ORCID: https://orcid.org/0000-0001-6664-0375.

1. INTRODUCTION

Since the appearance of bitcoin in 2008, people have become increasingly interested in virtual currencies. Because virtual currencies have been promoted as a new and advanced means of payment that can replace legal tender (fiat currencies), various studies have been conducted on the capabilities of these new instruments. It is a general academic consensus that any successful currency must be able to function as a medium of exchange, store of value, and unit of account.[1] The first generation of cryptocurrencies (such as bitcoin) did not meet these criteria, as their price volatility prevented stable, long-term transactions from taking place, so that users of virtual currencies had to constantly recalculate their agreed prices. In addition, while cryptocurrency transactions have generally proven to be safe, various means of storing virtual currencies proved vulnerable to theft, making them a risky way to store value.[2] These factors made virtual currencies more of a speculative investment than a typical currency used as a medium of exchange.[3] Despite the mentioned challenges, however, interest remained high as the general belief in the value of blockchain technology – the technical foundation for virtual currencies – remained strong. Soon, subsets of virtual currencies (such as tokens and stablecoins) developed, which offered solutions to volatility problems, but virtual currencies were still not seriously considered as a possible replacement for existing means of payment (such as fiat currencies, deposit money and electronic money).

This changed when various countries decided to develop their own virtual currencies. Such virtual currencies are primarily referred to as national cryptocurrencies or central bank digital currencies (CBDCs), but they have also been referred to as government-based cryptocurrencies, country-owned digital currency,[4] digital government-backed cryptocurrency,[5] etc.[6] Different countries are developing their own virtual currencies for a variety of reasons. For example, some countries engage in this activity because they do not have their own reliable national currency (e.g. certain countries in Africa and Latin America), while others seek to strengthen their influence on the international market (e.g. China). In this paper, we will determine how exactly national virtual currencies are integrated into national legal frameworks, how a national cryptocurrency can be defined, and what the requirements are for them to be legal tender. Building on these insights, we will analyse the most significant national virtual currencies in the world. We will present the key features of their underlying technology and legal status in order to compare them and determine whether certain national virtual currencies can indeed function as reliable legal tender.

1 David Yermack, 'Is bitcoin a real currency? An economic appraisal' (2014) National bureau of economic research, Working Paper 19747, 9, https://www.nber.org/system/files/working_papers/w19747/revisions/w19747.rev0.pdf, accessed 3 August 2023.

2 David Yermack, 'Is bitcoin a real currency? An economic appraisal' (2014) National bureau of economic research, Working Paper 19747, https://www.nber.org/system/files/working_papers/w19747/revisions/w19747.rev0.pdf, accessed 3 August 2023.

3 See more about that subject Marko Perkušić, *Law on electronic payments* (Školska knjiga, 2020) 338–339.

4 Bob Mason, 'The Next Cryptocurrency Evolution: Countries Issue their Own Digital Currency', *FX Empir*e, (31 May 2020) <www.kitco.com/commentaries/2017-10-23/The-Next-Cryptocurrency-Evolution-Countries-Issue-their-Own-Digital-Currency.html> accessed 3 August 2023.

5 Sudhir Khatwani, 'List of Countries That Have Plans to Roll out Their Own Cryptocurrencies', Coinsutra, (2018), <coinsutra.com/national-cryptocurrencies/> accessed 3 August 2023.

6 Srirath Goi Gohwong, 'Government-based Cryptocurrencies' [2019] 3(2), Asian Political Science Review.

2. LEGAL TENDER

There is no international consensus to the definition of legal tender. However, the modern view on legal tender is that for something to be considered legal the recipient of a transaction (creditor) must be obliged by law to accept a payment made with the respective monetary value (the legal tender) unless there is a specific agreement between him and the sender (debtor) to accept another medium of exchange.[7] It follows that if a particular type of virtual currency is determined by law as legal tender, any person entering into a legal transaction is obliged to accept that type of virtual currency as a means of payment, unless expressly agreed otherwise. This, in turn, has the effect of making a country responsible for ensuring the validity of transactions involving this type of payment (virtual currency), since the country has effectively compelled the contracting party to accept a particular type of virtual currency as a means of payment. Therefore, each country must carefully consider, analyze and thoroughly regulate all aspects (such as mode of operation, possible intermediaries, and security of transactions) of such a virtual currency before declaring it a legal tender. Otherwise, at a certain point, it risks serious damages to its financial market and economy.

3. NATIONAL CRYPTOCURRENCIES AND CBDC

National governments have had mixed reactions to the emergence of virtual currencies. Some countries have chosen to regulate and tax income and gains from virtual currencies, while others have taken a more restrictive stance. In recent years, however, the positive aspects of regulation and taxation have become increasingly prominent in public discourse.[8] As stated earlier, the European Union (EU) has already spearheaded numerous initiatives to regulate virtual currencies, protect consumers, and prevent money laundering associated with virtual currencies. Due to the increasing popularity of virtual currencies and their advantages in terms of security, transaction speed and programmability, some governments have decided to work on introducing their own versions of virtual currencies. Today, national versions of virtual currencies are diverse in nature, ranging from currencies comparable to traditional crypto tokens to so-called CBDCs.

Although CBDCs are centralized, they do not have much in common with the previously described centralized cryptocurrencies, because some of them aim to be legal tender and as they are issued and controlled by an institution with public authority. Definitions of national virtual currencies in general and CBDCs in particular are diverse. They can be defined as "a type of cryptocurrency, owned by the government ... and used by government as a solution for fixing loss of control on internal affairs in their territory from non-government-based cryp-

7 George Selgin, 'Adaptive Learning and the Transition to Fiat Money' [2003], The Economic Journal 113, 160; Dror Goldberg, 'Legal tender' (2009) Working Paper No. 2009-04, 2, Bar-Ilan University, Department of Economics, Ramat-Gan, <https://www2.biu.ac.il/soc/ec/wp/2009-04.pdf> accessed 3 August 2023.

8 Šime Jozipović, Marko Perkušić, Andrej Ilievski, 'Cryptocurrencies as (i)legal tender in North Macedonia and the EU' [2020] 11(2) Iustinianus Primus Law Review, 1–20.

tocurrency",[9] or as "government backed cryptocurrency akin to paper currency, but in digital form".[10] However, particularly in the context of comparing current solutions in this area, we believe a more accurate definition to be "money that is issued by the central bank or directly by the government that is electronic, universally accessible, and enabling payment with no intermediary through a peer-to-peer network".[11] However, even this definition may be inaccurate based on the technical solutions that are used for the respective CBDC.

While the legal classification of "CBDCs" will ultimately be shaped by the way these new means of payment are integrated in the financial system, they can generally be defined as an electronic variant of cash issued by a central bank that combines cryptography and digital ledger technology to offer this digital money.[12] Its most important feature is that it represents a central bank liability in electronic form, which can then, based on the system of implementation, take the form of:[13]

1. A cash substitute if held by the public
2. A central bank reserve if held only by banks and other financial intermediaries participating in the system

In practice, this means that CBDCs are a separate category of virtual currencies that are inextricably linked to national central banks. However, this relationship is not necessarily visible to the end user. Since the use of CBDCs is essentially very similar to other transaction methods, it may be questionable whether users can distinguish CBDCs from other means of payment.[14] However, there are clear differences that, from a legal perspective, present significant advantages to users when using CBDCs. Since CBDCs are a direct substitute for cash and central banks guarantee the exchangeability of CBDCs, users have a direct claim against the respective central banks.

The role of central banks is particular and related to M0 money – a form of money issued directly by the legally defined primary issuer. As the primary issuer (central bank) is legally authorized to issue M0 money, its liquidity in meeting obligations is a given. This means that any holder of a CBDC can be sure that their CBDC can be exchanged for physical money. In contrast, no one guarantees the exchangeability of traditional cryptocurrencies. Moreover, other

9 *Ibid.*

10 Kartik Hegadekatti, 'WorldMoney – The International Sovereign Backed Cryptocurrency' (2016) SSRN, (December 22, 2016). <https://ssrn.com/abstract=2888773> accessed 7 August 2023. In that context, national cryptocurrencies are also called regulated and sovereign backed cryptocurrencies.

11 Morten Linnemann Bech, Rodney Garratt, 'Central Bank Cryptocurrencies' [2017] BIS Quarterly Review, September 2017, 55–70; Juan J. Duque Romero, 'State involvement in cryptocurrencies. A potential world money?' [2020] The Japanese Political Economy 46(1), 4. In that context, national cryptocurrencies are also called central bank cryptocurrency.

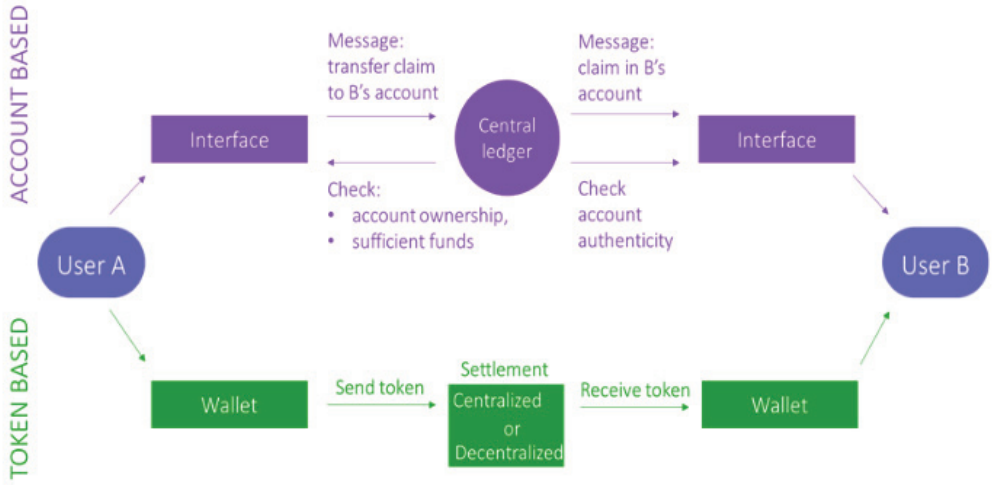
12 Santiago Fernández De Lis, Javier Sebastián, 'Central Bank Digital Currencies and Distributed Ledger Technology' (2019) BBVA Research: Madrid, Spain, 2019, <http://www.bbvaresearch.com/publicaciones/las-monedas-virtuales-de-bancos-centrales-y-la-tecnologia-de-contabilidad-distribuida/> accessed 8 December 2022.

13 ECB, 'Report on a digital euro', Report on a digital euro (October 2020), <https://www.ecb.europa.eu/pub/pdf/other/Report_on_a_digital_euro~4d7268b458.en.pdf> accessed 2 March 2023.

14 Sergio Luis Náñez Alonso, Javier Jorge-Vazquez, Ricardo Francisco Reier Forradellas, 'Central Banks Digital Currency: Detection of Optimal Countries for the Implementation of a CBDC and the Implication for Payment Industry Open Innovation' [2021] J. Open Innov. Technol. Mark. Complex 7(1), 72, 86.

already established forms of money such as electronic money or deposit money are liabilities of the issuer and thus dependent on the liquidity of the issuer (bank, e-money institution[15]).[16]

There are two main technical solutions for creating CBDC systems: an account-based system and a token-based system. An account-based system is similar to deposit money, with the key difference that the CBDC is not a liability of a bank, but of the central bank, either directly or indirectly. A token-based system, on the other hand, is more similar to a crypto-token, with the key difference that instead of a private issuer, the central bank guarantees exchangeability. The structure of transactions can be illustrated by the following scheme:



Source: IMF Staff – Tommaso Mancini Griffoli, Maria Soledad Martinez Peria, Itai Agur, Anil Ari, John Kiff, Adina Popescu, Celine Rochon: Casting Light on Central Bank Digital Currencies, available under: https://www.imf.org/en/Publications/Staff-Discussion-Notes/Issues/%202018/11/13/Casting-Light-on-Central-Bank-Digital-Currencies-46233, p. 6

Since 2014, many governments (such as Venezuela, Thailand, Iceland, various African countries, etc.)[17] have been working on launching their own version of a national virtual currency. However, in most of these countries, national cryptocurrencies are still in the experimental and analytical phase, which can be carried out through regulatory sandboxes, with the aim of minimising the risk of implementation while still reaping the benefits of this new

15 See more about that: Perkušić (n 3) 80–274.

16 While banks guarantee for the deposits of consumers to a certain amount, this is not the case for businesses or government institutions. One has just to consider cases like the deposit losses related to the recent insolvency of Greensill Bank in Germany to see the extent to which deposit money can be at risk. See German Federal Institution for the Supervision of Financial Services (BaFin), 'FAQ Greensill Bank AG', available under: <https://www.bafin.de/SharedDocs/Downloads/DE/Anlage/dl_PM_210303_Greensill.pdf?__blob=publicationFile&v=2>, (2021), accessed 10 August 2023.

17 Stephen O'Neal, 'State-Issued Digital Currencies: The Countries Which Adopted, Rejected or Researched the Concept', *Cointelegraph* (19 July 2018) <cointelegraph.com/news/state-issued-digital-currencies-the-countries-which-adopted-rejected-or-researched-the-concept> accessed 7 August 2023; Viewnodes, 'National Cryptocurrencies: An Innovation No One Really Wants', Hackernoon (18 December 2018) <hackernoon.com/national-cryptocurrencies-an-innovation-nobody-wants-4666ce099da5> accessed 7 August 2023; Gohwong (n 6).

technology.[18] Regulatory sandboxes can be defined as "a safe place where companies can test innovative products, services, business models and delivery mechanisms without immediately facing all the normal regulatory consequences of engaging in the activity in question".[19]

Different countries have chosen to issue national cryptocurrencies for a variety of reasons and have adapted them to their specific needs. While we cannot discuss[20] all of the many national projects in this area, we will present examples of national cryptocurrencies as well as pilot projects and plans for CBDCs that have emerged in Venezuela, China, various African countries and the EU.

3.1. CRYPTOCURRENCIES AND DIGITAL PAYMENTS ACROSS VARIOUS AFRICAN LEGAL SYSTEMS

Cryptocurrencies and other alternative means of payment have become increasingly popular in numerous African countries.[21] This is undoubtedly related to the challenges in accessing traditional financial institutions across the continent and their inability to provide fast and affordable financial services.[22] In addition, African financial systems lack the level of stability comparable to the level that many Western systems such as the Eurozone have. However, while the European Union has a strong foundation through the monetary union system, African countries lack such a traditionally high level of cooperation. The introduction of a common digital currency would therefore rely on broad support from states and citizens, as well as the creation of a functioning technical framework.[23] Due to insufficient fiscal and monetary integration among African countries, proponents of a pan-African digital currency suggest that such a currency should be decentralized and cloud-based, integrate smart contracts for tax collection, and be backed by real assets such as gold.[24] If such a digital currency were to be based on gold, it would be important that the exchange rate be guaranteed by central banks, governments or other entities. An important aspect of CBDCs is that they should be central bank liabilities and legal tender.

18 Dennis Ng, Paul Griffin, 'The wider impact of a national cryptocurrency' [2018] Global Policy, Research Collection Lee Kong Chian School of Business, 8, <https://ink.library.smu.edu.sg/lkcsb_research/5880> accessed 7 August 2023.

19 Financial Conduct Authority, 'Regulatory Sandbox', *Financial Conduct Authority* (November 2015) <https://www.fca.org.uk/publication/research/regulatory-sandbox.pdf> accessed 7 August 2023.

20 See for example the already established, but still very basic CBDC project in the Bahamas or new initiatives from countries in Asia like Malaysia. In detail: Náñez Alonso, Jorge-Vazquez, Reier Forradellas (n 14), 85.

21 Michelle Chivunga, Alistair Tempest, 'Digital Disruption in Africa: Mapping Innovations for the AfCFTA in Post-COVID Times' (2021) South African Institute of International Affairs, 19; International Monetary Fund (IMF), 'Digital Currency Innovations in Sub-Saharan Africa' (2022) In Regional Economic Outlook: Sub-Saharan Africa—Living on the Edge, Washington, DC, October 2022, 2 f.

22 James Odero, 'Introducing a Cryptocurrency backed African States: Cause and effect' (2018), Univ. Of the Witwatersrand, Faculty of Commerce, Law and Managment, nr. 1568241, sec. 1s; Fexco report (Fexco Report, August 2, 2017), 'How long do international bank transfers take?' <https://fexco.com/fexco/news/how-long-international-bank-transfers-take/> accessed 10 August 2023; Anabel González, 'Deepening African Integration: Intra-African Trade for Development and Poverty Reduction, The Future of the Multilateral Trading System: Perspectives from African Policy-Makers and Partners' in Patrick Low, Chiedu Osakwe and Maika Oshikawa (eds), *African Perspectives on Trade and the WTO* (Cambridge University Press, 2016) 59.–66, 60.

23 Odero (n 22), sec. 1.1.

24 *Ibid.* sec. 1.3.2.

Alternatives to a joint currency could also be achieved through blockchain technology and smart contracts. However, the power requirements of a blockchain-based system would call into question the sustainability of such a currency, especially in Africa.[25] Moreover, the use of cryptocurrencies would require reliable and cheap access to data, which would also prove challenging in large parts of Africa.[26] A multilateral approach to an African digital currency would therefore be fraught with technical challenges. A major prerequisite for a pan-African digital currency would be the harmonization of key components such as data protection, financial regulation, and surveillance standards.[27] As there is currently no initiative to harmonize legislation to the extent that the EU has done in Europe, it could be questioned whether it would be possible to create a single digital currency, as such a currency would be heavily dependent on at least a basic common regulatory framework. However, financial regulation would not necessarily need to be developed in a similar way to EU standards. Over-regulation could be harmful, as many African countries have traditionally embraced new digital and mobile payment methods, encouraging fintech start-ups in this field.[28]

Currently there are three categories of potential contenders for new payment systems. The first is a national digital currency created by one of the more advanced African countries in this field. For example, South Africa was amongst the first countries to show a high degree of readiness for a move to digital currencies.[29] Such a currency could become popular across borders and gain popularity. The fact that major central banks around the world are working to digitise their currencies, shows that there are clear advantages to establishing a currency as a global or at least regional reserve currency. Currently multiple countries in Africa have moved towards pilot projects or CBDC launches.[30] In this regard, the Nigerian eNaira, which has launched in 2021 has proven to be of increasing interest amongst the citizens of Nigeria.[31]

The next option could be the use of a decentralized cryptocurrency. One approach to such a decentralized cryptocurrency would be the implementation of a regional cryptocurrency like the AFRO Coin. Cryptocurrencies that are geographically linked to specific areas already exist. They are built on existing blockchain technology and can be designed in different ways. The AFRO coin is based on the idea of a pan-African cryptocurrency.[32] However, it has not reached the interest of a wider audience. It is therefore no more relevant than other altcoins in relation to the topic at hand. Therefore, since the AFRO Coin cannot be considered a genuine national or supranational project, but only a private initiative, its relevance is limited at the moment. Furthermore, there are no indications that regional cryptocurrencies have any better chances

25 *Ibid.* sec. 1.4.

26 Chivunga, Tempest (n 21) 16.

27 Olivier Gakwaya, Uta Meier-Hahn, Ralph Oyini Mbouna and Lars Wannemacher, 'Blockchain in Africa: Opportunities and challenges for the next decade: How African countries can take advantage of distributed ledger technologies as they are maturing' (2020), <https://www.giz.de/expertise/downloads/Blockchain% 20in%20Africa.pdf> 44, accessed 10 August 2023.

28 *Ibid*., 46.

29 Sergio Luis Náñez Alonso, Javier Jorge-Vazquez, Ricardo Francisco Reier Forradellas, 'Central Banks Digital Currency: Detection of Optimal Countries for the Implementation of a CBDC and the Implication for Payment Industry Open Innovation' [2021] J. Open Innov. Technol. Mark. Complex. 7(1), 72, 84.

30 International Monetary Fund (IMF) (n 21) 4.

31 Peterson Ozili, 'Determinants of interest in eNaira and financial inclusion information in Nigeria: role of FinTech, cryptocurrency and central bank digital currency' [2023], Digital Transformation and Society 2(2).

32 See AFRO Foundation, 'manifesto', <https://afrofoundation.org/pt/afro-foundation-2/> accessed 2 March 2023.

to be adopted in Africa than other (global) cryptocurrencies. This conclusion has especially proven relevant as recently the Central African Republic has declared Bitcoin to be national legal tender.[33]

A third possibility would be that an external currency is informally adopted by individual users and tolerated by national governments. An interesting development in this regard is the digital yuan. This CBDC is intended to be usable both offline and online. Therefore, some new generation mobile phones already contain the necessary hardware to use these digital currencies.[34] At this point, the high price might still be a significant barrier to entry, especially for a large part of the African market. However, as prices fall and the technology becomes more widely accessible, the digital yuan could become a relevant means of payment on the African continent.

3.2. THE VENEZUELAN PETRO – A NATIONAL CRYPTO-TOKEN

Venezuela has been under economic sanctions since it failed to cooperate in the war on drugs in 2005.[35] These sanctions, along with other poor government decisions and the collapse of oil prices, led to a deep economic crisis in which people turned to cryptocurrencies and cryptocurrency mining to circumvent currency controls and protect themselves from hyperinflation and scarcity.[36] In addition to the economic crisis, cryptocurrency mining is also particularly attractive to people in Venezuela because of the low price of electricity in the local market. Research has shown that in Venezuela, crypto miners spend 10 cents/dollar per month on electricity when one to three computers are used for crypto mining.[37] As a result of such an environment, it is estimated that there are more than 60,000 crypto miners in Venezuela mining $80 million to $100 million worth of cryptocurrencies per month.[38] Under these circumstances, the Venezuelan Government also turned to cryptocurrencies and in 2018, the Venezuelan Ministry of Finance hosted an Initial Coin Offering (ICO)[39] for the Venezuelan Petro (PTR).[40] Their cryptocurrency (PTR) was offered on the government website as well as

33 International Monetary Fund (IMF) (n 21) 2.

34 See Michale Kimani 'China Leads Africa's Digital Currency Rate', Coindesk (September 14, 2021) <https://www.coindesk.com/china-leads-africas-digital-currency-race> accessed 2 March 2023.

35 Thomas Clautice, 'Nation State Involvement in Cryptocurrency and the Impact to Economic Sanctions' (2019) Economic Crime Forensics Capstones. 43, 19. Available at <https://digitalcommons.lasalle.edu/ecf_capstones/43> accessed 2 March 2023.

36 Antulip Rosales, 'Radical rentierism: gold mining, cryptocurrency and commodity collateralization in Venezuela' [2019], Review of International Political Economy 26(5).

37 *Ibid.*

38 Carlos Vargas, 'Podremos comprar pan con criptomonedas', Noticias Barquisimento (January 15 2018) <http://www.panorama.com.ve/politicayeconomia/Podremos-comprar-pan-con-criptomonedas-Carlos-Vargas-20180113-0033.html> accessed 10 August 2023; Rosales (n 36) 16.

39 Initial coin offering (ICO) function in a way that "technology entrepreneurs offer tokens in exchange for cryptocoins (typically bitcoins or ethers). Contributors receive tokens that can be understood as cryptographically-secured coupons which embody a bundle of rights and obligations". Philipp Hacker and Chris Thomale, 'Crypto-Securities Regulation: ICOs, Token Sales and Cryptocurrencies under EU Financial Law' [2018], European Company and Financial Law Review 15(4), 645–696, 646.

40 Ana Berman, 'Venezuela Officially Launches Sale of Controversial Petro Coin for Fiat', Cointelegraph (October 30, 2018) <https://cointelegraph.com/news/venezuela-officially-launches-sale-of-controversial-petro-coin-for-fiat-crypto> accessed 10 August 2023; Clautice (n 35) 20.

on six different cryptocurrency exchanges authorized by Venezuelan authorities, all based in Venezuela.[41]

PTR can be defined as a "cryptocurrency, or Venezuelan digital currency based on blockchain technology, that is backed by the reserves of various natural resources in Venezuela such as oil, gold, diamonds and gas"[42] but we consider that for the purposes of this paper, PTR is best described as a national (token-based) cryptocurrency. Characteristics of PTR are that: – it is based on blockchain technology, – it is backed by the state and its natural reserves (primarily oil), – the PTR equivalent is a purchase-sale contract for one barrel of oil, – it has the ability to facilitate international transactions, – it is controlled and supervised by the Blockchain Observatory of Venezuela, – it can operate without intermediaries, – transactions are free of commission, and – it is intended to be used as a means of exchange.[43] Based on these characteristics, the main difference between the PTR and other crypto tokens is that it is government- backed, rather than being a privately-backed token. However, there is no decentralized and autonomous mechanism such as a smart contract in place, that would ensure that an exchange of PTR for a barrel of oil or other resource in a neutral market is actually guaranteed. Thus, trusting this token is tantamount to trusting the Venezuelan government, rather than a private third party.

3.3. THE E-PESO PILOT PROJECT IN URUGUAY

The Central Bank of Uruguay was one of the first central banks in the world to experiment with a CBDC system. The central bank launched a CBDC called e-Peso.[44] This digital currency was considered valid legal tender in Uruguay for the period of the test, equivalent to the traditional peso.[45] Of particular interest for our analysis is that the existing legal framework was used as the basis for the entire e-Peso regulatory system.[46] The e-peso was based on a multi-layered system in which the central bank controlled a platform operated by service providers that enabled instant peer-to-peer (P2P) and peer-to-business (P2B) transactions between end-users' digital wallets.[47] The system allowed for pseudonymous tracking of transactions.[48]

41 Clautice (n 35) 20.

42 Usman W. Chohan, 'Cryptocurrencies as Asset-Backed Instruments: The Venezuelan Petro' (2018), 2, Available at SSRN: https://ssrn.com/abstract=3119606 or http://dx.doi.org/10.2139/ssrn.3119606.

43 *Ibid.*

44 See SUERF – European Money and Finance Forum, 'Presentation on the E-peso (2021), available at: <https://www.suerf.org/docx/l_d1c38a09acc34845c6be3a127a5aacaf_16719_suerf.pdf> accessed 5 March 2023.

45 *Ibid.*

46 Christian Barontini, Henry Holden, 'Papers No 101 Proceeding with caution – a survey on central bank digital currency' (2019), Bank of International Settlements, 5: See SUERF – European Money and Finance Forum, 'Presentation on the E-peso (2021), available at: <https://www.suerf.org/docx/l_d1c38a09acc34845 c6be3a127a5aacaf_16719_suerf.pdf> accessed 5 March 2023.

47 See SUERF – European Money and Finance Forum, 'Presentation on the E-peso (2021), available at: <https://www.suerf.org/docx/l_d1c38a09acc34845c6be3a127a5aacaf_16719_suerf.pdf> accessed 5 March 2023.

48 *Ibid.*

The e-peso was managed on a centralized platform that served as a registry of ownership.[49] Digital e-peso banknotes were distributed both directly and indirectly. In both cases, however, the e-peso was designed to be essentially a central bank liability. This was not a problem for the directly issued e-peso, while a deposit system was used for the indirectly issued e-peso. Participating intermediaries had to deposit an equal amount of pesos with the central bank in order to receive the e-peso.[50] This ensured that the e-peso was not simply another form of (bank) deposit money, as it was not a bank liability. The e-Peso was not based on blockchain technology.[51]

3.4. THE DIGITAL YUAN – CHINAS NATIONAL CRYPTOCURRENCY

China is one of the frontrunners among major economies when it comes to digital payment services. In China, mobile financial transactions have become the most common payment method and the use of large digital payment services such as Alipay and WeChat Pay has become the norm.[52] In this environment, the Chinese central bank introduced the digital yuan which serves as alternative not only to private digital payment services but especially as cash substitute[53]. The Chinese stance on CBDCs is that a digital yuan helps reach the unbanked population, reduces the risks of holding physical cash, counters monopoly distortions, and is more cost-effective than current solutions.[54] To test the systematic requirements and potential challenges that such an innovation required, the Central Bank of China launched a successful initial test in collaboration with major Chinese banks.[55] Today, the digital yuan is being expanded through various projects across China. Just recently the Local Financial Supervision and Administration Bureau of Changshu City, Jiangsu Province and the Changshu City Finance Bureau decided to make salary payments to public servants in digital yuan.[56]

It is important to note that the digital yuan payment system is different from existing digital (mobile) payment methods, as only the digital yuan is M0 money.[57] While the use of the digital yuan is increasing in China, further developments are still underway. Since its inception, the Chinese central bank's digital currency research team (the Digital Currency Research

49 Barontini, Holden (n 46) 5.

50 *Ibid.*

51 Náñez Alonso, Jorge-Vazquez, Francisco Reier Forradellas, (n 29) 79.

52 Michael A. Peters, Benjamin Green & Haiyang (Melissa) Yang 'Cryptocurrencies, China's sovereign digital currency (DCEP) and the US dollar system' (2020), Educational Philosophy and Theory, 1.

53 Working Group on E-CNY Research and Development of the People's Bank of China, 'Progress of Research & Development of E-CNY in China',People's Bank of China, (July, 2021), 3 http://www.pbc.gov.cn/en/3688110/3688172/4157443/4293696/2021071614584691871.pdf accessed 23. accessed April 2024.

54 See Tommaso Mancini Griffoli, Maria Soledad Martinez Peria, Itai Agur, Anil Ari, John Kiff, Adina Popescu, Celine Rochon, 'Casting Light on Central Bank Digital Currencies' (November 12, 2018), 28, available at: https://www.imf.org/en/Publications/Staff-Discussion-Notes/Issues/%202018/11/13/Casting-Light-on-Central-Bank-Digital-Currencies-46233.

55 Peters, Green, Yang (n 52) 1.

56 Local Financial Supervision and Administration Bureau of Changshu City, Jiangsu Province and the Changshu City Finance Bureau recently – Notice on the Implementation of Full Salary Digital Renminbi Issuance from May 2023.

57 *Ibid.*

Lab at the People's Bank of China) has filed numerous patents that collectively aim to create a hybrid infrastructure in which the digital yuan would form a dual system of deposit money and cryptocurrency.[58] However, a key aspect of the initiative is that, similar to centralized cryptocurrencies, the digital yuan is based on a centralized blockchain ledger that is fully controlled by the central bank, rather than being decentralized like traditional cryptocurrencies.[59] The digital yuan follows a two-tier approach that allows for the involvement of financial institutions like retail banks, which will however serve only a supporting role in data collection and the providing of additional services.[60] Supervision of wallets and transactions is centralized.[61]

Moreover, the Chinese approach has similarities to the Uruguay-model. A key aspect of the system is the obligation of participating banks to match the amount of distributed digital yuan through deposits made at the central bank. This allows for equal treatment of users whether they receive the digital yuan directly or indirectly, as the central bank has an obligation to exchange digital yuan for regular currency in both cases. However, this also raises privacy issues. Both the central bank and participating banks will have access to certain user data.[62] The access of participant banks is however limited to a level, which does not exceed the information that banks collect currently[63]. As the digital yuan is designed to compete with other means of payment, including regular currency, the increasing use of this means of payment gives the Chinese central bank unprecedented control over the cash economy.[64] While plans exist to create anonymous wallets that protect privacy[65] they can hardly be effective if applied within a fully integrated payment system that is linked to a broad array of information sources.

Especially in the environment of the Covid 19 pandemic, the digital yuan was aimed as a tool to increase the global relevance of the Chinese currency.[66] While the first target for the digital yuan is to become a functional means of payment within national borders, plans are already made to work on cross-border integration.[67] Given that such developments could lead

58 See: Wolfie Zhao, 'PBoC Filings Reveal Big Picture for Planned Digital Currency, Coindesk', (26.6.2018.) available at: https://www.coindesk.com/markets/2018/06/26/pboc-filings-reveal-big-picture-for-planned-digital-currency/ with reference to further documents (accessed 6.3.2023.).

59 Peters, Green, Yang (n 52) 2.

60 Working Group on E-CNY Research and Development of the People's Bank of China, 'Progress of Research & Development of E-CNY in China',People's Bank of China, (July, 2021), 4 http://www.pbc.gov.cn/en/ 3688110/3688172/4157443/4293696/20210716145846918 71.pdf accessed 23. accessed April 2024.

61 Working Group on E-CNY Research and Development of the People's Bank of China, 'Progress of Research & Development of E-CNY in China' People's Bank of China, (July, 2021), 8 http://www.pbc.gov.cn/en/3688110/ 3688172/4157443/4293696/20210716145846918 71.pdf accessed 23. accessed April 2024.

62 See Alun John, 'How does China's digital yuan work?', Reuters, (October 19, 2020) <https://www.reuters.com/article/us-china-currency-digital-explainer-idUSKBN27411T/> accessed 23 April 2024.

63 Working Group on E-CNY Research and Development of the People's Bank of China, 'Progress of Research & Development of E-CNY in China' People's Bank of China, (July, 2021), 7 <http://www.pbc.gov.cn/en/3688110/ 3688172/4157443/4293696/20210716145846918 71.pdf> accessed 23. April 2024.

64 Peters, Green, Yang (n 52) 2.

65 Working Group on E-CNY Research and Development of the People's Bank of China, 'Progress of Research & Development of E-CNY in China' People's Bank of China, (July, 2021), 7 <http://www.pbc.gov.cn/en/3688110/ 3688172/4157443/4293696/20210716145846918 71.pdf> accessed 23. April 2024.

66 Peters, Green, Yang (n 52) 3; Vinod K. Aggarwal, Tim Marple, 2020, *op. cit*. 78.

67 Working Group on E-CNY Research and Development of the People's Bank of China, 'Progress of Research & Development of E-CNY in China',People's Bank of China, (July, 2021), 5 <http://www.pbc.gov.cn/en/ 3688110/3688172/4157443/4293696/20210716145846918 71.pdf> accessed 23. accessed April 2024.

to the yuan being increasingly used as a reserve currency, it is likely that other countries will need to step up their efforts to develop their own CBDCs.[68] However, many Western democracies in particular will have to critically address numerous privacy and personal data issues, both with regard to the international use of foreign CBDCs and the use of a (supra-)national CBDC.

3.5. CBDCS IN THE EUROPEAN UNION – OPPORTUNITIES AND RISKS

The main strategy document relevant to the consideration of a CBDC in the Eurozone is the Report on a Digital Euro,[69] which was later complemented by the Eurosystem's Report on the Public Consultation on a Digital Euro.[70] The original report on a digital euro explored various options for the introduction of a digital euro. Collaboration between the European Central Bank (ECB) and existing financial institutions was highlighted as a key aspect of most of the proposed solutions.[71] The creation of a digital euro on such a common basis was considered important for two main reasons, the first being the benefits of relying on existing financial infrastructure[72] and the second focusing on the systemic risks of a declining role of banks if deposit money is increasingly replaced by a safer and potentially cheaper digital euro.[73] Moreover, it can be seen from the Eurosystem's report on the public consultation on a digital euro that the reliance on existing financial service providers would also allow for the integration of existing and new financial services – a highly relevant aspect for the acceptance of a digital euro system.[74]

Another question that needs to be answered concerns the technical design of a digital euro. Two opposing concepts exist here – the digital euro as an offline or as an online means of payment.[75] Each of the two technical solutions is possible in principle, while they in practice would have opposing advantages and disadvantages. Offline payment systems, for example, do not rely on an Internet connection and are therefore more reliable.[76] They are also easier to design in a way that protects user privacy.[77] On the other hand, online transactions allow for more complex systems, integration with existing payment systems and programmable mon-

68 Vinod K. Aggarwal, Tim Marple , 2020. *op. cit*. 78 f.

69 ECB, 'Report on a digital euro' (October, 2020), available at: https://www.ecb.europa.eu/pub/pdf/other/ Report_on_a_digital_euro~4d7268b458.en.pdf>accessed 2.3.2023.

70 ECB, 'Eurosystem report on the public consultation on a digital euro', available under: <https://www.ecb. europa.eu/pub/pdf/other/Eurosystem_report_on_the_public_consultation_on_a_digital_euro~539fa8cd8d.en.pdf, ECB (april 2021)> accessed 2.3.2023.

71 The ECB considers in its report alternative solutions, but is quick to point out the serious risks and disadvantages of a system that entirely excludes the existing financial system and financial services providers.

72 ECB, October 2020: Report on a digital euro, 26.

73 ECB, October 2020: Report on a digital euro, 16.

74 ECB, April 2021: Eurosystem report on the public consultation on a digital euro, 20.

75 ECB, October 2020: Report on a digital euro, 29.

76 ECB, October 2020: Report on a digital euro, 31.

77 ECB, October 2020: Report on a digital euro, 26.

ey.[78] Therefore, a third solution that combines both approaches has been proposed.[79] While such a solution is the most complex, it would better respect user privacy,[80] allow for a wide application, and be technologically advanced enough to be used in the Fin-Tech sector for programming smart contracts and other new developments. It can therefore be concluded that a digital euro system will likely have to be a complex hybrid that builds on the existing financial infrastructure, involves numerous institutions, and allows for diverse and sometimes complex applications such as programmability within smart contracts, while still being able to guarantee user rights, especially the right to privacy. It is therefore not difficult to conclude that it will be a challenge to establish such a system from all aspects, be it the technical foundation, the financial integration or the legal regulation.

A regulatory sandbox could be applied to a digital euro in the same way it can be applied to national cryptocurrencies. This would allow the ECB to monitor possible: – technical and operational issues, – security needs, – impact of digital euro payments, – effects on the payment system, – benefits of a digital euro, etc.[81] However, in contrast to the ECB, many other central banks are already in the testing or pilot phase. By the time the ECB decides to issue a digital euro, there will be plenty regulatory examples from other countries. For this reason, there is unlikely to be a need for a regulatory sandbox approach similar to other systems, unless the ECB decides to go in a different legal or technical direction, for example in the sense that it decides to issue a digital euro that is more similar to deposit money and electronic money. This could become not only possible but probably even necessary if key innovators in the field, such as China, restrict the use of certain patented technologies needed to establish an efficient and well-functioning CBDC. In this case, a regulatory sandbox approach might make more sense. However, at this point, the EU may already be so far behind the technological curve of the digitized legal tender that more urgent modes of application should be considered.

Given these challenges, it is likely that a general review of existing legislation will be required to identify which pre-existing laws and regulations could be directly applied or adapted to regulate a euro CBDC. In this context, it would be beneficial to take a similar approach to the networking solutions proposed in the ECB report. Namely, to incorporate the existing regulatory solutions for current financial transaction systems such as deposit money and electronic money. Since these two sets of regulations are the most likely contenders to form a new basis for CBDC, it is necessary to conduct further research on their legal adaptation. At the same time, criminal law and property protection would almost certainly be less problematic. Numerous criminal offenses that protect private property in digital form are already implemented by the national legislators of various EU Member States. The fact that the digital euro would be a central bank liability would certainly not negatively affect its protection under the current criminal law regime. Moreover, the fact that this CBDC would be legal tender would classify offenses in the same category as those against deposit money or e-money.

78 ECB, October 2020: Report on a digital euro, 9 f.

79 ECB, October 2020: Report on a digital euro, 34 f.

80 On certain approaches, especially the role of intermediaries see: ECB, April 2021: Eurosystem report on the public consultation on a digital euro, 20 f.

81 For national cryptocurrencies, see similar Ng, Griffin, (n 18) 15.

4. THE FUTURE OF CBDCS – CROSS BORDER USE, PRIVACY ISSUES AND THE CREATION OF A SOLID LEGAL FRAMEWORK

The (supra-)national approaches to the creation of CBDCs and national digital currencies outlined above have shown that there is a great deal of diversity in terms of both their actual purpose and the practical implementation of these means of payment in existing financial systems. However, in many national jurisdictions, but especially within the EU, certain concerns regarding the protection of individual rights are at the heart of the discussion. A key issue here is, above all, the protection of personal data and privacy. In particular, if blockchain-based currencies were to lose the pseudonymity aspects, this would lead to intense data protection issues.[82] Publicly available data would give a large number of subjects access to information about individual transactions and finances. While financial institutions have some insight into individual transactions when they use credit cards or wire transfers, CBDCs would raise a number of new privacy issues.[83] In particular, widespread use of CBDCs, which could replace other means of payment, would open up the possibility of systematically tracking individual transactions.

However, CBDCs could also significantly contribute to the prevention of money laundering activities. For cryptocurrencies, service providers that issue virtual wallets are already required to comply with anti money laundering standards[84]. However, cryptocurrency payments can still be performed through an autonomous P2P network that does not require such service providers. Such a possibility however does not exist in relation to CBDCs. The full integration of CBDCs into the payment system, especially when applied to both online and offline payments, would allow for much easier tracking of illegal transactions and would make it significantly more difficult to conduct transfers of undocumented funds. It is therefore not surprising that these concerns are relevant to the discussion within European Union. The EUs privacy protection standards are particularly high but the EU also adheres to strict anti money laundering standards. In conclusion, anti money laundering requirements will certainly be met, however any solution, in order to be viable, must allow individuals to rely on processes that respect their individual rights as European citizens. This in turn will allow, at least in part, for a euro-CBDC in the EU to grant partial pseudonimity similar to cryptocurrencies. However, it is questionable whether other jurisdictions will adapt similar approaches.

Furthermore, traditional financial institutions, particularly the banking sector in general, will face challenges if CBDCs are widely adopted and begin to replace bank deposits as a store of value.[85] However, all models currently under discussion rely heavily on existing financial networks and collaborations with financial service providers. It will therefore be essential to define in detail the rights and obligations of all parties involved. This is particularly important as CBDCs will constitute central bank liabilities and legal tender, which in turn creates a responsibility for regulators and central banks to protect these means of payment.

82 Gakwaya, Meier-Hahn, Oyini Mbouna and Wannemacher (n 21) 29.

83 *Ibid*., 17.

84 Šime Jozipovic, Marko Perkušić, Stjepan Gadžo, 'Tax Compliance in the Era of Cryptocurrencies and CBDCs: The End of the Right to Privacy or No Reason for Concern?' (2022) EC Tax Review, Volume 31, Issue 1 (2022) pp. 21.

85 *Ibid.*

5. CONCLUSION

National virtual currencies and CBDCs have become an increasingly important topic for regulators and central banks. By combining the technical capabilities of virtual currencies with the security of national or central bank-backed assets, this new generation of digital means of payment could gain widespread acceptance in a short period of time. However, in addition to the many benefits that these technological advances would bring to the payments sector, numerous challenges remain. The current legal infrastructure is not designed for this innovation, and existing laws would need to be adapted at the (supra-)national level in order for CBDCs or national virtual currencies to be usable in a secure and predictable manner. This paper has presented sandbox approaches, pilot projects and systems relying on existing solutions such as tokenization. However, while projects such as regional cryptocurrencies and national tokens have contributed to the development of this field, it is expected that only real CBDCs will have a chance of widespread adoption. As the examples of Uruguay and China show, the full adoption of CBDCs at the national level will need to be thoroughly tested beforehand due to the severe impact that a collapse of such a system could have.

Moreover, this paper has shown that the classification of a means of payment as legal tender creates a responsibility on the part of the national regulator to protect the integrity of transactions. This conclusion derives directly from the premise that a "legal tender" must be accepted as payment, thus compelling individuals to accept CBDCs and national virtual currencies as payment in this case. As a result, this means that not only is a public law regulatory framework required for the introduction of national virtual currencies or CBDCs, but there must also be civil law mechanisms regulating transactions, enforcement mechanisms protecting creditors, and criminal sanctions in cases of theft, fraud, etc.

All the above measures must also be designed while considering the balance between two important aspects – data protection and prevention of money laundering and illegal activities. International standards for the prevention of money laundering and other illegal activities, as well as (supra-)national regulatory efforts to prevent illegal activities, could greatly be enhanced through effective monitoring of CBDC transactions. However, in a system that increasingly substitutes cash payments for more modern means of payment, the privacy protection in relation to personal transactions is essential. Especially in the EU, with its extremely high data protection standards, it will be a challenge to strike a precise balance between protecting the privacy of citizens and establishing an efficiently functioning, secure and balanced system.

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*Šime Jozipović**
*Marko Perkušić***
*Nina Mladinić****

USPOREDNI PREGLED PRAVNOG STATUSA NACIONALNIH KRIPTOVALUTA I CBDC-A: ZAKONSKO SREDSTVO PLAĆANJA ILI SAMO JOŠ JEDNO SREDSTVO PLAĆANJA

Sažetak

Ovaj rad analizira pravni okvir nacionalnih virtualnih valuta i takozvanih digitalnih valuta središnje banke (CBDC) iz perspektive komparativnog prava. Autori definiraju značenje pojmova „sredstvo plaćanja" i „zakonsko sredstvo plaćanja" te utvrđuju pravne posljedice uvrštavanja pojedinih sredstava plaćanja u zakonsko sredstvo plaćanja. Nadovezujući se na to, autori ističu nova dostignuća u području suverenih virtualnih valuta i analiziraju njihov razvoj kroz komparativnu pravnu analizu različitih nacionalnih virtualnih valuta. U tom kontekstu, autori predstavljaju njihov razvoj u različitim afričkim državama, posebno ističu inicijativu Venezuele za uvođenje prvog državnog kripto tokena te prve pilot-projekte CBDC-a u Urugvaju i Kini. Pri tom se posebno razmatra uvođenja CBDC-a u EU-u. Na temelju provedene analize tih sustava, posebno se ističu problemi u vezi s privatnošću, zaštitom korisnika i učinkovitom regulacijom platnih transakcija, a sve u cilju otklanjanja pravnih izazova koji bi se mogli pojaviti pri uspostavi potpuno funkcionalnog (nad)nacionalnog digitalnog eura (CBDC-a).

Ključne riječi: *virtualne valute, CBDC, plaćanje, sredstvo plaćanja, digitalni euro*

* Dr. sc. Šime Jozipović, docent Ekonomskog fakulteta Sveučilišta u Splitu, Cvite Fiskovića 5, 21000 Split, E-adresa: sjozipov@efst.hr. ORCID: https://orcid.org/0000-0002-8050-5134.

** Dr. sc. Marko Perkušić, docent Sveučilišnog odjela za forenzične znanosti Sveučilišta u Splitu, Ruđera Boškovića 33, 21000 Split, E-adresa: mperkusi@forenzika.unist.hr. ORCID: https://orcid.org/0000-0002-5845-2961.

*** Dr. sc. Nina Mladinić, docentica Sveučilišnog odjela za forenzične znanosti Sveučilišta u Splitu, Ruđera Boškovića 33, 21000 Split, E-adresa: nmisic@forenzika.unist.hr. ORCID: https://orcid.org/0000-0001-6664-0375.