

*Šime JOZIPOVIĆ\**  
Faculty of Economics, University of Split, Croatia  
*Marin KERŠIĆ\*\**  
Faculty of Law, University of Split, Croatia

## **SCHOLARLY SYSTEMATIZATION OF LEGAL NORMS: THE CASE OF DIGITAL PAYMENTS AND VIRTUAL ASSETS**

*Throughout history, legal theory has undergone continuous development. With the growing complexity of modern society, regulatory requirements have been increasing while contractual relationships have grown more sophisticated. Technological progress usually precedes regulation. This is only natural, as law serves to regulate the relationships between legal subjects concerning legal objects. However, this also means that regulation always lags one step behind innovation. Particularly in rapidly developing areas of technology, regulation can become complex, inconsistent and insufficiently balanced. The scholarly systematization of legal norms has become an important mechanism to mitigate such issues. Even more, scholarly systematization of legal norms in new technologies has sparked entire new areas of law. (At least) five reasons to approach legal norms regulating innovation from the perspective of the scholarly systematization of law are: first, the identification of valid legal norms is easier; second, it helps with legal interpretation, especially systematic interpretation; third, it serves to identify and resolve antinomies between norms; fourth, it is the basis for the formation of legal disciplines; and fifth, it impacts the jurisdictions of organs. The aim of this paper is to analyse the impact of the scholarly systematization of legal norms in the fin-tech space, based on recent key innovations including crypto-assets and central bank digital currencies.*

**Keywords:** legal norms, systematization, digital payments, virtual assets.

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\* PhD, Associate professor, ORCID: 0000-0002-8050-5134, e-mail: [sjozipov@efst.hr](mailto:sjozipov@efst.hr)

\*\* PhD, Assistant professor, ORCID: 0000-0002-0964-4625, e-mail: [marin.kersic@pravst.hr](mailto:marin.kersic@pravst.hr)

## 1. INTRODUCTION

With the growing complexity of modern society, regulatory requirements have been increasing while contractual relationships have grown more sophisticated (Bennett Moses, 2007). Technological progress usually precedes regulation (Visković, 2006, p. 235). Examples of this can be found in numerous cases of the industrial revolution that opened entirely new fields of regulation in areas like transportation, employee safety, social security etc. More recent examples include the rise of the internet and later the switch to smartphones which led to a fast-paced evolution in various segments of contract law and intellectual property law. Innovation preceding regulation is only natural. Law serves to regulate the relationships between legal subjects concerning legal objects. However, this relationship also means that regulation always lags one step behind innovation. Particularly in rapidly developing areas of technology, regulation can become complex, inconsistent and insufficiently balanced.

The so-called scholarly systematization of legal norms has become an important mechanism to mitigate such issues. Even more, scholarly systematization of legal norms in new technologies has sparked entire new areas of law. For example, the innovations in transportation technologies and the increasing importance of air transportation were the basis for the establishment of aerospace law as a separate field, while the increasing importance of mobile phones introduced services like mobile banking and mobile payment systems which are the foundation for digital payment law. In legal theory there can be identified (at least) five reasons to approach legal norms regulating innovation from the perspective of the scholarly systematization of law: first, the identification of valid legal norms is easier; second, it helps with legal interpretation, especially systematic interpretation; third, it serves to identify and resolve antinomies between norms; fourth, it is the basis for the formation of legal disciplines; and fifth, it impacts the jurisdictions of organs (Visković, 2006, pp. 268-269; see also: Aarnio, 2011, pp. 177-184). The notion of scholarly systematization of legal norms can be contrasted with the notion of hierarchical systematization of legal norms. While the first one is the product of the work of legal scholars (or legal scientists, so it can also be called scientific systematization of legal norms), the second one is the product of the legal system, i.e., the hierarchical relations between normative acts that contain respective norms (Visković, 2006, pp. 268-269). We opted for the term “scholarly” instead of “scientific” since it is a more faithful translation of the original term, even though scientific systematization of legal norms could also be used without any consequences for the idea of the paper.

This paper analyses the impact of the scholarly systematization of legal norms in the fin-tech space, based on recent key innovations including crypto-assets and central bank digital currencies. This space has been chosen due to its extremely rapid development and a strong focus on innovation. Especially innovative financial technology and crypto assets attract early adopters and tech-savvy individuals and thus form a functional ecosystem long before valid regulation can be established. The aim of this paper is to analyse two separate cases of innovation, namely the emergence of crypto-assets and the subsequent attempts to regulate it as well as the plans to introduce CBDCs – Central

Bank Digital Currencies. The comparison is chosen as in both cases innovative financial technology is compared, but with crypto assets, the creation of the technology preceded any regulation, while CBDCs are a public project and thus regulation goes hand in hand with the development of the technology. Based on this comparison, the five previously established benefits of scholarly systematization are analysed in order to determine their relevance in rapidly changing sectors, led by private or public initiatives.

In order to achieve the aim of the paper, this paper is divided into four parts. After this introductory section, Part 2 describes the development and evolution of crypto assets and the attempts to regulate them in the EU. Part 3 focuses on the introduction of CBDCs and the attempts to introduce them together with the respective regulations in the Eurozone. Part 4 focuses on the role of systematization and provides conclusions concerning the potential benefits of legal classification in rapidly developing areas of technology.

## 2. CRYPTO ASSETS

Crypto assets have increased in popularity in recent years, due to their numerous technological benefits including increased speed, efficiency and transparency (Çağlayan Aksoy, 2023, p. 185). The rise of crypto assets was sparked by the creation of Bitcoin, the first decentralized digital currency (Nakamoto, 2008). Bitcoin works on a decentralized ledger based on a proof of work authentication of transactions. This means that multiple participants (so-called crypto miners) attempt to solve a complex mathematical equation which requires significant processing power. Due to the fact that it is uncertain which miner will solve the equation, and the significant investment of resources, it is unlikely that the authenticator will provide incorrect feedback on a transaction. Thus, the system is built in a manner where transactions between various participants do not rely on the trust of any third party but are executed between pseudonymous participants through authenticators that are previously unknown (Jozipović, Perkušić & Ilievski, 2020, p. 3). As one can expect, this creates a fully decentralized system in which traditional legal concepts like rights and obligations, property, possession etc. are challenged (Mandjee, 2015, p. 165).

### *2.1. The Status of Crypto Assets from a Theoretical Point of View*

Academia attempted very early to determine the legal status of crypto assets. The first category of crypto assets was so-called cryptocurrency like Bitcoin. Numerous academic papers attempted to classify cryptocurrencies in general as things, property, units of accounting, rights etc. However, it proved difficult to exactly identify their status, especially as data usually is not treated as property or right in general, but only under specific circumstances defined by law (Zilioli, 2020, p. 252). So, for example, for something to be considered a right, this right of one person must be related to the obligation of one or more other persons. In a fully decentralized system, however, it is difficult to identify who would bear these obligations. Furthermore, in cases of cyber-crime it has been difficult to categorize cryptocurrencies, as they do not have a physical form

in order to be considered a potential object of theft, but simultaneously also do not fulfil the requirements to be considered a specifically protected right like intellectual property (Zilioli, 2020, p. 253). The advantages of the scholarly systematization of law through the further development of the information, communication and technology (ICT) law can be seen here, since the object that is or that will be regulated by the law (in this case, crypto assets) does not clearly fall under the scope of the “traditional” branches of law.

## ***2.2. The Role of Tax Law in Determining the Status of Crypto Assets***

A breakthrough in the definition of cryptocurrencies was achieved at the moment, at which they were considered from a tax law perspective. Tax law is highly relevant for the functioning of any modern state. In order to levy taxes, it is not only a technical necessity but, in many cases, a constitutional requirement to exactly define all relevant requirements for taxation, especially what makes a taxable event. Thus, tax law will often be amongst the first fields of law that will be faced with novel concepts and issues. This comes as no surprise, since tax law is an exemplary case of public law and the coercive force of the state, placing the addressees of its norms in a subordinated position (Visković, 2006, p. 286).

However, tax law usually relies on other areas of law for the definition of key terms. Tax law-related issues thus in particular require the exact identification of the right area of law and applicable norms. This has once more been proven in the case of crypto assets-related taxation. Many governments like those of the USA (IRS notice) or the UK (UK-policy brief) had to address crypto assets from a tax standpoint. In addition to this, administrative authorities and courts were faced with cases involving crypto assets (Jozipović, Perkušić & Ilievski, 2021, p. 6; Mandjee, 2015). In an early decision of the European Court of Justice, it was made clear that cryptocurrencies cannot be considered tangible property (Skatteverket/Hedqvist). However, due to a lack of civil law harmonization in the EU in this area, there has not been one legal norm based on which a unified understanding of cryptocurrencies or crypto assets could be built. Thus, with the rise of the popularity of crypto assets, legislators had to create specific and adequate regulations for them (Wronka, 2024, p. 4). Further development of “information, communication and technology (ICT) law” as a new and emerging branch of law would help mitigate the issues regarding cryptocurrencies – in particular, the problem of identification of relevant legal norms, their interpretation and the resolution of antinomies between them. Antinomies between legal norms are more likely to arise in a more complex legal system, such as the EU one, because the rapid technological advancement pressures both national (member-state) and supranational legislative bodies to legally regulate social relations arising from new technological advancements.

It can be seen from the previous paragraph that the legal treatment of crypto assets was primarily determined by tax law. Here, the scholarly systematization of law is not only relevant first of the aspects mentioned (identification of legal norms) but even more: in the case of crypto assets, it *established* fundamental legal norms which legally defined a new technological advancement.

### ***2.3. Crypto Asset Regulation***

An important step in crypto asset regulation came with the implementation of new anti-money laundering (AML) standards when the term “virtual currency” was defined for AML purposes and the scope of financial service providers was widened significantly. Due to insufficient regulation in the crypto-asset space and the decentralized nature of crypto-assets, they were increasingly used as vehicles for illegal activities like fraud or money laundering (Jozipović, Perkušić & Ilievski, 2020, pp. 11, 16; Trautman, 2018, p. 467). Thus, the EU implemented new standards in order to mandate service providers in this space to ensure conformance with reporting and controlling standards (AMLD 5). Other legal sources like MiFID II, which regulates financial instruments only partially cover crypto assets to the extent that they overlap with existing financial instruments (Jozipović, Perkušić & Gadžo, 2022). The Anti-Money laundering efforts of the EU show that even very urgent matters like the prevention of certain criminal activities will take time to be regulated. Even if this regulation is introduced faster than more general regulation on an issue, it will still lag significantly behind the introduction of the technology.

Only after a long period of time in which existing national and European regulations were not harmonized in this field, did the EU introduce the Markets in Cryptoassets Regulation (MiCAR). The MiCAR is a key segment in the broader block-chain strategy of the EU which includes multiple aspects from increasing the interoperability of technologies and creating an open innovation environment (Perkušić, Jozipović & Piplica, 2020, p. 371). MiCAR was aimed at increasing legal certainty and finally giving clarity over numerous open issues concerning the categorization and treatment of crypto assets (van der Linden & Shirazi, 2023, p. 21). It defined key categories of crypto-assets like stablecoins, cryptocurrencies and crypto-tokens, and established a partial framework for crypto assets. However, again the legislative process to establish MiCAR has shown the inefficiencies in legislation in rapidly developing environments. So-called non-fungible tokens (NFT) emerged as a new category of crypto assets. These tokens were different from existing crypto assets as each singular token was uniquely identifiable and thus able to serve as proof of ownership of certain rights or privileges (Takahashi, 2022, p. 340). The legislative procedure has not taken this category into account and during the legislative process, it was questioned if the MiCAR should be postponed in order to include this category of crypto asset as well. In the end, it was decided to not include NFTs into MiCAR, due to the additional delay this would cause. The first bitcoin was mined in 2008. MiCAR entered into force in 2023, about 15 years later, and it still covers only certain aspects of the crypto-asset space (MiCAR). This example shows, how difficult it is for legislators to keep up with innovation. It can be argued that the lack of development in information, communication and technology (ICT) law, resulting from the complexity of crypto assets, contributed to legislation falling behind and not catching up with technological development. The need for interdisciplinary research can be seen here since ICT law is arguably among the areas of law which require the most non-legal input and knowledge.

### 3. CBDCs

As has been shown above, crypto assets are an example of rapid innovation within the private sector that required regulators and legislators to act in order to regulate an entirely new space. Due to the fact that the technology preceded any attempts of regulation, regulators were significantly lagging behind, and it took a long time to start regulating crypto assets on an EU level. Within this timeframe, the legal status of crypto assets was mostly derived from case law and legal theory which used analogies and attempts to identify the relevant legal norms.

Central Bank Digital Currencies (CBDC) are similar to crypto assets in that they are based on innovative financial technology and have the potential to strongly influence consumer behaviour and the market for financial services. However, in contrast to crypto assets which are advanced through private and often decentralized initiatives, CBDCs are centralized public projects spearheaded by national or supranational central banks. For example, one of the most advanced CBDC projects - the digital yuan project is entirely controlled by the People's Bank of China (Yuan – progress report). In the Eurozone, the ECB is currently working on the possible implementation of a digital euro. In both cases, the CBDC involves numerous innovations and various cutting-edge financial technologies. However, CBDCs are created in order to become legal tender and thus require upfront regulation, in contrast to private projects like crypto assets which, as has been shown above have to be regulated ex-post. In the following text, we present how the processes of innovation and regulation of CBDC-related technologies diverge from those related to crypto-assets. Based on this analysis, we will then in the next chapter analyse how the different benefits of systematization affected regulation, legal certainty and efficiency of the legal system.

#### 3.1. CBDCs and Regulation

In order to understand CBDCs, first it is essential to understand the difference between a means of payment and legal tender. The modern view of legal tender is that this term describes a means of payment that under (supra)national law must be accepted as a settlement for a debt (Selgin, 2003, p. 116; Goldberg, 2009, p. 147). Cryptocurrencies are usually used for payment on a voluntary basis, except in cases where national legislators explicitly grant them the status of a mandatory means of payment (Jozipović, Perkušić & Mladinić, 2024, p. 79), while the acceptance of CBDCs is planned to be mandatory and thus impacts the rights of creditors. Namely, when creditors have to accept a specific means of payment, such payment should be safe and cost-efficient, as all associated costs with the transaction represent an additional burden, which for another legal tender like cash might not exist. For this reason, it was essential to determine the status of CBDCs beforehand and define clear criteria for its use.

While different central banks focused on different key aspects of CBDC development, one important concept for the digital euro was, that it should become an important substitute to cash and thus offer the majority of the advantages that cash provides, without having some of the downsides.

Within the EU, consumer protection and individual privacy are considered high priorities. Thus, end-users of the digital euro should be able to use it in a safe manner that protects their privacy. However, privacy has to be defined differently from anonymity, as in contrast to cash, digital euro transactions are planned to be traceable (ECB-1). In order to limit access to private data, the Proposal for a Regulation on the Digital Euro defines rules for the separation and limitation of access to information. So, the ECB and national central banks will have the role of processing data in order to complete transactions and other related purposes. However, the Proposal states that personal data processing should build on the use of state-of-the-art security and privacy-preserving measures, such as pseudonymization or encryption, to ensure that data is not directly attributed to an identified digital euro user by the ECB and national central banks. (Proposal, art. 35). These rules show that legislation is defining the direction that the technology in this field will have to take.

Cost and efficiency of transactions are essential in order for the digital euro project to be successful. Especially small businesses could have challenges covering installation costs for the required technology as well as additional fees. Therefore, the Digital Euro proposal highlights the following „For microenterprises and non-profit legal entities, the acquisition of the required infrastructure and the acceptance costs would be disproportionate. They should therefore be exempted from the obligation to accept payments in digital euro. In such cases, other means for the settlement of monetary debts should remain available” (Proposal, nr. 18). The Proposal thus determines various exempt groups, like NGOs, natural persons acting for their private purposes or businesses that employ fewer than 10 persons or whose annual turnover or annual balance sheet total does not exceed EUR 2 million (Proposal, art. 9). This exemption is further combined with strict rules on the maximum transaction fees in the legislative part of the proposal. Here the maximum merchant service charge or inter-PSP fee is regulated to ensure that they do not exceed the lowest of the following two amounts (Proposal, art. 17):

- (i) incurred services provider cost increased by a reasonable margin of profit and
- (ii) fees or charges requested for comparable means of payment.

In the case of CBDCs, (some) positive impacts of the scholarly systematization of law are preceded by and achieved by the regulation. The reason for this is that CBDCs, compared to crypto assets, are public and not private projects and that significant research into new means of payment has already been completed in the crypto-asset and fin-tech space.

### ***3.2. New Technologies and CBDCs***

In order to ensure that CBDCs can successfully be implemented, it is necessary to adapt existing financial infrastructure and develop new cyber-security solutions, as well as innovative payment mechanisms. One of the most innovative technologies that is planned to be developed for the digital euro, is the offline payment option. The digital euro is planned to be fully accessible for offline payments similar to cash. This would allow its use even for the unbanked population in the Eurozone, as well as in remote locations without reliable internet access, for example on planes, boats or remote islands. Such a technology, which would be secure, ensure privacy and which could work off-line while being economically viable, currently does not exist, and thus will have to be developed first.

### **3.3. Regulatory Efforts and Innovation**

The regulatory process for the digital euro started early on in the digital euro project. Even in the very early phase, where the potential of the digital euro was assessed, significant efforts were put into determining how the legal design of the digital euro should look. This was important as through the digital euro project, private money would be transformed into public money (ECB-2). Even more, it took for the process to get into an advanced stage before it was decided that innovative and technologically challenging features like offline payment would be implemented early on. The digital euro first had to be defined as a clear concept with its key features. In parallel with this process, the required regulation of the digital euro was already being discussed, and only after this, the process for solving complex technological challenges was initiated (ECB-3). This is in stark contrast to the development of crypto-asset technologies where the legal characteristics of crypto assets were determined *ex-post*. With the digital euro, technological innovation is set for the later stages of the project, basically as a custom solution to the legal and economic characteristics that were already predetermined by the legislator.

## **4. BENEFITS AND EFFECTS OF LEGAL SYSTEMATIZATION**

Having presented digital payments and virtual assets, we can turn to the benefits of scholarly systematization of legal norms in the given context. In this context, it makes sense to first analyze the benefits relating to crypto-asset regulation.

### **4.1. Benefits of the Systematization of Crypto-Asset Regulation**

The first and obvious advantage is the easier identification of relevant legal norms. The development of the “information, communication and technology (ICT)” law is of particular relevance here since digital payments and virtual assets represent a new possibility of transactions, typically used by tech companies which advance technological development. Achieving a high level of legal certainty by identifying and systematizing legal norms in this area of law is necessary in order to foster (or at least not slow down) further technological development. In the early phase of crypto assets, it was essential to classify them not just as data, but in the context of rights and obligations of their holder and third parties. For the 15 years before MiCAR entered into force, classification helped to guide the decision of tax authorities and judicial bodies in the right direction and determine that crypto assets while not considered things, still represent a type of property due to their market value.

Secondly, the more developed the scholarly systematization of law is in this area, the interpretation of relevant legal norms (and in particular, the systematic interpretation) will be easier. For example, the classification of crypto assets into various categories allowed us to classify crypto service providers and determine to which extent other legal norms like AML regulation will be applicable. This made it easier for participants in this space to comply with regulation thus increasing legal certainty.



Third, the more developed the scholarly systematization of law is, the easier the antinomies between norms can be determined. This is especially the case when there is a possibility of regulation from two legislators – the national one, and the (supra)national, EU one. However, we have shown that the initiative from the (supra)national legislator is more relevant here, as the EU is taking the lead in crypto-asset regulation due to the complexity and relevance of the matter.

Fourth, the scholarly systematization of law constitutes new areas of law. The development of new areas of law, such as the mentioned information, communication and technology (ICT) law resolves some of the issues we are facing by establishing itself between public and private law. Furthermore, digital finance law is continuing to emerge as a separate area of law and is undergoing an increasingly dynamic evolution.

Finally, the work on scholarly systematization of law also influences the determination of the competence of various bodies, for example, tax authorities, AML authorities, banking authorities etc.

It is important to note two things. First, we do not propose a particular systematization of crypto-asset regulation here. It would be beyond the scope of any (one) paper. Instead, we use a particular general theoretical framework to present the benefits of the scholarly systematization of legal norms in the area of crypto-asset regulation by providing some examples. In a similar manner, the same general theoretical framework could be used (and in our opinion, fruitfully) in other areas of law. Second, it has to be emphasized that there is a lack of scholarly systematization of legal norms in the area of crypto-asset regulation which creates problems. It comes as a result of regulation lagging behind technological developments. The problems are those that have been mentioned before and which are mitigated by the scholarly systematization of norms. First, the identification of relevant (valid and applicable) legal norms. Second, more difficult interpretation of legal norms and the (im)possibility of applying the systematic interpretation. Third, unclear situations in the cases of conflicts between norms and the question of which norm should take precedence. Fourth, scholarly systematization of law constitutes new areas of law. Fifth and final, the competencies of different bodies can remain unclear and overlap, which can lead to so-called negative conflicts of jurisdiction.

#### ***4.2. The Impact of Crypto-Asset Regulation on the Development of New Technologies***

Crypto-asset regulation significantly benefited from legal systematization, which helped bridge the 15-year gap between the initial creation of the technology and the first comprehensive regulation in the EU. However, as has been seen above, CBDC regulation took another route. It partially preceded technological development. However, this was only possible due to the fact that CBDC represents a reaction to the increasing popularity of alternative means of payment and the decreasing importance of cash. Thus, the innovations in the field of digital payments, especially crypto assets, paved the route for CBDCs.

When considering this relationship between these innovations, it becomes even clearer how legal systematization impacts innovation. Namely, the legal systematization

conducted concerning crypto assets significantly contributed to the identification of issues with existing payment regulation and allowed legislators to consider public law solutions. CBDCs are in essence a public law regulation-driven innovation that builds on the broader space of financial technology law.

## 5. CONCLUSIONS

In this paper, we conducted a comparison of crypto-asset regulation and proposed digital euro (CBDC) regulation in the EU and their relation to innovation. By comparing the two very different regulatory processes, we were able to show how systematization impacts innovation and adaptation processes. First, CBDCs heavily relied on the systematization of crypto-asset-related issues, as legal norms from various fields had to be used in order to determine the nature of crypto-assets and the rights and obligations of participants in the crypto-asset space. Later, systematization served an important role in the design of a broader crypto-asset framework. Finally, regulatory competencies have heavily been based on the overlap of ICT law and other fields like tax law, law concerning the prevention of criminal activities, contract law etc. However, the impact of legal systematization did not stop there.

When CBDCs are closely examined, it becomes clear that they do not necessarily represent an anomaly of regulation preceding innovation, but rather a reaction of the public sector to innovation in the private sector. Legal systematization made it possible to identify issues and challenges with payment services and thus allowed regulators to start researching a public answer to private innovation in the payment space both from a regulatory as well as from a technological perspective. While regulation precedes some aspects of the technology that will have to be used for the digital euro, the majority of the processes related to the technology have already been tested by private solutions like crypto assets. Thus, the combination of innovation in the private sector, in combination with regulation concerning that innovation, and significant systematization efforts, created the basis for a “regulation first” approach of CBDCs in the EU.

## LIST OF REFERENCES

### *Books, Monographs and Textbooks*

- Aarnio, A. 2011. *Essays on the Doctrinal Study of Law*. Dordrecht: Springer. <https://doi.org/10.1007/978-94-007-1655-1>
- Visković, N. 2006. *Teorija države i prava*. 2<sup>nd</sup> ed. Zagreb: Birotehnika CDO.

### *Scholarly articles*

- Bennett Moses, L. 2007. Why have a Theory of Law and Technological Change? *Minnesota Journal of Law, Science and Technology*, 8(2), pp. 589-606.
- Çağlayan Aksoy, P. 2023. The applicability of property law rules for crypto assets: considerations from civil law and common law perspectives. *Law, Innovation and Technology*, 15(1), pp. 185-221. <https://doi.org/10.1080/17579961.2023.2184140>
- Goldberg, D. 2009. Legal tender. *Working Paper No. 2009-04, 2*, Bar-Ilan University, Department of Economics, Ramat-Gan. Available at: <https://www2.biu.ac.il/soc/ec/wp/2009-04.pdf> (3. 8. 2023).
- Jozipović, Š., Perkušić, M. & Gadžo, S. 2022. Tax Compliance in the Era of Cryptocurrencies and CBDCs: The End of the Right to Privacy or No Reason for Concern? *EC Tax Review*, 31(1), pp. 16-29. <https://doi.org/10.54648/ECTA2022003>
- Jozipović, Š., Perkušić, M. & Ilievski, A. 2020. Cryptocurrencies as (i)legal Tender in North Macedonia and the EU. *Iustinianus Primus Law Review*, 11(2), pp. 1-22.
- Jozipović, Š., Perkušić, M. & Ilievski, A. 2021. From Taxation to Comprehensive Regulation of Cryptoassets. *Iustinianus Primus Law Review*, 12(1), pp. 1-14.
- Jozipović, Š., Perkušić, M. & Mladinić, N. 2024. A comparative review of the legal status of national cryptocurrencies and CBDCs: a legal tender or just another means of payment. *Pravni vjesnik: časopis za pravne i društvene znanosti Pravnog fakulteta Sveučilišta J. J. Strossmayera u Osijeku*, 40(1), pp. 77-95. <https://doi.org/10.25234/pv/27044>
- Mandjee, T. 2015. Bitcoin, its Legal Classification and its Regulatory Framework. *Journal of Business and Securities Law*, 15, pp. 157-211.
- Perkušić, M., Jozipović, Š. & Piplica, D. 2020. The need for legal regulation of blockchain and smart contracts in the shipping industry. *Transactions on Maritime Science*, 9(2), pp. 365-373. <https://doi.org/10.7225/toms.v09.n02.019>
- Selgin, G. 2003. Adaptive Learning and the Transition to Fiat Money. *The Economic Journal*, 113, pp. 147-165. <https://doi.org/10.1111/1468-0297.00094>
- Takahashi, K. 2022. The law is applicable to proprietary issues of crypto-assets. *Journal of Private International Law*, 18(3), pp. 339-362. <https://doi.org/10.1080/17441048.2022.2138102>
- Trautman, L. J. 2018. Bitcoin, Virtual Currencies, and the Struggle of Law and Regulation to Keep Pace. *Marquette Law Review*, 102(2), pp. 448-537. <https://doi.org/10.2139/ssrn.3182867>
- van der Linden, T. & Shirazi, T. 2023. Markets in crypto-assets regulation: Does it provide legal certainty and increase adoption of crypto-assets? *Financial Innovation*, 9:22, pp. 1-30. <https://doi.org/10.1186/s40854-022-00432-8>

- Wronka, C. 2024. Crypto-asset regulatory landscape: a comparative analysis of the crypto-asset regulation in the UK and Germany. *Journal of Asset Management*, pp. 1-10. <https://doi.org/10.1057/s41260-024-00358-z>
- Zilioli, C. 2020. Crypto-Assets: Legal Characterisation and Challenges under Private Law. *European Law Review*, 45(2), pp. 251-266. <https://doi.org/10.2139/ssrn.3532316>

### ***Articles, Press Releases and Reports***

- ECB-1 – A stocktake on the digital euro – Summary report on the investigation phase and outlook on the next phase, ECB 2023. Available at: [https://www.ecb.europa.eu/paym/digital\\_euro/investigation/profuse/shared/files/dedocs/ecb.dedocs231018.en.pdf](https://www.ecb.europa.eu/paym/digital_euro/investigation/profuse/shared/files/dedocs/ecb.dedocs231018.en.pdf) (1. 10. 2024).
- ECB-2 Panetta, F. & Dombrovskis, V. Why Europe needs a digital euro. 2023. Available at: <https://www.ecb.europa.eu/press/blog/date/2023/html/ecb.blog230628~140c43d2f3.en.html> (1. 10. 2023).
- ECB-3 – press release ECB. 2022. Available at: <https://www.ecb.europa.eu/press/key/date/2022/html/ecb.sp221107~dcc0cd8ed9.en.html> (1. 10. 2024).
- IRS notice - Internal Revenue Service, Notice 2014–21, 2014–16 I.R.B. 938. Available at: <http://www.irs.gov/pub/irs-drop/n-14-21.pdf> (1. 10. 2024).
- Nakamoto, S. 2008. Bitcoin: A Peer-to-Peer Electronic Cash System. White paper.
- UK-policy brief - Policy paper, Revenue and Customs Brief 9 (2014), Bitcoin and other cryptocurrencies. Available at: <https://bitcoin.org/bitcoin.pdf> (1. 10. 2024).
- Yuan progress report - Progress of Research & Development of E-CNY in China, Working Group on E-CNY Research and Development of the People's Bank of China 3, 8 (July 2021).

### ***Legal sources and case law***

- AMLD 5 – Directive (EU) 2018/843 of the European Parliament and of the Council of 30 May 2018 amending Directive (EU) 2015/849 on the prevention of the use of the financial system for the purposes of money laundering or terrorist financing, and amending Directives 2009/138/EC and 2013/36/EU.
- MiCAR - Regulation (EU) 2023/1114 of the European Parliament and of the Council of 31 May 2023 on markets in crypto-assets, and amending Regulations (EU) No 1093/2010 and (EU) No 1095/2010 and Directives 2013/36/EU and (EU) 2019/1937, PE/54/2022/REV/1.
- MiFID II - Council Directive 2014/65/EC of 15 May 2014 on markets in financial instruments and amending Directive 2002/92/EC and Directive 2011/61/EU [2014] OJ L173/349.
- Proposal for a Regulation of the European Parliament and of the Council on the establishment of the digital euro, COM/2023/369 final.
- Skatteverket/Hedqvist (C-264/14) EU:C:2015:718.