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**Decentralized Finance from the Perspective of
Czech Financial Regulation and MiCA
Proposal**

Master's thesis

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Introduction

Blockchain technology introduced a unique way of transfer of value through the replacement of trusted third parties with code and computational processes, which ultimately allows the opening of system of financial products and services to everybody with access to the internet. Decentralized finance represents a new concept of allocation of resources and processing of financial operations in which digital data can finally constitute non-replicable values. Such an innovation brings new perspectives on the automatization of processes in financial systems and their characterizations, as well as on the effects connected with them, such as their wide availability across multiple jurisdictions, monetary implications regarding potentially new types of legal tenders or views on the exploits of the respective systems. Further, next to the economic and social impacts, it also brings new regulatory responses reacting to the weak points of the latest technologies brought by their leap development.

Blockchain technology is gaining more and more popularity which causes a significant inflow of capital into the newly invented tools and their development. The year 2021 brought decisive changes in the cryptocurrency industry as Bitcoin was adopted as a legal tender of El Salvador¹, several publicly traded companies in the USA added Bitcoin to their balance sheet, Tesla, Inc.² and MicroStrategy Incorporated³ being the most articulated ones, and Coinbase, Inc. was listed on Nasdaq stock exchange as the first cryptocurrency trading platform in the USA⁴.

During the year 2021, the total value locked within DeFi protocols reached over \$180 billion, and the total market capitalization of DeFi tokens amounted to \$170 billion.⁵

¹ RENTERIA, Nelson and Anthony ESPOSITO. El Salvador's world-first adoption of bitcoin endures bumpy first day. In: *Reuters* [online]. 2021 [cit. 2022-02-16]. Available at: <https://www.reuters.com/business/finance/el-salvador-leads-world-into-cryptocurrency-bitcoin-legal-tender-2021-09-07/>.

² KOVACH, Steve. Tesla buys \$1.5 billion in bitcoin, plans to accept it as payment. In: *CNBC* [online]. 2021 [cit. 2022-02-16]. Available at: <https://www.cnbc.com/2021/02/08/tesla-buys-1point5-billion-in-bitcoin.html>

³ BELLUSCI, Michael. MicroStrategy Adds Almost 9,000 Bitcoins to Its Holdings in Third Quarter. In: *CoinDesk* [online]. 2021 [cit. 2022-02-16]. Available at: <https://www.coindesk.com/business/2021/10/28/microstrategy-added-almost-9000-bitcoins-to-its-holdings-in-third-quarter/>.

⁴ LEVY, Ari. Coinbase closes at \$328.28 per share in Nasdaq debut, valuing crypto exchange at \$85.8 billion. *CNBC* [online]. 2021 [cit. 2022-02-16]. Available at: <https://www.cnbc.com/2021/04/14/coinbase-to-debut-on-nasdaq-in-direct-listing.html>.

⁵ Overview. Defi Llama [online]. [cit. 2022-11-17]. Available at: <https://defillama.com/> and Top 100 DeFi Coins by Market Capitalization. In: *CoinGecko* [online]. [cit. 2022-11-17]. Available at: <https://www.coingecko.com/en/categories/decentralized-finance-defi>.

It is important to note that DeFi emerged only in 2017 with the launch of Maker DAO, which is considered to be the first DeFi application to earn significant adoption.⁶ Although, some would argue that DeFi was created with the introduction of Bitcoin, as it was the first digital asset which enabled its users to transfer value using blockchain.

The events in 2022 took a completely opposite course of direction, beginning with the crash of the most popular and widely spread algorithmic stablecoin, TerraUSD, along with its associated blockchain network Luna. The estimations suggest that around \$60 billion was wiped out, triggering a cascade of liquidations of hedge funds vastly involved in the crypto asset markets.⁷ The industry took another hit in November with the collapse of one of the most popular centralized exchanges, FTX. The information available at the moment of writing this thesis suggest that FTX was tremendously mismanaged and practically shared all of its customers' resources with its closely affiliated hedge fund Alameda Research. The situation resulted in the bankruptcy of FTX and its associated companies affecting the whole industry again.⁸

Also, because of the recent events and high instability in the crypto asset markets, more and more attention is directed towards regulations that would prevent such situations from occurring or at least mitigate their impacts on consumers. In European Union, it is the MiCA Proposal which is delving into the area of regulating crypto assets and their associated services as one of the first regulations of its kind, setting the standard for the rest of the world. The importance of MiCA is also why it was chosen as one of the main points of interest of this thesis, along with DeFi, which embodies the innovation brought by the existence of crypto assets and associated blockchain capabilities.

This thesis aims to (i) introduce the reader to fundamental technical mechanisms of blockchain and decentralized finance, (ii) outline the infrastructure of the DeFi ecosystem along with its specifics, (iii) analyse the current financial regulatory regime of DeFi with regards to the Czech legalisation in force, not taking into account the associated tax consequences, (iv) outline some of the fundamental aspects of MiCA, its

⁶ RUSSO, Camila. What Is Decentralized Finance?: A Deep Dive by The Defiant. In: *CoinMarketCap* [online]. 2021 [cit. 2022-02-16]. Available at: <https://coinmarketcap.com/alexandria/article/what-is-decentralized-finance>.

⁷ CHOW, Andrew R. The Real Reasons Behind the Crypto Crash, and What We Can Learn from Terra's Fall. In: *Forbes* [online]. 2022 [cit. 2022-11-19]. Available at: <https://time.com/6177567/terra-ust-crash-crypto/>.

⁸ CHOI, Jason. The Definitive Thread on FTX. In: *Twitter* [online]. 2022 [cit. 2022-11-19]. Available at: <https://twitter.com/mrjasonchoi/status/1592502785873825794> and HERN, Alex and Dan MILMO. What do we know so far about collapse of crypto exchange FTX?. In: *The Guardian* [online]. 2022 [cit. 2022-11-19]. Available at: <https://www.theguardian.com/technology/2022/nov/18/how-did-crypto-firm-ftx-collapse>.

background and scope, and (v) assess DeFi model applications with regards to the scope of MiCA. The descriptive method and analysis will be used, and the assessments will be done using the qualitative research method.

At first, the structure and defining attributes of blockchain will be described together with the mechanism of smart contracts and a brief characterization of tokens, coins and transactions. The basic knowledge of blockchain mechanisms is essential to understanding the specifics of DeFi when it is being assessed from the regulatory perspective. Next, emphasis will be put on the DeFi ecosystem, its use cases, comparison with traditional financial systems and the aspects of decentralization. Most of the specifics of DeFi will be derived from the technical aspects of blockchain, which ultimately define the uniqueness of the whole system.

Further, the DeFi ecosystem will be summarised, and its elemental financial applications will be outlined along with their specifics. The applications will be described with regard to their general form and economic implications, as well as considering their model example forms which will be further reflected in the assessments of the Czech regulation and Proposal MiCA.

Subsequently, the legal aspects of DeFi will be assessed from the perspective of financial regulation currently applicable in the Czech Republic. The focus will be on the analysis of DeFi in terms of its characterization within the selected acts regulating and potentially affecting DeFi activities. The author notes that it is not within the scope and possibilities of this thesis to analyse all of the potentially applicable laws, hence, some of them will be chosen to demonstrate whether the regulation can potentially include some of the relevant applications within their scope. Current regulation of anti-money laundering will be mentioned in relation to the definition of crypto assets provided by applicable regulation, but it will not be discussed in great detail as the topic is beyond the reasonable extent of this thesis and is not directly linked to the activities of DeFi. Aspects regarding the taxation of crypto assets will not be addressed in this thesis at all.

Then, the proposed legislation and approach of the European Commission will be outlined along with the scope of the MiCA Proposal, which will be used for the analysis of DeFi. The research will be provided by way of subsumption of the previously described concepts and activities under the normative rules derived from the regulation, mainly with regard to the scope and related defining provisions. The issues associated with stablecoins will only be dealt with in the context of their decentralized variants.

As DeFi is a relatively new phenomenon concerning crypto assets, the author assumes that the European Commission did not take its existence into account when it was creating the Proposal, although, without further interventions, it could potentially have implications for the whole DeFi system and hence hinder the innovations in this segment. In an effort to prove this, the analysis of DeFi applications in connection with MiCA will identify in what aspects MiCA regulates the actions which take place during activities within the DeFi ecosystem, not taking into account any derived and later stated exemptions which could influence the overall applicability of MiCA on DeFi. The author's hypothesis is that MiCA would strongly influence DeFi if it would not be associated with the decentralization of power. This presumption will be evaluated with regard to the assessment of the decentralization of DeFi in general and its relation to the original Proposal by the European Commission.

Although the regulation MiCA has not been formally adopted yet, there is broad consensus within the EU institutions on its enactment based on the concluded provisional agreement between the Council and the European Parliament from June 2022.⁹ The negotiations resulted in a number of changes to the original Proposal submitted by the European Commission, namely concerning the relation to decentralization which will be briefly outlined in part [Introduction to MiCA Proposal](#).

As MiCA is currently the only comprehensive regulation of crypto assets with the potential to influence the Czech legal system in the near future, the author finds its scope crucial in defining the future of DeFi and the whole industry of crypto assets in the Czech Republic and the European Union in general. It is important to note that the blockchain industry and DeFi are in their very early stages of existence, therefore, their position within the global financial system will be only determined in the future. Similarly to other industries, the legal environment is one of the decisive factors in the decision of the innovators on where to locate their operations and business. Hence, it is in the EU's high interest to provide both entrepreneurs and users with sufficient legal certainty and favourable legal policies. On the other hand, it is necessary to balance these policies with adequate rules dealing with risks for consumer protection and financial stability.

⁹ Digital finance: agreement reached on European crypto-assets regulation (MiCA). In: *The European Council and the Council of the European Union* [online]. 2022 [cit. 2022-11-16]. Available at: <https://www.consilium.europa.eu/en/press/press-releases/2022/06/30/digital-finance-agreement-reached-on-european-crypto-assets-regulation-mica/>.

The legal assessments and conclusions are derived exclusively from Czech laws in force on 31. September 2022 and from the official proposal for a regulation of the European Parliament and of the Council on Markets in Crypto-assets provided by the European Commission on 24. September 2020 in Brussels.

1. Decentralized Finance

Decentralized Finance is a general term comprising a system of financial operations on different blockchains where parties do not need to rely upon verification and execution of their conducts on trusted third parties but choose to act within a predefined framework set by code executed on a blockchain. By making use of decentralized applications, protocols can now facilitate access to financial products which function in a permissionless and autonomous way, allowing anybody with internet access to interact with them.¹⁰

To be able to assess the activity associated with DeFi protocols, it is necessary to outline the basic mechanisms on which DeFi is built. The mechanisms entail specifics relating to the subsequent characterization and evaluation of derived outcomes. It is the technology which underpins the legal analysis of the DeFi ecosystem. The following description should therefore serve as an introduction to the specifics that are inherently related to blockchain, crypto assets and the DeFi ecosystem. The reader should be aware that the technologies are described by a layman in the computer science field, and it is not the aim of the thesis to comprehensively describe the functioning of the discussed systems but rather to introduce their main and distinguishing features, which possibly influence its legal consequences.

The ultimate financial application brought by blockchain is its ability to serve as a transfer of value and therefore create a relatively secure global payment system with fast settlements. In this thesis, the emphasis will be put on financial applications enabled through the use of smart contracts, therefore, when the term Decentralized Finance (DeFi) is used, it should be understood in its narrow sense, not taking into account simple transfer of assets from person A to person B, but rather more complex operations resulting in the provision of services and products listed in part [Financial Applications in DeFi](#).

DeFi is based on a composable infrastructure, which ultimately allows it to interconnect different assets, smart contracts and applications to provide new and unique solutions. Various components can be combined to increase the value of the used

¹⁰ SCHÄR, Fabian. Decentralized Finance: On Blockchain- and Smart Contract-based Financial Markets. *SSRN Electronic Journal* [online]. [cit. 2022-03-14]. ISSN 1556-5068. Available at: doi:10.2139/ssrn.3571335 and KAOUSAR NASSR, Iota, Robert PATALANO, Christophe DEBONNEUIL and Pamela DUFFIN. Why Decentralised Finance (DeFi) Matters and the Policy Implications. *OECD* [online]. 2022 [cit. 2022-02-16]. Available at: <https://www.oecd.org/finance/why-decentralised-finance-defi-matters-and-the-policy-implications.htm>.

products while at the same time facilitating the creation of innovation. This is often possible because DeFi applications are open-source, and the creators can make use of already invented mechanisms.¹¹

One of the distinguishing aspects of DeFi is that it is non-custodial, meaning that the digital assets belonging to the users are managed directly by them, having independent and complete control over the disposition with them, with the only limitations constituted by the conditions of used smart contracts. The control belongs to the possessor of private keys corresponding to the public address to which the digital assets are assigned.¹²

Further, due to the openness of the protocols and related self-governance, it is often the case that DeFi becomes strongly influenced and driven by the community. The self-governance of the protocol is usually based on the distribution of the governance tokens, whose holders possess the right to participate in the protocol's related decision-making. By way of voting on specific proposals, the holders then determine any adjustments to the protocol. The governance is then closely connected to the decentralization of the tokens as one of the important elements in determining the potentially responsible entity with regard to actions resulting from the automated processes.¹³

It can be argued whether protocols which are not properly decentralized and based on community governance should be labelled as DeFi, even though they are implemented on blockchain and connected with its token economy. Nowadays, in the early stages of the development of DeFi, public opinion is only being formed, however, in practice, DeFi protocols are based on various governance and decentralization models with corresponding implications, some of them being more of a centralized nature than perceived by the public. In the author's opinion, as the development of the DeFi segment progresses, governance and decentralization will take a more significant part also in

¹¹ POPESCU, Andrei-Dragoş. DECENTRALIZED FINANCE (DEFI) – THE LEGO OF FINANCE. *Social Sciences and Education Research Review* [online]. 2020, vol. 7, i. 1, p. 321 - 349 [cit. 2022-03-14]. ISSN 2393–1264. Available at: https://sserr.ro/wp-content/uploads/2020/07/SSERR_2020_7_1_321_349.pdf.

¹² KAOUSAR NASSR, Iota, Robert PATALANO, Christophe DEBONNEUIL and Pamela DUFFIN. Why Decentralised Finance (DeFi) Matters and the Policy Implications. *OECD* [online]. 2022 [cit. 2022-02-16]. Available at: <https://www.oecd.org/finance/why-decentralised-finance-defi-matters-and-the-policy-implications.htm>.

¹³ KAOUSAR NASSR, Iota, Robert PATALANO, Christophe DEBONNEUIL and Pamela DUFFIN. Why Decentralised Finance (DeFi) Matters and the Policy Implications. *OECD* [online]. 2022 [cit. 2022-02-16]. Available at: <https://www.oecd.org/finance/why-decentralised-finance-defi-matters-and-the-policy-implications.htm>.

defining DeFi protocols, mainly due to implications derived from legal interventions. The model described below presumes DeFi protocols to be based on decentralization and community governance in their ideal form.

DeFi is inherently bound with limitations with regard to the information contained only within the blockchain ledger. As an example may serve the price feed needed for the execution of liquidations with regard to collateralized debt positions or markets (see below). To overcome this deficiency, so-called oracles are used for smart contracts to access external data sources. Oracles may often be constituted in a centralized way relying on one source of information and causing the risk of tampering with the protocol through a single point of failure, or in a decentralized way retrieving information from multiple structuralized data locations and therefore alleviating the consequences of situations when some of the entry points are compromised.¹⁴

1.1. Blockchain

Blockchain is a specific type of distributed ledger technology which stores packages of data (blocks) structured in a linked chain and copied across multiple computers (nodes). Its update – the addition of a new data block – requires the consensus of a majority of the nodes based on a specific consensus mechanism, such as proof of work or proof of stake. The fundamental data contained in each block are composed of transactions, timestamps, and cryptographic hashes of the previous block, which secures the immutability of the blockchain as all of the previous blocks would have to be altered in order to temper with the stored data.¹⁵

The blocks are added to the ledger recurrently by validators. Validators, in cases of a system based on a proof of work consensus mechanism referred to as miners, receive the data from blockchain users, which are then reviewed to verify their compliance with rules and information already maintained within the database. The previous block's hash is then added to the rest of the data, and a specific validator is chosen to create the block. The mechanism of choice of the validator differs across particular blockchains and is

¹⁴ SCHÄR, Fabian. Decentralized Finance: On Blockchain- and Smart Contract-based Financial Markets. *SSRN Electronic Journal* [online]. [cit. 2022-03-14]. ISSN 1556-5068. Available at: doi:10.2139/ssrn.3571335.

¹⁵ NOFER, Michael, Peter GOMBER, Oliver HINZ and Dirk SCHIERECK. Blockchain. *Blockchain. Business & information systems engineering* [online]. 2017, vol. 59, i. 3, p. 183-187 [cit. 2022-02-17]. ISSN 2363-7005. Available at: doi:10.1007/s12599-017-0467-3.

usually associated with economic motivation to run the network, as the successful validators receive rewards for their used computational power and energy.¹⁶

Blockchain is an inherent component of DeFi as it represents the structure of the database of transactions and commands (smart contracts) constituting the DeFi ecosystem. Due to the blockchain's immutability, users trust its records, and because of the automatization of the processes, the transactions can be settled within minutes or seconds, opposite to bank transfers and credit card payments, which can take days to settle, depending on the cooperability of the particular intermediaries.¹⁷

Apart from the most well-known use of blockchain as a ledger for the transfer of value (digital assets) and following possibilities of use as means of exchange (payment mechanism), its applications include tracing of ownership of properties (e.g. supply chains, cadastral record), maintaining personal records, the establishment of digital identities or use in digital voting systems.¹⁸ The primary use case as the mean of exchange is also facilitated by the ability to prevent double-spending, which can be considered one of the most important and innovative features brought by this technology compared to previous versions of distributed ledger systems. This attribute ultimately enabled the emergence of crypto assets and introduced scarcity in digital space. By making use of it, irreplicable values can be securely and reliably transferred to other persons using digitally existing accounts.¹⁹

The uniqueness of blockchain lies within its ability to store and transfer information over the internet while maintaining transparency and security. All of the transactions made on blockchain are publicly accessible and auditable. The reason for that is that the data are stored, validated, and executed on a network of computers which, in the case of permissionless blockchains, is accessible to anybody with the internet.²⁰ For

¹⁶ NOFER, Michael, Peter GOMBER, Oliver HINZ and Dirk SCHIERECK. Blockchain. *Blockchain. Business & information systems engineering* [online]. 2017, vol. 59, i. 3, p. 183-187 [cit. 2022-02-17]. ISSN 2363-7005. Available at: doi:10.1007/s12599-017-0467-3.

¹⁷ How Blockchain Could Disrupt Banking. *Research Briefs* [online]. 2021 [cit. 2022-02-17]. Available at: <https://www.cbinsights.com/research/blockchain-disrupting-banking/>.

¹⁸ BERRYHILL, Jamie, Théo BOURGERY and Angela HANSON. Blockchains Unchained: Blockchain Technology and its Use in the Public Sector. In: *OECD Working Papers on Public Governance* [online]. 2018 [cit. 2022-02-16]. ISSN 19934351. Available at: doi:10.1787/3c32c429-en.

¹⁹ REIFF, Nathan a Erika RASURE. How does a block chain prevent double-spending of Bitcoins?. In: *Investopedia* [online]. 2021 [cit. 2022-02-19]. Available at: <https://www.investopedia.com/ask/answers/061915/how-does-block-chain-prevent-doublespending-bitcoins.asp>.

²⁰ KRAUS, Daniel, Thierry OBRIST and Olivier HARI. *Blockchains, smart contracts, decentralised autonomous organisations and the law* [online]. Northampton, MA: Edward Elgar Pub, 2019. ISBN 1-78811-513-9.

the purposes of this thesis, as blockchain and all of the technologies built on it, it will be regarded a permissionless blockchain to which access is not restricted. Opposite to permissionless blockchains, there are permissioned blockchains, which can limit or condition the ability to view or add information to the ledger.²¹

Centralized entities inherently possess a risk of data loss by the destruction of the data storage, corruption of the data by internal influences (intentionally or unintentionally), or manipulation of the data in case of cyber-attacks. These risks are mitigated by built-in security mechanisms, whereas decentralized infrastructure has internalized solutions to these points of failure as its architecture is more secure by its nature. The effort needed to manipulate the stored data rises with the number of nodes run within the particular blockchain, and the interlinking of the blocks significantly lowers the risk of corruption.²² The same cannot be applied to subsequent use of the infrastructure, primarily utilizing smart contracts, which, due to the complexity of applications and the system's openness, is possible to be interfered by anybody and hence requires increased attention to potential vulnerabilities. This results in a number of successful attempts to exploit the protocols and loss of locked resources of the users.

It is important to note that the technical aspects of blockchain can differ in detail, but the structure outlined describes the fundamental principles of blockchain database introduced with the release of Bitcoin: A Peer-to-Peer Electronic Cash System in 2009, as the first blockchain database ever.²³ The whole concept of blockchain technology is inherently bound with cryptography, thus, the prefix “crypto” is often used in connection with its use cases.

The attributes given to blockchain in this thesis must be perceived from the perspective of an ideal form, as the assessment of possible security risks is not in the scope of this thesis but is rather subject to technical evaluations. However, the reader should be aware that, in theory, none of the blockchains is 100 % infallible²⁴, but in

²¹ BERRYHILL, Jamie, Théo BOURGERY and Angela HANSON. Blockchains Unchained: Blockchain Technology and its Use in the Public Sector. In: *OECD Working Papers on Public Governance* [online]. 2018 [cit. 2022-02-16]. ISSN 19934351. Available at: doi:10.1787/3c32c429-en.

²² ZETZSCHE, Dirk Andreas, Douglas W. ARNER and Ross P. BUCKLEY. Decentralized Finance (DeFi). *SSRN Electronic Journal* [online]. 2020 [cit. 2022-02-16]. ISSN 1556-5068. Available at: doi:10.2139/ssrn.3539194.

²³ NAKAMOTO, Satoshi. Bitcoin: A Peer-to-Peer Electronic Cash System. *Bitcoin* [online]. 2008 [cit. 2022-02-16]. Available at: <https://bitcoin.org/bitcoin.pdf>.

²⁴ JACCARD, Gabriel. Smart Contracts and the Role of Law. *SSRN Electronic Journal* [online]. 2018 [cit. 2022-02-16]. Available at: doi:10.2139/ssrn.3099885.

practice, some of them have proven to maintain a sufficient level of durability against malicious attacks and are widely used every day.

1.2. Smart Contracts and Decentralized Applications (Dapps)

Firstly, it is essential to note that smart contracts are not contracts in a typical legal sense, however, they are subject to legal interpretation as any other relevant juridical acts. In terms of high-level description, they are represented by commands written in a specific code language and executed within a blockchain database. On a low level, it is the computation corresponding to the programmed instructions with the addition of the users' input, which, when it is successful, results in a desired transfer of information. With regards to the blockchain, the computation is reflected by the database and replicated on multiple nodes within the network, thus securing its irreversibility and ensuring that the contract, or more specifically the code, will be executed and enforced according to its given parameters.

The term “smart contract” was used for the first time in 1994 by lawyer and computer scientist Nick Szabo who described it as “*a computerized transaction protocol that executes the terms of a contract. The general objectives of smart contract design are to satisfy common contractual conditions (such as payment terms, liens, confidentiality, and even enforcement), minimize exceptions, both malicious and accidental, and minimize the need for trusted intermediaries.*”²⁵ Smart contracts are in essence built on “if, then” basis, which means that the computational mechanism automatically proceeds with predefined steps when the conditions are met and self-executes. Ultimately it allows parties to transact within the framework set by the specific code and execute their intentions without a third party or trustee.²⁶ Because of the automatization of the processes, there is no need for legal intervention with regard to the execution of the

²⁵ KRAUS, Daniel, Thierry OBRIST and Olivier HARI. *Blockchains, smart contracts, decentralised autonomous organisations and the law* [online]. Northampton, MA: Edward Elgar Pub, 2019 [cit. 2022-11-10]. ISBN 1-78811-513-9 and SZABO, Nick. Smart Contracts. In: *Phonetic Sciences, Amsterdam* [online]. 1994 [cit. 2022-02-16]. Available at: <https://www.fon.hum.uva.nl/rob/Courses/InformationInSpeech/CDROM/Literature/LOTwinterschool2006/szabo.best.vwh.net/smart.contracts.html>.

²⁶ KRAUS, Daniel, Thierry OBRIST and Olivier HARI. *Blockchains, smart contracts, decentralised autonomous organisations and the law* [online]. Northampton, MA: Edward Elgar Pub, 2019 [cit. 2022-11-10]. ISBN 1-78811-513-9.

conditions from the smart contract, which eases transactions of remote parties and reduces administrative costs.²⁷

Blockchain provides its fundamental features also to smart contracts built on it, such as the immutability of the records of data and the ability to mitigate single points of failure.²⁸ However, the immutability of smart contracts in practice can be more flexible as the code may contain certain functions to enable the processing of external inputs.²⁹ Since they are run on a trusted network of blockchain nodes, the issuance of smart contracts can be done between anonymous and untrusted third parties while maintaining the reliability of the functions provided by the code.³⁰ Permissionless blockchains, therefore, open smart contracts to a wide variety of commercial applications, amongst which DeFi certainly belongs.³¹ Moreover, Szabo provided as a prime example of smart contracts the digital cash protocols and outlined future use cases in the form of electronic bearers of securities.³²

From a legal point of view, the interpretation of smart contracts may vary across different jurisdictions and legal cultures, however, as *Kasatkina* pointed out, “existing rules and law principles should be applied to them”, and they “should be legally binding in the common and civil law countries”.³³ With regards to Czech law, under Section 555 par 1. of the Civil Code, juridical acts are assessed according to their contents, thus, assessment of legal contracts that arise from interactions with smart contracts is to be made based on the implications that stem from the programmed commands.

²⁷ JACCARD, Gabriel. Smart Contracts and the Role of Law. *SSRN Electronic Journal* [online]. 2018 [cit. 2022-02-16]. Available at: doi:10.2139/ssrn.3099885 and HU, Yining, Madhusanka LIYANAGE, Ahsan MANSOOR, Kanchana THILAKARATHNA, Guillaume JOURJON and Aruna SENEVIRATNE. Blockchain-based Smart Contracts - Applications and Challenges. *arXiv* [online]. 2018 [cit. 2022-02-16]. Available at: <https://arxiv.org/abs/1810.04699>.

²⁸ HU, Yining, Madhusanka LIYANAGE, Ahsan MANSOOR, Kanchana THILAKARATHNA, Guillaume JOURJON and Aruna SENEVIRATNE. Blockchain-based Smart Contracts - Applications and Challenges. *arXiv* [online]. 2018 [cit. 2022-02-16]. Available at: <https://arxiv.org/abs/1810.04699>.

²⁹ JACCARD, Gabriel. Smart Contracts and the Role of Law. *SSRN Electronic Journal* [online]. 2018 [cit. 2022-02-16]. Available at: doi:<https://dx.doi.org/10.2139/ssrn.3099885>.

³⁰ HU, Yining, Madhusanka LIYANAGE, Ahsan MANSOOR, Kanchana THILAKARATHNA, Guillaume JOURJON and Aruna SENEVIRATNE. Blockchain-based Smart Contracts - Applications and Challenges. *arXiv* [online]. 2018 [cit. 2022-02-16]. Available at: <https://arxiv.org/abs/1810.04699>.

³¹ HU, Yining, Madhusanka LIYANAGE, Ahsan MANSOOR, Kanchana THILAKARATHNA, Guillaume JOURJON and Aruna SENEVIRATNE. Blockchain-based Smart Contracts - Applications and Challenges. *arXiv* [online]. 2018 [cit. 2022-02-16]. Available at: <https://arxiv.org/abs/1810.04699>.

³² SZABO, Nick. Smart Contracts. In: *Phonetic Sciences, Amsterdam* [online]. 1994 [cit. 2022-02-16]. Available at: <https://www.fon.hum.uva.nl/rob/Courses/InformationInSpeech/CDROM/Literature/LOTwinterschool2006/szabo.best.vwh.net/smart.contracts.html>.

³³ KASATKINA, Marina. The Interpretation of Smart Contracts in the EU and the USA. *International Comparative Jurisprudence* [online]. 2021, vol. 7, i. 2 [cit. 2022-11-10]. ISSN 2351-6674. Available at: <http://dx.doi.org/10.13165/j.icj.2021.12.007>. p. 215.

Smart contracts are accessible to ordinary users through the use of decentralized applications (dapps). Dapps comprise a conveniently readable and accessible interface for the user (front-end), which facilitates the complex transaction computed on a blockchain (back-end). The consequences of interaction with them are derived from the characteristics of smart contracts they refer to. Due to the permissionless nature of blockchain, multiple dapps may interact with the same smart contracts, making them composable. The front-end part of the decentralized app designed for direct interaction with the user may, however, be located on centralized servers, which is in conflict with the decentralized nature of the application and possesses a risk of unauthorized interference.³⁴

1.3. Tokens, Coins and Transactions

Tokens, in a general sense, are units of account used in blockchains.³⁵ They represent the irreplicable digital value, which is being transmitted on blockchain and takes the form of coins or tokens (in a narrow sense). Essentially tokens are pieces of information associated with qualitative (type/name of the tokens, transfer limitations etc.) and quantitative (amount) properties and assigned to certain owners, i.e., public address, and stored on a ledger distributed among all the nodes of the network. They usually comprise a right to be transferred in maximum number in which they are assigned to a specific public address using the digital signature of the owner, i.e. possessor of the corresponding private key, to another public address within the corresponding blockchain.³⁶ The distinction between coins and tokens (in the narrow sense) is not formally established, however, in general, a coin is understood to be the native currency of a particular blockchain (e.g. Ether on Ethereum) with fundamental usage as a form of payment for transaction fees, whereas token is considered to be issued through additional layer on top of blockchain using smart contracts and sometimes being connected with other utility or rights.³⁷

³⁴ INTRODUCTION TO DAPPS. *Ethereum Docs* [online]. Ethereum [cit. 2022-02-20]. Available at: <https://ethereum.org/en/developers/docs/dapps/>.

³⁵ The term token(s) is used in this thesis in its broad sense, unless stated otherwise.

³⁶ KOHAJDA, Michael and Jiří MORAVEC. Legal aspects of bitcoin under the Czech law. *Daně a finance*. 2016, vol. 24, i. 4, p. 36 – 45.

³⁷ What is a token?. *Coinbase* [online]. [cit. 2022-02-19]. Available at: <https://www.coinbase.com/learn/crypto-basics/what-is-a-token> and KRAUS, Daniel, Thierry OBRIST and Olivier HARI. *Blockchains, smart contracts, decentralised autonomous organisations and the law* [online]. Northampton, MA: Edward Elgar Pub, 2019 [cit. 2022-02-19]. ISBN 1-78811-513-9

Tokens can be further characterized and classified according to their economic functions derived from their qualitative properties. The Swiss Financial Market Supervisory Authority introduced this classification in its ICO guidelines.³⁸ Subsequently, it was also used, for example, by the Securities and Markets Stakeholder Group in its advice report on Initial Coin Offerings and Crypto-Assets to European Securities and Markets Authority.³⁹ According to this classification, the tokens can be divided into four categories – payment tokens, utility tokens, asset tokens and hybrid tokens.⁴⁰

Payment tokens also referred to as cryptocurrencies, are characterized by the intention to be used as a means of payment, although they are not associated with the existence of a claim on their issuer. Their value is therefore derived solely from the demand of their users. Utility tokens then provide their users with access to a digital application or service. Asset tokens are associated with the existence of the debt or equity claim on the issuer. And finally, hybrid tokens embed two or all of the functions outlined.⁴¹

Transactions are cryptographically stored data on blockchain containing information about the transfer of tokens. Each transaction contains information about the sender and the recipient in the form of their public addresses creating a verifiable structure. As a result, all nodes have complete information about all the transactions on the blockchain. On blockchains enabling smart contracts, in addition to information on the number of tokens sent, some transactions can contain code to be used as a smart contract. To be able to validly send the data package, it must be provided with the sender's digital signature, which authorizes the execution of the transaction. Additional data can be present depending on the specifics of the particular blockchain. Such a

³⁸ Guidelines for enquiries regarding the regulatory framework for initial coin offerings (ICOs). *FINMA* [online]. 2018 [cit. 2022-11-10]. Available at: https://www.finma.ch/en/~media/finma/dokumente/dokumentencenter/myfinma/1bewilligung/fintech/wegleitung-ico.pdf?sc_lang=en&hash=83EE49D77DA54DD079F314D9EDCBDC3D.

³⁹ SECURITIES AND MARKETS STAKEHOLDER GROUP. ADVICE TO ESMA: Own Initiative Report on Initial Coin Offerings and Crypto-Assets. In: European Securities and Markets Authority [online]. ESMA, 2018 [cit. 2022-11-10]. Available at: https://www.esma.europa.eu/sites/default/files/library/esma22-106-1338_smsg_advice_-_report_on_icos_and_crypto-assets.pdf.

⁴⁰ Guidelines for enquiries regarding the regulatory framework for initial coin offerings (ICOs). *FINMA* [online]. 2018 [cit. 2022-11-10]. Available at: https://www.finma.ch/en/~media/finma/dokumente/dokumentencenter/myfinma/1bewilligung/fintech/wegleitung-ico.pdf?sc_lang=en&hash=83EE49D77DA54DD079F314D9EDCBDC3D.

⁴¹ Guidelines for enquiries regarding the regulatory framework for initial coin offerings (ICOs). *FINMA* [online]. 2018 [cit. 2022-11-10]. Available at: https://www.finma.ch/en/~media/finma/dokumente/dokumentencenter/myfinma/1bewilligung/fintech/wegleitung-ico.pdf?sc_lang=en&hash=83EE49D77DA54DD079F314D9EDCBDC3D.

transaction is then validated, executed and inserted into the ledger by all the nodes participating in the network. Transactions can also serve as smart contract triggers.⁴²

1.4. Comparison of Selected Features with Traditional Financial System

The traditional financial system, also sometimes referred to as centralized finance or CeFi, is based on interoperating intermediaries, mainly financial institutions and market providers, which centralize financial services and resources. *“These intermediaries bring together a range of financial market participants, in particular those with finance resources (e.g. savers, lenders and investors) and those seeking financial resources (e.g. borrowers, entrepreneurs etc.) It is the intermediary which we often think of as the central point in traditional market-based financial systems into their traditional sectors of money, payments, banking, securities and insurance.”*⁴³

DeFi is based on the transparency of financial transactions and accompanying mechanisms associated with them.⁴⁴ Users can follow the chain of transactions and analyse related conducts, which allows better informational integrity and equal access to the data to anybody. The situation changes with regard to the processing of the data in which sophisticated parties will naturally possess significant advantages contrary to ordinary users. Nevertheless, the system's openness offers opportunities to counter informational inequalities related to the traditional financial system.

A major difference can be found in the mechanism of control of the assets. In DeFi, users are able to self-custody the assets, and therefore they directly decide on transfers and related conducts, which results in the loss of need for the intermediaries. Moreover, because of this, DeFi is more difficult to censor as there is no authority that can interfere with on-chain transactions or reverse them. This feature is necessarily associated with greater responsibility for the user's conducts, as well as with increased

⁴² Ethereum Whitepaper. *Ethereum* [online]. [cit. 2022-04-01]. Available at: <https://ethereum.org/en/whitepaper/>.

⁴³ ZETZSCHE, Dirk Andreas, Douglas W. ARNER and Ross P. BUCKLEY. Decentralized Finance (DeFi). *SSRN Electronic Journal* [online]. 2020 [cit. 2022-02-16]. ISSN 1556-5068. Available at: doi:10.2139/ssrn.3539194, p. 7.

⁴⁴ QIN, Kaihua, Liyi ZHOU, Yaroslav AFONIN, Ludovico LAZZARETTI and Arthur GERVAIS. CeFi vs. DeFi -- Comparing Centralized to Decentralized Finance. *arXiv* [online]. 2021 [cit. 2022-04-19]. Available at: doi:10.48550/ARXIV.2106.08157.

risk stemming from the technical nature of the operations, which can contain faults prone to exploits.⁴⁵

The access to functions provided by DeFi is dependent solely on access to on-chain funds and the internet. Some resources will always be needed to cover the costs of transactions on the blockchain, and due to the permissionless and non-custodial nature of DeFi, the connection to the network of nodes is mediated only through the use of the internet. There are no limitations with regard to opening hours, as blockchains are intended to function non-stop.⁴⁶

Figure 1 summarizes the decision mechanism for differentiating between DeFi and CeFi. The methodology was introduced by *Qin, Zhou, Afonin, Lazzaretti and Gervais*, who were “*the first to differentiate with three simple and objective questions whether a service is an instance of CeFi or DeFi.*”⁴⁷ The determining aspect of the assessment is the character of control over the assets, followed by the possibility of censoring the execution of transactions and the protocol execution. In the case of censorship of transaction execution, the situation refers to the centralized origin of the transaction with effects in the DeFi ecosystem, e.g., a transfer of funds from a centralized exchange to a non-custodial wallet. With regard to censorship of the protocol execution, the control over the protocol would have to be in the hands of a centrally governed entity. Otherwise, it can be assumed that the protocol can be deemed as part of DeFi.⁴⁸

⁴⁵ QIN, Kaihua, Liyi ZHOU, Yaroslav AFONIN, Ludovico LAZZARETTI and Arthur GERVAIS. CeFi vs. DeFi -- Comparing Centralized to Decentralized Finance. *arXiv* [online]. 2021 [cit. 2022-04-19]. Available at: doi:10.48550/ARXIV.2106.08157.

⁴⁶ QIN, Kaihua, Liyi ZHOU, Yaroslav AFONIN, Ludovico LAZZARETTI and Arthur GERVAIS. CeFi vs. DeFi -- Comparing Centralized to Decentralized Finance. *arXiv* [online]. 2021 [cit. 2022-04-19]. Available at: doi:10.48550/ARXIV.2106.08157.

⁴⁷ QIN, Kaihua, Liyi ZHOU, Yaroslav AFONIN, Ludovico LAZZARETTI and Arthur GERVAIS. CeFi vs. DeFi -- Comparing Centralized to Decentralized Finance. *arXiv* [online]. 2021 [cit. 2022-04-19]. Available at: doi:10.48550/ARXIV.2106.08157. p. 2.

⁴⁸ QIN, Kaihua, Liyi ZHOU, Yaroslav AFONIN, Ludovico LAZZARETTI and Arthur GERVAIS. CeFi vs. DeFi -- Comparing Centralized to Decentralized Finance. *arXiv* [online]. 2021 [cit. 2022-04-19]. Available at: doi:10.48550/ARXIV.2106.08157.

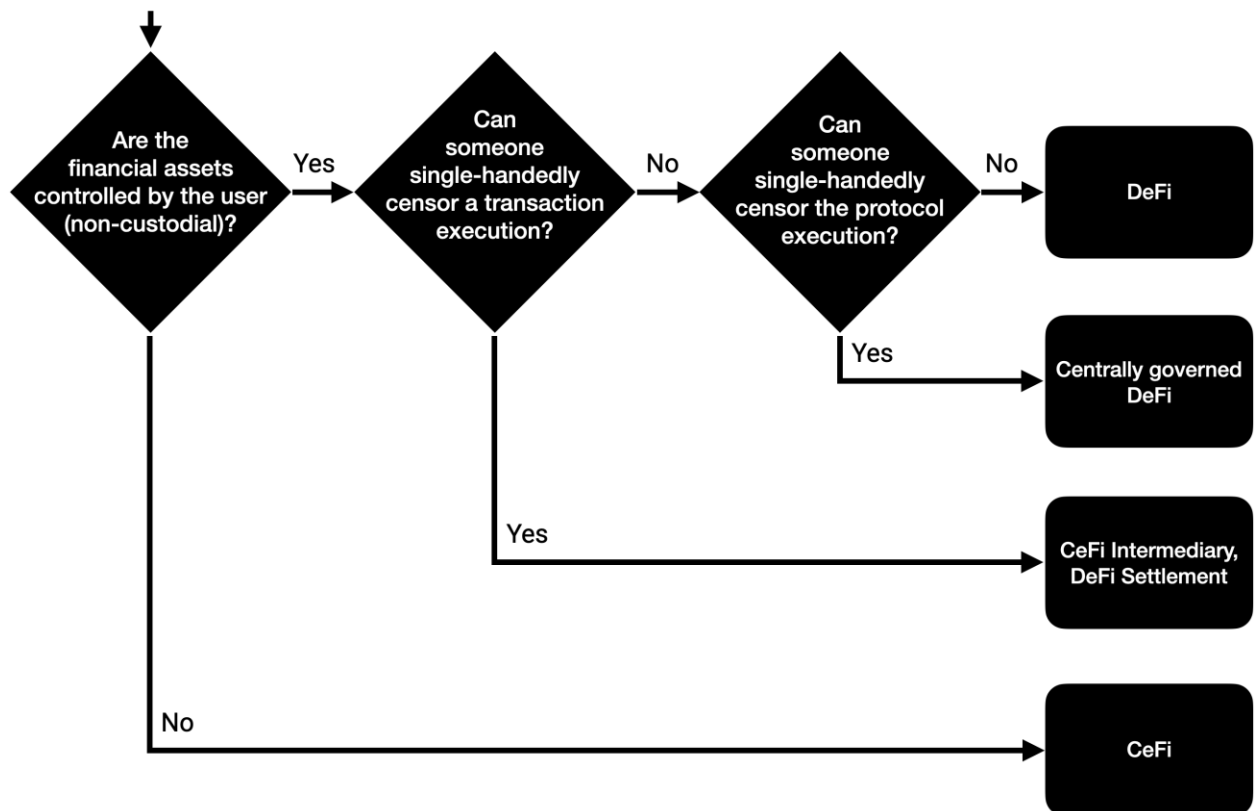


Figure 1: Decision tree to differentiate between DeFi and CeFi.⁴⁹

1.5. Governance, Voting and Decentralized Autonomous Organizations

Governance of DeFi protocols is maintained through community voting based on distributed governance tokens. Members of the community or a team dedicated to working on the development of the protocol submit on-chain proposals consisting of upgrades, updates and changes in the protocol’s functionalities or suggest allocations of treasury funds. The holders of the governance tokens then vote on the proposal, which is usually introduced in the form of an executable code (smart contract) and decide on its implementation in the protocol. The voting process may include additional conditions such as a quorum for a proposal to be submitted, a minimum number of voters quorum, an adjusted required majority etc. Governance of on-chain protocols can also be maintained through delegated voting, which gives the ultimate decision power into the hands of a centralized entity, however, such a governance process can be considered in

⁴⁹ QIN, Kaihua, Liyi ZHOU, Yaroslav AFONIN, Ludovico LAZZARETTI and Arthur GERVAIS. CeFi vs. DeFi -- Comparing Centralized to Decentralized Finance. *arXiv* [online]. 2021 [cit. 2022-04-19]. Available at: doi:10.48550/ARXIV.2106.08157. p. 2.

collision with the idea of decentralization and have effects on subsequent legal evaluations.⁵⁰

The issuance and distribution of governance tokens are closely related to the decentralization of the protocol. The possibilities of initial allocation vary from direct sales to airdrops and rewards to the liquidity providers. The tokens can then be traded on various exchanges resulting in practically unrestricted access to desired voting power for anybody with sufficient capital a may serve as a source of funding for the team behind the protocol and early adopters. Price discovery on secondary markets is finally reflected in the associated market capitalization of the protocol. Furthermore, some of the governance tokens may be included in the token economy of particular protocols providing additional utilities and creating demand for them.⁵¹

The organizational structure of communities based on distributed governance tokens is known as Decentralized Autonomous Organization (DAO). DAOs, in general, are not restricted only to DeFi protocols but may serve a wide variety of purposes based on interactions of a group of people with a common goal. The voting mechanism described above applies to them and depending on the organisation's purpose, relevant decisions are taken in accordance with the voting results. DAOs also allow communities to directly administer an on-chain pool of funds delegated to the organization's aims.

For practical purposes, sometimes DAOs are legally represented by companies with the limited liability of their members, or in some jurisdictions, they can be established as a special type of limited liability company.⁵² In the former situation, the DAOs are referred to as wrapped, whereas in the latter as true DAOs.⁵³

1.6. Aspects of Decentralization

Decentralization is an often-referred concept when discussing blockchain related topics, however, its meaning is not formally established, even considering its decisive

⁵⁰ KAOUSAR NASSR, Iota, Robert PATALANO, Christophe DEBONNEUIL and Pamela DUFFIN. Why Decentralised Finance (DeFi) Matters and the Policy Implications. *OECD* [online]. 2022 [cit. 2022-02-16]. Available at: <https://www.oecd.org/finance/why-decentralised-finance-defi-matters-and-the-policy-implications.htm>.

⁵¹ KAOUSAR NASSR, Iota, Robert PATALANO, Christophe DEBONNEUIL and Pamela DUFFIN. Why Decentralised Finance (DeFi) Matters and the Policy Implications. *OECD* [online]. 2022 [cit. 2022-02-16]. Available at: <https://www.oecd.org/finance/why-decentralised-finance-defi-matters-and-the-policy-implications.htm>.

⁵² LOM, Andrew and Rachael BROWNDORF. Wyoming to Recognize DAOs as LLCs. In: *Regulation Tomorrow* [online]. 2021 [cit. 2022-11-13]. Available at: <https://www.regulationtomorrow.com/us/wyoming-to-recognize-daos-as-llcs/>.

⁵³ SURIEL, Anibal. The Legal Basics of DAOs. In: *The Legal Guild* [online]. [cit. 2022-11-13]. Available at: <https://nearlegal.com/the-legal-basics-of-daos/>.

character with an impact not only on its technical characteristics but also on its legal effects. In practice, decentralization should not be assumed as automatically present in blockchains or protocols built on them. It is to be perceived as a spectrum rather than a binary element, although, to achieve accuracy in the evaluation of the systems when assessing appropriate legal consequences, sufficient binding conditions will have to be laid down, either by legislators or eventually judiciaries, and assessments will have to be made on a case-by-case basis.

According to the Oxford English Dictionary, the term *decentralization* is described as “*the weakening of the central authority and distribution of its functions among the branches or local administrative bodies.*”⁵⁴ Although this meaning is attributed especially to the political context, it is not without purpose for understanding decentralization in terms of blockchain and associated features. Decentralization, therefore, consists of two principal elements: (i) weakening of central authority and (ii) distribution of the authority’s functions. As a result of such a process, there should be no central authority (or a very weak one) and its functions should be distributed to a number of bodies. This brings even more questions regarding how influential the authority can stay or how many bodies the functions should be distributed to.

The decentralization can be attributed to multiple levels relating to DeFi, namely on the layers of (i) blockchain network and (ii) protocol management. Subsequently, both of these layers will be described and assessed in light of the two types of understanding of the term decentralization outlined by *Walch*, however, originally associated only with the decentralization of the blockchain network.

According to *Walch*, decentralization with regard to the blockchain can be understood in several senses. To generalize this categorisation, it can be concluded that it is based on the implications derived from decentralization. First, decentralization can be understood as a distribution of nodes participating in the blockchain network, reflecting the resiliency of the network. In this sense, decentralization is associated with the factual infrastructure maintaining the system and is supported by the idea that the higher the number of records of the ledger, the lower chance of its manipulation or even destruction. This approach should be complemented with other factors which have an impact on the network’s stability, such as the geographical distribution of the nodes or the factual

⁵⁴ "decentralization, n.". OED Online. March 2022. Oxford University Press. <https://www.oed.com/view/Entry/48127> (accessed March 25, 2022).

control over them. It is the key component of the network's security, which allows its users to rely on the trustworthiness of the blockchain.⁵⁵

Second, the meaning is attributed to a power distribution reflected in the ultimate responsibility for the effects associated with the network. In an ideal scenario, since there is no single party which would decide or control the network's consequences, no one should be accountable for its existence. This idea is connected with the creation of Bitcoin, which is supposed to serve as an alternative to existing monetary systems controlled by states, and by decentralization, it is supposed to make any attempts at its prohibition less practically achievable.⁵⁶

So far decentralization was discussed only with regards to the blockchain network on its low-level layer related to sustaining the ledger, however, this approach could also be transposed to DeFi protocols and their governance. Similarly, the first meaning can be attributed to the security of the protocol by way of the allocation of the governance tokens to as many entities as possible. The involvement of multiple parties in the process of development of respective protocols can lead to improvement in the quality of decision-making and increase the chance of detecting malicious proposals. The quality of such decentralization relates to many other factors, with a crucial question of what is even considered to be beneficial for the protocol. For this reason, the consequences are not as straightforward as in the case of the physical distribution of the nodes.

With regards to the second approach reflected in the decentralization of DeFi protocols and their management, it concerns the power distribution, which is considered in the accountability for what is happening with the protocol and associated implications. It is important to note that token holders should be involved in the management and daily operation decisions, therefore, the relationship with the impacts produced by the stakeholders is closer compared to traditional corporate shareholder governance. The decentralization in this sense should comprise multiple criteria. It can be concluded that on the fundamental level, the whole system of governance and maintenance of the protocol must be based directly on the decisions of the token holders, without exclusive

⁵⁵ WALCH, Angela. Deconstructing "Decentralization". *Cryptoassets* [online]. Oxford University Press, 2019, p. 42, [cit. 2022-04-19]. ISBN 9780190077310. Available at: doi:10.1093/oso/9780190077310.003.0003.

⁵⁶ WALCH, Angela. Deconstructing "Decentralization". *Cryptoassets* [online]. Oxford University Press, 2019, [cit. 2022-04-19]. ISBN 9780190077310. Available at: doi:10.1093/oso/9780190077310.003.0003.

control of the developers over the implementations of any changes, as described in the chapter [Governance, Voting and Decentralized Autonomous Organizations](#).⁵⁷

Another element included in the assessment can be the attribution of economic benefits derived mainly from the protocol's fees, as a result of which the allocation of profits should not resemble compensation for the provision of services. Furthermore, *Maia* and *Vieira dos Santos* argue that for the protocol to be decentralized, the requirements also apply to its interface, therefore, to the front-end of a Dapp as described in the chapter [Smart Contracts and Decentralized Applications \(Dapps\)](#). In the author's opinion, a distinction must be made between the protocol in the form of smart contracts running on the blockchain and the overall decentralized application consisting of the smart contracts (the protocol) and user interface, which provides access to the protocol. The interface, however, does not affect the code on the blockchain but only allows the users to interact with it conveniently. The protocol stands alone and can, in fact, be accessed even through other interfaces. The transaction itself is then usually sent straight from the user's device by way of interaction with a non-custodial wallet, and the front-end code is used to set up a valid transaction. It would be more precise to say that the interface is used to construe the transactions rather than it transmits or receipts them. It only reads the information contained in the blockchain and translates it into human-readable language and vice-versa.⁵⁸

On the other hand, as *Maia* and *Vieira dos Santos* rightly pointed out, the existence of the interface facilitates the interaction between the user and the protocol, hence, in practice, the entity hosting the interface could be perceived as “*responsible for the effects that protocol reflects on the public.*”⁵⁹ To overcome this situation, the front-end of the Dapp can also be hosted on decentralized storage solutions.

Quantifying sufficient distribution in the light of the above-mentioned elements comprises the determination of the number of nodes, entities exercising control over the

⁵⁷ MAIA, Guilherme and João VIEIRA DOS SANTOS. MiCA and DeFi ('Proposal for a Regulation on Market in Crypto-Assets' and 'Decentralised Finance'). *SSRN Electronic Journal* [online]. [cit. 2022-03-14]. ISSN 1556-5068. Available at: doi:10.2139/ssrn.3875355.

⁵⁸ MAIA, Guilherme and João VIEIRA DOS SANTOS. MiCA and DeFi ('Proposal for a Regulation on Market in Crypto-Assets' and 'Decentralised Finance'). *SSRN Electronic Journal* [online]. [cit. 2022-03-14]. ISSN 1556-5068. Available at: doi:10.2139/ssrn.3875355 and KASIREDDY, Preethi. The Architecture of a Web 3.0 application. In: *Preethi Kasireddy* [online]. 2021 [cit. 2022-04-19]. Available at: <https://www.preethikasireddy.com/post/the-architecture-of-a-web-3-0-application>.

⁵⁹ MAIA, Guilherme and João VIEIRA DOS SANTOS. MiCA and DeFi ('Proposal for a Regulation on Market in Crypto-Assets' and 'Decentralised Finance'). *SSRN Electronic Journal* [online]. [cit. 2022-03-14]. ISSN 1556-5068. Available at: doi:10.2139/ssrn.3875355. p. 15.

network, addresses holding governance tokens, entities eligible to vote with the tokens in the governance process, entities eligible for the profit derived from the protocol and assessment of the hosting used to store the front-end of the Dapp. Different aims of decentralization will be associated with different limits, and because of the character of decentralization as a spectrum, adequate thresholds will be more probably set in a range rather than by an exact amount. To achieve the benefits related to decentralization, it would have to be reached at both levels mentioned – the network level as well as the protocol level (including the interface).

Nowadays, the reality of DeFi protocols often does not reflect the ideal model. It is without a doubt that centralized development is more efficient and even crucial in the early stages of the protocols, which also impacts the later distribution of the governance. According to *Nadler's* and *Schär's* analysis of DeFi protocol token distribution, *“in most cases, the majority of the tokens are still held by a handful of individuals.”*⁶⁰ They also highlight the complexity of the ecosystem and relevant analysis.⁶¹ Moreover, there is a question of the competency of ordinary DeFi users to vote on technical proposals regarding the protocol's code. Due to the highly specialized and complicated nature of the code, it can be presumed that most of the users would not be able to make an informed assessment of the proposals and vote accordingly. This may lead to the centralization of the voting power to more sophisticated parties or reliance on other judgments.

Decentralization, in the above-mentioned sense, is an unknown term to most legal systems. It can be said with certainty that there is no clear line established yet, however, some suggestions have been made regarding the decentralization of blockchain networks. A statement from William Hinman, Director of the SEC's Division of Corporation Finance, in which Bitcoin and Ethereum were practically declared decentralized from the SEC's point of view, can provide perspective on the matter. Hinman stated that: *“If the network on which the token or coin is to function is sufficiently decentralized – where purchasers would no longer reasonably expect a person or group to carry out essential managerial or entrepreneurial efforts – the assets may not represent an investment contract. Moreover, when the efforts of the third party are no longer a key factor for*

⁶⁰ NADLER, Matthias and Fabian SCHÄR. Decentralized Finance, Centralized Ownership? An Iterative Mapping Process to Measure Protocol Token Distribution. *arXiv* [online]. 2020 [cit. 2022-04-19]. Available at: doi:10.48550/ARXIV.2012.09306. p. 8.

⁶¹ NADLER, Matthias and Fabian SCHÄR. Decentralized Finance, Centralized Ownership? An Iterative Mapping Process to Measure Protocol Token Distribution. *arXiv* [online]. 2020 [cit. 2022-04-19]. Available at: doi:10.48550/ARXIV.2012.09306.

determining the enterprise's success, material information asymmetries recede. As a network becomes truly decentralized, the ability to identify an issuer or promoter to make the requisite disclosures becomes difficult, and less meaningful.”⁶²

⁶² HINMAN, William. Digital Asset Transactions: When Howey Met Gary (Plastic): Remarks at the Yahoo Finance All Markets Summit: Crypto. In: *U.S. Securities and Exchange Commission* [online]. 2018 [cit. 2022-04-19]. Available at: <https://www.sec.gov/news/speech/speech-hinman-061418>.

2. Financial Applications in DeFi

This part will outline the main financial applications in DeFi according to chosen methodology. Firstly, their economic functionality will be presented briefly, and then the protocols will be described with regard to their technical attributes, which constitute the fundamental mechanisms of the applications. The aim is to establish specific steps which take place during the interaction with the protocols for the purposes of subsequent analysis provided in the parts [Applicable Czech Regulatory Regime of DeFi](#) and [Analysis of DeFi Financial Applications under MiCA](#).

The specific applications were chosen by taking into account the popularity and actual usage reflected by the presence of a significant amount of total value locked or market capitalisation of the protocols, the existence of corresponding products in traditional financial systems resembling those provided within DeFi, and the approach of the expert public towards the range of DeFi applications. Beyond the selected applications as provided in the chapters below, the opinion of the expert public on the relevant applications provided within the DeFi ecosystem may additionally include the categories of payments, lottery and insurance.⁶³ In the author's opinion, the provision of payments is included within the fundamental characteristics of blockchain and does not need to be assessed separately for the purposes of this thesis. On the other hand, the topic of lottery and insurance may comprise many different technical variations, and their assessment would be above a reasonable range of this thesis, therefore, these two areas will be omitted.

The mechanisms of DeFi financial applications outlined below are based on the currently established and prevailing practice used by protocols with the largest market capitalisation within the service provided and simplified for the general analysis. Some of the activities may even be omitted due to their technical complexity and because the research aims to demonstrate whether some of the fundamental features would be affected by applicable laws or the MiCA Proposal rather than to describe each possible situation and its implications exhaustively. New and different solutions may naturally emerge or even already exist, possibly differing in multiple aspects from those described below, however, due to the constant and complex development of the ecosystem, it would not be practical to research and deal with every type of application separately. Focus is therefore

⁶³ LAU, Darren, Daryl LAU, Teh SZE JIN, Kristian KHO, Erina AZMI, Benjamin HOR, Lucius FANG and Khor WIN WIN. *How to DeFi: Beginner* [online]. 2nd Edition. CoinGecko, 2021 [cit. 2022-03-14].

put on the fundamental applications and their characteristic features. The protocols used for extraction of the main unique mechanisms were the Maker Protocol for decentralized stablecoins, Aave for lending and borrowing, Uniswap for automated market maker exchanges, GMX for derivatives, and Enzyme for asset management. Mostly the first and fundamental versions of the protocols were considered for the provision of simplified characteristics of the mechanisms. Advanced versions then often combine other supporting tools, and to evaluate each of them in detail would deserve a separate thesis for each of the protocols.

2.1. Stablecoins

Stablecoins are types of tokens designed to maintain their value fixed to a certain reference asset, usually a fiat currency or commodity, or baskets and combinations of assets. In this way, it is possible to transact via blockchain with minimalised risk of changes in the value of the transferred assets, as opposed to most native coins or other tokens, which are prone to high volatility. There are three types of stablecoins: centralized, decentralized and algorithmic stablecoins.⁶⁴ For subsequent analysis purposes, only the decentralized and algorithmic variants of the stablecoins will be deemed as components of DeFi.

Centralized (fiat-collateralized) stablecoins peg their value with an account of centralized reserves of fiat currencies, commodities or other assets. Once the corresponding tokens are issued on a blockchain, they can be used in DeFi applications. However, due to their highly centralized nature regarding their backing, it can be argued whether they should be considered part of DeFi *stricto sensu*.⁶⁵

Decentralized (crypto-collateralized) stablecoins are also based on reserves, although the reserves, in this case, consist of other tokens. Issuance of such stablecoins is conducted using smart contracts. Hence the resources and processes are transparent and can be verified on-chain⁶⁶. The risk connected with the volatility of the underlying assets is also ultimately reflected in the design of such stablecoins. Protocols which allow users

⁶⁴ MAIA, Guilherme and João VIEIRA DOS SANTOS. MiCA and DeFi ('Proposal for a Regulation on Market in Crypto-Assets' and 'Decentralised Finance'). *SSRN Electronic Journal* [online]. [cit. 2022-03-14]. ISSN 1556-5068. Available at: doi:10.2139/ssrn.3875355.

⁶⁵ LAU, Darren, Daryl LAU, Teh SZE JIN, Kristian KHO, Erina AZMI, Benjamin HOR, Lucius FANG and Khor WIN WIN. *How to DeFi: Beginner* [online]. 2nd Edition. CoinGecko, 2021 [cit. 2022-03-14] and MAIA, Guilherme and João VIEIRA DOS SANTOS. MiCA and DeFi ('Proposal for a Regulation on Market in Crypto-Assets' and 'Decentralised Finance'). *SSRN Electronic Journal* [online]. [cit. 2022-03-14]. ISSN 1556-5068. Available at: doi:10.2139/ssrn.3875355.

⁶⁶ Data available solely through access to the blockchain ledger.

to collateralize assets in exchange for the issuance of their decentralized stablecoins essentially do so through borrowing mechanisms. An unexpected price drop may then result in unsolicited and irreversible liquidation of the collateralized funds, which can be triggered after the price of the underlying asset drops below the liquidation threshold. Stability is facilitated by over-collateralization of the supplied assets, resulting in inefficient use of the locked capital.⁶⁷

The model working mechanism of issuance of decentralized stablecoins is based on the transfer of the user’s crypto assets into an inaccessible smart contract in exchange for the issuance of stablecoins. The crypto assets used as collateral stay locked within the smart contract and cannot be accessed either by the protocol or by the user until the issued stablecoins are returned and burned or the price of the collateralized assets drops below the set liquidation threshold. When the latter situation occurs, a third party can trigger the liquidation of the locked crypto asset by purchasing a sufficient amount of collateral to cover the debt and related fees or penalties. The remaining collateral can then be withdrawn by the user who originally provided the collateral in exchange for the issuance of the stablecoins.

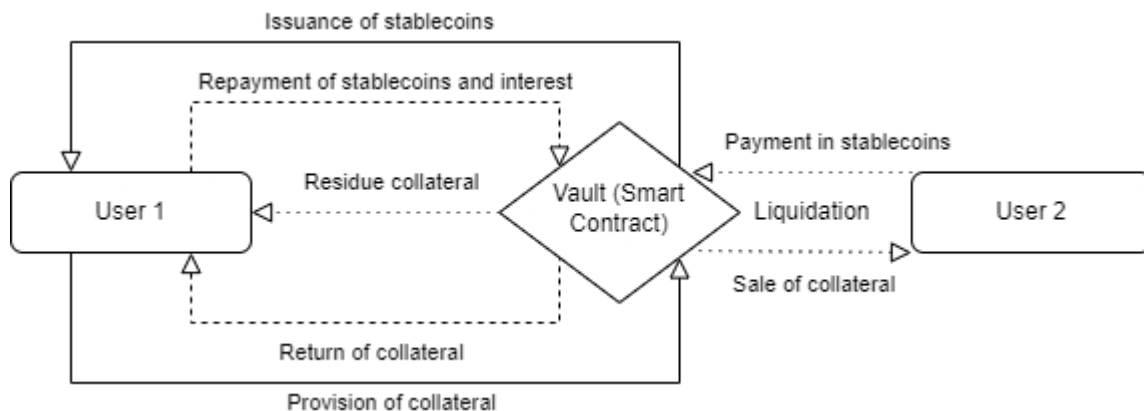


Figure 2: Model mechanism of decentralized stablecoins.

Algorithmic stablecoins are intended to maintain their value as a result of pre-programmed operations controlling their supply. Additionally, some of the tokens’ prices are supported by partial backing of centralized or decentralized assets. By use of a rebase model, the supply is affected directly, changing the number of tokens held on each

⁶⁷ LAU, Darren, Daryl LAU, Teh SZE JIN, Kristian KHO, Erina AZMI, Benjamin HOR, Lucius FANG and Khor WIN WIN. How to DeFi: Beginner [online]. 2nd Edition. CoinGecko, 2021 [cit. 2022-03-14] and MAIA, Guilherme and João VIEIRA DOS SANTOS. MiCA and DeFi ('Proposal for a Regulation on Market in Crypto-Assets' and 'Decentralised Finance'). *SSRN Electronic Journal* [online]. [cit. 2022-03-14]. ISSN 1556-5068. Available at: doi:10.2139/ssrn.3875355.

account according to the movement of the tokens' market price while retaining the same market share for the holders and, therefore, approximately the same value. Another type of algorithmic stablecoin model is the seigniorage model, which influences the supply through a system of incentives for users to stake and earn more of the tokens or burn the supply of the tokens with the possibility of being rewarded for it in the future when the expansion phase begins again. Due to the rather experimental nature of algorithmic stablecoins, most of them were unable to achieve their purpose.⁶⁸

2.2. Lending and Borrowing

Decentralized lending and borrowing enable the provision of loans nominated in desired tokens to the users who are able to over-collateralize them with different crypto assets in their possession. A typical use case of lending through DeFi protocols is when a user provides a native coin of the blockchain as collateral and locks it into a smart contract in exchange for the provision of stablecoins in the form of a loan. The loan can be provided either from a lending pool, in which the lenders' funds are aggregated, or directly in a peer-to-peer manner, when there is a match between the lender and the borrower, depending on the type of protocol. The borrower is then obliged to return the assets along with accrued interest, while on the other hand, the lenders are eligible to obtain interest for the provided assets. The over-collateralization of the borrowed resources guarantees eventual repayment of the loan in case the value of collateralized assets, along with interest accrued, reaches the set limit. Then, the collateral can be liquidated similarly to the decentralized stablecoins mechanism, thus preventing loss from being incurred.⁶⁹

A close relationship between the issuance of some of the decentralized stablecoins and the provision of a loan can be observed in practice. The distinction must be made between a protocol which issues stablecoins based on its own mechanism of issuance in exchange for collateral with the issued tokens as newly created tokens without the record of previous holders (collateralized debt positions) while on the other hand, lending

⁶⁸ FANG, Lucius, Benjamin HOR, Erina AZMI and Khor WIN WIN. *How to DeFi: Advanced* [online]. CoinGecko, 2021 [cit. 2022-03-14].

⁶⁹ FANG, Lucius, Benjamin HOR, Erina AZMI and Khor WIN WIN. *How to DeFi: Advanced* [online]. CoinGecko, 2021 [cit. 2022-03-14] and MAIA, Guilherme and João VIEIRA DOS SANTOS. MiCA and DeFi ('Proposal for a Regulation on Market in Crypto-Assets' and 'Decentralised Finance'). *SSRN Electronic Journal* [online]. [cit. 2022-03-14]. ISSN 1556-5068. Available at: doi:10.2139/ssrn.3875355 and SCHÄR, Fabian. Decentralized Finance: On Blockchain- and Smart Contract-based Financial Markets. *SSRN Electronic Journal* [online]. [cit. 2022-03-14]. ISSN 1556-5068. Available at: doi:10.2139/ssrn.3571335.

protocols that provide tokens to the borrowers from a pool of stablecoins, which are issued separately from the provision of a loan and only then provided by the lenders into the pool and lent to the borrowers (collateralized debt markets).⁷⁰ However, in both situations, the practical consequences for the borrower are very similar.

The non-existence of a credit score system within the blockchain limits the use cases for the provision of financial resources without sufficient on-chain collateral.⁷¹ This can be eventually mitigated by tokenization of real-world assets or through interconnection with reliable digital identity systems containing adequate data regarding the credibility of the users, which can be used for potential enforcement of the obligations via legal means.

The lending and borrowing mechanism can be divided into two phases – supplying and borrowing of the assets. During the supply phase, funds are provided by the lender. The provided funds simultaneously serve as collateral in case the user intends to borrow assets from the protocol. To track the provision of funds and to distribute interest, users are provided with tokens representing the amount of provided crypto assets. The amount of such tokens in a wallet grows with time according to a certain amount of interest obtained for the provision of funds. For the purposes of this thesis, these tokens will be called tracking tokens. The main purpose of the tracking tokens is that they can be redeemed for the underlying crypto asset or to access the borrowing service and have an attached right to accrue interest. At the same time, the tracking tokens possess qualities of stablecoins as they practically correspond to their underlying assets and can be redeemed for them while the tracking tokens are burned during that transaction.

With regards to the borrowing phase, the user must provide collateral through the use of the protocol's smart contracts beforehand, as described in the supply phase, to be able to withdraw the desired funds from the pool as a loan. The tokens obtained in the supply phase to track the provision of assets are then set to function as collateral, securing the user's debt, which is represented by new non-transferable tokens. The ratio between those two types of tokens then serves to track the provided collateral-debt ratio. Transfer of the collateralized assets from the user's wallet cannot exceed the amount representing

⁷⁰ SCHÄR, Fabian. Decentralized Finance: On Blockchain- and Smart Contract-based Financial Markets. *SSRN Electronic Journal* [online]. [cit. 2022-03-14]. ISSN 1556-5068. Available at: doi:10.2139/ssrn.3571335.

⁷¹ MAIA, Guilherme and João VIEIRA DOS SANTOS. MiCA and DeFi ('Proposal for a Regulation on Market in Crypto-Assets' and 'Decentralised Finance'). *SSRN Electronic Journal* [online]. [cit. 2022-03-14]. ISSN 1556-5068. Available at: doi:10.2139/ssrn.3875355.

the needed collateral-debt ratio, otherwise, the transaction fails. Finally, when the collateral-debt ratio drops below a set threshold due to the underlying assets' price movement, liquidation in the form of a sale of the user's assets may take place similarly to the mechanism outlined in the case of decentralized stablecoins.

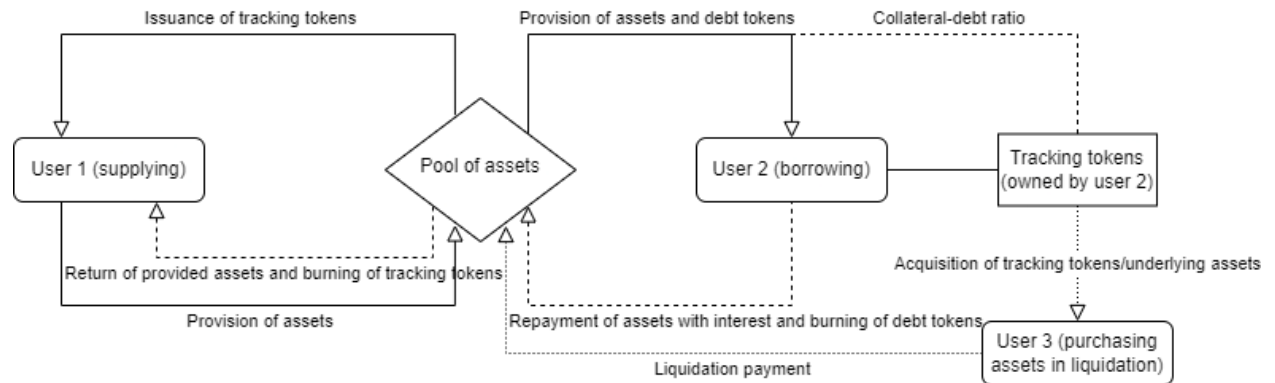


Figure 3: Model mechanism of lending and borrowing in DeFi.

A flash loan is a special type of borrowing mechanism that uses complex smart contracts comprising in a single transaction the provision of tokens and a specific operation with them, usually resulting in profit for the borrower and immediate repayment of the tokens with an additional fee. Because of the instantaneous reimbursement ensured by the smart contract conditions and the instant settlement, such a loan is provided without the need for any collateral. Flash loans can then be used for large-scale transactions, such as arbitrage or restructuring of a portfolio.⁷²

2.3. Exchanges

Decentralized exchanges (DEXs) provide non-custodial swaps between different tokens within the particular blockchain and serve as an alternative to, at this moment, predominantly used centralized exchanges. As previously discussed, tokens can be issued through the use of smart contracts, and exchanges facilitate the interchange of them among holders. By use of DEXs, users can trade their crypto assets directly on blockchain in a permissionless way while maintaining complete control over the assets. There are several types of decentralized exchanges: decentralized order book exchange, constant

⁷² SCHÄR, Fabian. Decentralized Finance: On Blockchain- and Smart Contract-based Financial Markets. *SSRN Electronic Journal* [online]. p. 12 [cit. 2022-03-14]. ISSN 1556-5068. Available at: doi:10.2139/ssrn.3571335.

function market maker (also known as an automated market maker), smart contract-based reserve aggregation and peer-to-peer exchange protocol.⁷³

Decentralized order book exchange functions on the basis of maintaining an on-chain book of orders, which are to be executed when desired conditions are met and the orders are matched. This solution, in its completely decentralized form, is not very feasible due to the speed and costs incurred by every interaction with the blockchain. The more centralized alternative of an order book exchange combines an off-chain order book with subsequent settlements of the order on the blockchain.⁷⁴ It is arguable whether such a semi-decentralized version of an order book exchange can be considered as DeFi.

Constant function market maker (automated market maker) utilizes liquidity pooling and mathematical functions to determine the price of the traded assets. The mechanism is based on the pooling of multiple assets by liquidity providers into an account determined by a smart contract with which then traders interact. When a trade is executed, a specific number of tokens is provided into the pool in exchange for a different type of tokens. The ratio of these tokens, and, therefore, the price assigned to the trade, is determined through the multiplication of the total amount of reserves in the pool, which results in a predetermined constant. In this way, when the supply of one of the tokens is reduced, its price (the number of tokens of the corresponding pair needed to be provided in exchange) rises due to the ratio enforced by the constant function embedded in the smart contract. Because of the frequent change in the price resulting from the trades, opportunities arise for arbitrageurs to take advantage of the differences in market prices among different exchanges.⁷⁵

Traders who interact with the protocol usually pay a fee quantified in percentage from the value of the executed trade. The fees then serve as an incentive for liquidity providers to provide their assets to the liquidity pools. After the provision of the liquidity, liquidity providers receive newly issued tokens, which correspond to their share of the liquidity pool and are later used for the withdrawal of the assets from the pool. As a result

⁷³ SCHÄR, Fabian. Decentralized Finance: On Blockchain- and Smart Contract-based Financial Markets. *SSRN Electronic Journal* [online]. [cit. 2022-03-14]. ISSN 1556-5068. Available at: doi:10.2139/ssrn.3571335.

⁷⁴ SCHÄR, Fabian. Decentralized Finance: On Blockchain- and Smart Contract-based Financial Markets. *SSRN Electronic Journal* [online]. [cit. 2022-03-14]. ISSN 1556-5068. Available at: doi:10.2139/ssrn.3571335.

⁷⁵ SCHÄR, Fabian. Decentralized Finance: On Blockchain- and Smart Contract-based Financial Markets. *SSRN Electronic Journal* [online]. [cit. 2022-03-14]. ISSN 1556-5068. Available at: doi:10.2139/ssrn.3571335.

of a change in the price of the assets, and hence the ratio of tokens locked in the liquidity pool, the liquidity providers may be eligible for their share of the pool, also consisting of different proportions of the tokens. Such a situation is known as an impermanent loss since the loss can still be reversed by a change in assets' price in the future.⁷⁶

Smart contract based reserve aggregation allows users to execute the most advantageous trade based on the opportunities offered by multiple liquidity providers. The smart contract is able to compare prices from different providers automatically and chooses to interact with the one offering the lowest price for desired tokens. In some cases, the aggregation protocols are connected with more centralized measures to ensure verifiable competition and maximum prices.⁷⁷

Peer-to-peer exchange protocol (over-the-counter protocol) offers a simple solution based on an exchange of assets via the use of an escrow smart contract with predetermined conditions. Users negotiate and agree on the price for the desired tokens, which is then facilitated by the use of smart contracts. After both parties lock in their assets in the agreed amount, the smart contract executes the trade by releasing the assets to the counterparty's account. Peer discovery usually occurs via centralized means and is made on a case-by-case basis, which is the main difference compared to decentralized order book exchanges.⁷⁸

2.4. Derivatives

As derivatives in the traditional financial system, derivatives in DeFi allow its users to speculate on the prices of their underlying assets or hedge themselves from unsolicited price movements and volatility. In the case of decentralized derivatives, the rights and obligations are usually associated with tokens or smart contracts and automatically executed as a result of the performance of the respective asset and set conditions. The mechanisms of derivatives' issuance and settlement differ among the protocols, but often the possibility of trading with margin is included, and the data

⁷⁶ MAIA, Guilherme and João VIEIRA DOS SANTOS. MiCA and DeFi ('Proposal for a Regulation on Market in Crypto-Assets' and 'Decentralised Finance'). *SSRN Electronic Journal* [online]. [cit. 2022-03-14]. ISSN 1556-5068. Available at: doi:10.2139/ssrn.3875355.

⁷⁷ SCHÄR, Fabian. Decentralized Finance: On Blockchain- and Smart Contract-based Financial Markets. *SSRN Electronic Journal* [online]. [cit. 2022-03-14]. ISSN 1556-5068. Available at: doi:10.2139/ssrn.3571335.

⁷⁸ SCHÄR, Fabian. Decentralized Finance: On Blockchain- and Smart Contract-based Financial Markets. *SSRN Electronic Journal* [online]. [cit. 2022-03-14]. ISSN 1556-5068. Available at: doi:10.2139/ssrn.3571335.

sources for the performance are again, but not necessarily, provided with the use of oracles.⁷⁹

The derivatives in DeFi can further be classified into three categories: typical derivatives, perpetual swaps and synthetic assets. Typical derivatives include futures and options with specified sizes, prices, expiration dates and settlement mechanisms. Futures incorporate the obligation to buy or sell a certain asset, whereas options provide the user only with the possibility to conclude such a trade. Perpetual swaps consist of futures and contracts-for-difference with no expiry date and the possibility of trading with leverage. Synthetic assets serve similarly to stablecoins as an instrument in the form of a token, which pegs price to the price of the underlying assets such as currencies, commodities, bonds, stocks, indices or other crypto assets.⁸⁰

Although there is a large variety of technical solutions provided by the protocols relating to different kinds of derivatives, as outlined above, the focus will be solely on the model example of perpetual futures protocol. Aspects relating to the existence of liquidity and related safety measures will be omitted from the description. For users to be able to open and close trades, they must deposit assets or enable them to function as collateral by use of interaction with a smart contract which will result in the creation of their trading account. According to the collateral balance available, users may choose to interact with the protocol's smart contract and open or close trades using leverage.

2.5. Asset Management

Asset management in DeFi can serve the purposes of collective investments, similar to traditional investment funds, although the assets are allocated through the use of smart contracts. Therefore, no separate custodian is needed as the managers do not have unlimited access to the assets provided but only possess the ability to allocate them in accordance with the predefined framework. The investing strategy can be executed automatically based on a rebalancing mechanism or by the manual action of a portfolio manager. Relevant rules for handling the assets in case of automatic rebalancing of the portfolio may be embedded in the applicable smart contract, as well as the limits of the

⁷⁹ SCHÄR, Fabian. Decentralized Finance: On Blockchain- and Smart Contract-based Financial Markets. *SSRN Electronic Journal* [online]. [cit. 2022-03-14]. ISSN 1556-5068. Available at: doi:10.2139/ssrn.3571335.

⁸⁰ MAIA, Guilherme and João VIEIRA DOS SANTOS. MiCA and DeFi ('Proposal for a Regulation on Market in Crypto-Assets' and 'Decentralised Finance'). *SSRN Electronic Journal* [online]. [cit. 2022-03-14]. ISSN 1556-5068. Available at: doi:10.2139/ssrn.3875355.

manager's strategy and relevant fees. The limits may include the rules for the allocation of resources in accordance with the risk profile of the investments, trading restrictions or specific schedules. Any rule encoded in the smart contract will be unconditionally enforced, which may enhance the participants' trust and lower auditing costs. When the complete administration of the portfolio is managed on a blockchain, another advantage for the investors is the transparency of related conducts and immediate access to relevant information such as the performance of the investments or current open positions of the fund. On the other hand, most of the benefits offered by the on-chain allocation of resources are only available to tokenized investing opportunities, which nowadays narrows down the selection possibilities.⁸¹

As in liquidity pools in the case of automated market makers, after the provision of funds, the investors typically obtain newly issued tokens representing their share of the portfolio's assets which can be used to redeem the assets from the pool. The reimbursement mechanism in case of withdrawal of the funds may also be connected with settlement through the exchange of the underlying assets on decentralized exchange and subsequent transfer of the funds to the investor in the form of the chosen denominated asset. The accession to the portfolio is managed similarly, only the process is reversed. In general, the investor can maintain control over his funds with the possibility to liquidate them anytime, but restrictions may again apply depending on features of the particular settings.

Portfolios granting exposure to specific segments of tokens by means of passive management are called decentralized indices, resembling traditional exchange-traded funds linked to stock market indices. In essence, any of the tokens representing a share in any portfolio can be traded on decentralized exchanges, however, in practice, sufficient liquidity is needed to ensure the stability of corresponding liquidity pools and related prices. Tokens representing the share on an index are often available to trade on DEXs and serve as a simple tool for the diversification of assets. Some of the indices include governance possibilities for their users to determine the protocol's future.⁸²

The technology provided by blockchain and smart contracts allows such investments to be also managed directly by the community by virtue of voting on the

⁸¹ SCHÄR, Fabian. Decentralized Finance: On Blockchain- and Smart Contract-based Financial Markets. *SSRN Electronic Journal* [online]. [cit. 2022-03-14]. ISSN 1556-5068. Available at: doi:10.2139/ssrn.3571335.

⁸² FANG, Lucius, Benjamin HOR, Erina AZMI and Khor WIN WIN. *How to DeFi: Advanced* [online]. CoinGecko, 2021 [cit. 2022-03-14].

allocation structure of the portfolio. In accordance with the chosen strategy, regular rebalancing of the portfolio takes place, ensuring compliance with the collective decision.

3. Applicable Czech Regulatory Regime of DeFi

Firstly, tokens will be characterized from the perspective of the AML Act, and the applicable laws used in the following analysis are to be selected according to the general attributes of relevant DeFi applications. Essential for the overall assessment of applicable laws to DeFi is determining the defining characteristics of objects and activities representing the scope of the relevant applicable laws. Subsequently, DeFi tokens and activities will be subjected to subsumption under the determined regulatory scope and assessed in that regard separately on the basis of the applicable laws.

An important issue with regard to the subsequent analysis is determining what kind of contractual agreements may be formed by the conducts and mechanisms made functional by the code. Since the analysis is focused on the application presented in their most generalized forms, the legal attributes of DeFi must be considered in accordance with their substantive content and implications resulting from the activities. It is important to note that these characteristics may vary for different protocols depending on the specific framework used.

General contract law issues regarding smart contracts and DeFi activities are not within the scope of this thesis, and the conducts between the respective parties will be presumed to form legally binding agreements. The assessments relating to possible contractual arrangements will be done by taking into consideration only the back-end features represented by smart contracts on the blockchain and their practical implications for the user, hence, not taking into account any potentially contractually relevant aspects of the front-end interfaces.

DeFi is not so far explicitly regulated by any Czech laws, and it can even be claimed that none of the financial laws applicable at the moment of writing this thesis presumed the existence of DeFi and its implications. From the characteristics mentioned in part [Decentralized Finance and its Foundations](#), it is evident that practical enforcement of laws and regulations in relation to DeFi is at least questionable. This may be supported by the fact that as of writing of this thesis, there has not been made any decision nor even an official investigation initiated on the European level towards any of the major decentralized protocols. Of a similar opinion is also Schueffel, who stated that *“If a system is decentralized and anonymous, meaning if there is no central party that can*

decide who can participate in the system, then no regulatory authority can enforce laws and regulations.”⁸³

Although theoretically, it is possible to determine the range of persons associated with the activity of the protocols, practically, it will be very often impossible or disproportionately expensive to identify them, prove their responsibility and execute an applicable decision. This situation creates a gap between the theoretical and practical approach which should, in the author’s opinion, be reflected also in the legal classification of such new concepts.

The answer to the question of whether DeFi tokens associated with certain rights and activities conducted through the DeFi framework can be deemed to have an accountable counterparty is not clearly established yet. The reason for that is the absence of identifiable counterparties and the novelty of the whole system comprising new features and characteristics originating in the technical side but extending their impacts into the legal assessments of contract law and legal accountability. This issue would need a separate thesis to be assessed, and the author presumes the uncertainty in this matter in the following analysis, which is why the focus will be put on the subsumption of the tokens and activities under the regulated areas as provided, whereas questions relating to the liability of the protocol as a counterparty will not be discussed.

3.1. Definition of Crypto Assets in Applicable Regulation

The only mention of crypto assets, tokens, coins or any other representation thereof can be found within the Czech applicable legislation in Act No. 253/2008 Coll., on selected measures against legitimisation of proceeds of crime and financing of terrorism, also known as the AML Act. The umbrella term used in the AML Act is *virtual assets*, which is further defined in Section 4 par. 9 of the AML Act in the following manner:

(9) For the purposes of this Act, a virtual asset means an electronically storable or transferable unit that is

(a) capable of performing a payment, exchange or investment function, whether or not it has an issuer, unless it is

⁸³ SCHUEFFEL, Patrick. DeFi: Decentralized Finance - An Introduction and Overview. *Journal of Innovation Management* [online]. Porto Portugal: Association Journal of Innovation Management (Associação Journal of Innovation Management) - NIPC 514006935, 2021, vol. 9, i. 3, I-XI [cit. 2022-10-18]. ISSN 2183-0606. Available at: doi:10.24840/2183-0606_009.003_0001. p. 3.

1. *a security, a financial instrument, or funds under the Act on Payment System,*
 2. *a unit referred to in Section 3(3)(c)(4) to (7) of the Act on Payment System, or*
 3. *a unit by which a payment is made pursuant to Section 3(3)(e) of the Act on Payment System, or*
- (b) a unit referred to in point (a)(2) and which can ultimately be used to pay only for a narrowly defined range of goods or services which includes an electronically storable or transferable unit referred to in point (a).*

The definition requires either of two main attributes for a unit to be characterized as a virtual asset – it must be either electronically storable or transferable. Further, it serves either payment, exchange or investment function or as a payment for a narrowly defined range of goods or services, including other virtual assets. From the scope of the definition are excluded virtual assets, which can be characterized as securities, financial instruments, funds or other units under the Act on Payment System as specified.

Virtual tokens cannot be considered securities from a private law perspective.⁸⁴ The conclusion does not necessarily have to be the same regarding the public law interpretations as outlined in the following chapter, ultimately impacting the assessment of financial instruments.

Crypto assets, in general, can embody rights to certain conduct. When the tokens are characterized solely through lenses of their capabilities allowed by relevant smart contracts, the assessment must be done in accordance with what the technical aspects of the particular tokens allow them. From the definition provided in the AML Act, as well as from their economic functions as outlined, it can be derived that tokens can perform certain functions having consequences in the economic sphere of the user and can be associated with rights and obligations.

⁸⁴ DĚDIČ, Jan; ŠOVAR, Jan; MIKULA, Ondřej. Proč podle českého soukromého práva nelze uvažovat o (ICO) tokenech jako o cenných papírech. *Právní rozhledy: časopis pro všechna právní odvětví*. Praha: C.H. Beck, 2018, v. 15-16, p. 554 and MINISTERSTVO FINANČÍ. Veřejná konzultace - Blockchain, virtuální měny a aktiva. In: *Ministerstvo financí ČR* [online]. 2018 [cit. 2022-11-13]. Available at: <https://www.mfcr.cz/cs/soukromy-sektor/kapitalovy-trh/cenne-papiry/2018/verejna-konzultace-blockchain-virtualni-33613>.

3.2. Regulated Objects and Activities Relevant to DeFi

The main areas of intersections with applicable financial regulation can be derived from the classification of tokens based on their economic functions outlined in the chapter [Tokens, Coins and Transactions](#). For activities related to payments, it will be the regulation aiming at payment methods and exchange activities. For utility access and asset representations, capital market regulation must be considered. Additional potential areas of intersection concerning the activities mentioned in part [Financial Applications in DeFi](#), such as the provision of loans or management of asset portfolios, are related to the regulations concerning banks and consumer loans. For the purposes of the subsequent analysis, the author has chosen to address the following acts: Act No. 370/2017 Coll., on Payment System, Act No. 277/2013 Coll., on Currency Exchange, Act No. 21/1992 Coll., on Banks, Act No. 257/2016 Coll., on Consumer Credit and Act No. 256/2004 Coll., Capital Market Undertakings Act.

Act on Payment System

Act on Payment System defines its scope in Section 1, which mentions the regulation of activities relating essentially to payment services, electronic money and payment systems.⁸⁵ The key element used in defining both payment services and payment system and, at the same time, comprising electronic money is the term *funds*, defined as banknotes, coins, scriptural money (literally translated as non-cash funds) and electronic money.⁸⁶

Banknotes and coins are irrelevant when dealing with crypto assets, and the term *scriptural money* is not further defined, however, according to the explanatory memorandum of the Act on Payment System, scriptural money is considered to be a claim on the payment service provider recorded at the account.⁸⁷ According to provisions of the Civil Code regarding accounts, it can be derived that accounts record funds in certain currency and allow for deposits and cash withdrawals (banknotes and coins).⁸⁸ Although the linguistic interpretation makes the definition rather tautologic due to the repetition of the term *funds*, teleologically, it can be concluded that accounts serve to

⁸⁵ BERAN, J., NÝDRLE, T., STRNADEL, D. *Zákon o platebním styku: Komentář*. [Systém ASPI]. Prague: Wolters Kluwer [cit. 2022-10-11]. Available at: www.aspi.cz. ISSN 2336-517X.

⁸⁶ Section 2 par. 1 (c) of Act on Payment System.

⁸⁷ BERAN, J., NÝDRLE, T., STRNADEL, D. *Zákon o platebním styku: Komentář*. [Systém ASPI]. Prague: Wolters Kluwer [cit. 2022-10-11]. Available at: www.aspi.cz. ISSN 2336-517X.

⁸⁸ BERAN, J., NÝDRLE, T., STRNADEL, D. *Zákon o platebním styku: Komentář*. [Systém ASPI]. Prague: Wolters Kluwer [cit. 2022-10-11]. Available at: www.aspi.cz. ISSN 2336-517X.

record claims in centrally emitted fiat currencies, which is not compatible with crypto assets occurring within DeFi.

The Act on Payment System defines electronic money in Section 4 par. 1 as *“monetary value which: (a) represents a claim against the person that issued it, (b) is stored electronically, (c) is issued against the receipt of funds for the purpose of executing payment transactions, and (d) is received by a person other than the person that issued it.”* Further, Section 3 par. 2 of the Act on Payment System provides two exceptions with regard to electronic money. The first relates to the availability of the payment method only to limited networks, and the second comprises specific transactions made by an electronic communications service provider or an operator. The former exception must be assessed on a case-by-case basis, however, overall, both of them can be presumed as not relevant for general analysis with regard to crypto assets and DeFi.

The definition, again, operates with the term *funds*. With the exception of electronic money, it leaves to consider *funds* only as banknotes, coins and scriptural money and, therefore, *funds*, within the definition of electronic money in its fundamental form, are fiat currencies in physical form or claims on fiat currencies stored on accounts which are redeemable in physical form. Hence, to consider DeFi tokens as electronic money, only the tokenized versions of fiat money with appropriate characteristics would have to be used for issuing these DeFi tokens. With regard to other requirements, it can be deemed that tokens represent monetary value and are stored electronically. The existence of a claim must be determined individually depending on the mechanisms provided by the protocols.

Act on Currency Exchange

Act on Currency Exchange, according to Section 1, regulates the operating conditions for authorised currency exchangers and other conditions for conducting currency exchange. Essential for determination of what activity is comprised in currency exchange according to Section 2 par. 3 of the Act on Currency Exchange is the definition of an exchange transaction provided in Section 2 par. 3 of the Act on Currency Exchange where it is defined as *“a transaction consisting of the exchange of (a) banknotes, coins or cheques denominated in certain currency for banknotes, coins or cheques denominated in another currency, or (b) scriptural money or electronic money denominated in certain currency for banknotes, coins or cheques denominated in another currency, provided that a payer has given a payment order to transfer the scriptural money or the electronic*

money through a payee providing currency exchange.” As in the case of funds above, banknotes, coins or other physical forms of money are irrelevant to consider when dealing with crypto assets, hence, exchange transactions do not comprise exchanges of crypto assets and will not be further discussed.

Act on Banks

Act on Banks, according to Section 1, regulates banks which are companies characterized by accepting deposits from the public, providing loans and holding bank licence to carry on these activities as a business. Under Section 2 par. 1 of the Act on Banks, it is forbidden to accept deposits from the public without a bank licence unless provided otherwise by a special legislative act. *Liška*, in the commentary of the Act on Banks, mentions situations of acceptance of deposits regulated by special legislative acts relating to credit unions, Czech National Bank, building societies and deposits accepted by employers.⁸⁹ For purposes of the following analysis, only authorization relevant to banks will be considered, as none of the situations mentioned have practical relation to DeFi. In accordance with Section 79 par. 1 of the Act on Payment System, neither the *“funds against the receipt of which electronic money has been issued or which have been entrusted to an electronic money institution”* should be considered as deposits under the Act on Banks.

Essential for determining the scope of the Act on Banks is, therefore, the definition of the deposit provided in Section 1 par. 2 (a) as *“any funds entrusted to the bank that constitute an obligation of the bank to the depositor to repayment thereof.”* According to *Smutný, Pihera* and *Cuník*, deposits should be perceived in a broad sense comprising any monetary obligation arising as a result of the provision of funds.⁹⁰ The type of agreement constituting the entrustment is necessary to determine according to its content.⁹¹ Relevant named agreements will include, for example, loan or credit agreements.⁹² The term *funds* is not further defined within the Act on Banks but should be

⁸⁹ DŘEVÍNEK, K., ELEK, Š., KOTÁB, P., LIŠKA, P., RÝDL, T. *Zákon o bankách: Komentář*. [Systém ASPI]. Prague: Wolters Kluwer [cit. 2022-10-13]. Available at: www.aspi.cz. ISSN 2336-517X.

⁹⁰ SMUTNÝ, Aleš, Vlastimil PIHERA, Pavel SÝKORA and Tomáš CUNÍK. *Zákon o bankách: komentář* [online]. 2nd Edition. In Prague: C.H. Beck, 2019 [cit. 2022-11-13]. Beckovy komentáře. ISBN 978-80-7400-764-4.

⁹¹ ČNB. K neoprávněnému přijímání vkladů od veřejnosti (tzv. černé bankovnictví). In: *ČNB* [online]. 2022 [cit. 2022-11-13]. Available at: <https://www.cnb.cz/cs/dohled-financni-trh/legislativni-zakladna/stanoviska-k-regulaci-financniho-trhu/RS2022-04/>.

⁹² SMUTNÝ, Aleš, Vlastimil PIHERA, Pavel SÝKORA and Tomáš CUNÍK. *Zákon o bankách: komentář* [online]. 2nd Edition. Prague: C.H. Beck, 2019 [cit. 2022-11-13]. Beckovy komentáře. ISBN 978-80-7400-764-4.

understood within the meaning used in the Act on Payment Systems, including foreign currencies.⁹³ As a public, it will be deemed any person other than a credit or financial institution.⁹⁴

Moreover, as acceptance of deposits according to Section 2 par. 2 of the Act on Banks, it is considered also “*the continuing issuance of bonds and other comparable securities ... where: a) it constitutes the sole, or one of the main, activities of the issuer, b) the issuer’s line of business is providing loans, or c) the issuer’s line of business is one or more of the activities listed in Article 1(3).*” As other comparable securities, it can be deemed to consider the investment securities based on debt according to the Capital Market Undertaking Act as described below. Due to uncertainty associated with the existence of the entity acting as a counterparty in DeFi, the existence of such issuer is questionable.

Act on Consumer Credit

Act on Consumer Credit, in accordance with its Section 1, applies to activities relating to the provision and intermediation of consumer credit. Consumer credit is further defined in Section 2 par. 1 of the Act on Consumer Credit as deferred payment, cash loan, credit or similar financial service provided or intermediated to a consumer. According to *Slanina, Jemelka, Vetešník, Wachtlová* and *Flídr*, financial service must be perceived in a broad sense as comprising both nominate and innominate contracts assessed according to their economic content.⁹⁵ Such agreements may be then related even to the sale of goods or services with delayed payment. As can be derived from the definition of virtual assets in the AML Act, crypto assets can also be considered as goods, and, therefore, their provision to a consumer with the obligation to be paid off later with money will constitute a financial service according to the Act on Consumer Credit. Nevertheless, in the case of lending and borrowing, as described above, the borrower is required to return the same kind of tokens as initially borrowed, hence, the agreement will constitute a cash loan only when it consists of tokens considered as cash, which will be the case of tokens considered as electronic money.

⁹³ ČNB. K neoprávněnému přijímání vkladů od veřejnosti (tzv. černé bankovnictví). In: ČNB [online]. 2022 [cit. 2022-11-13]. Available at: <https://www.cnb.cz/cs/dohled-financni-trh/legislativni-zakladna/stanoviska-k-regulaci-financniho-trhu/RS2022-04/>.

⁹⁴ DŘEVÍNEK, K., ELEK, Š., KOTÁB, P., LIŠKA, P., RÝDL, T. *Zákon o bankách: Komentář*. [Systém ASPI]. Prague: Wolters Kluwer [cit. 2022-10-13]. Available at: www.aspi.cz. ISSN 2336-517X.

⁹⁵ SLANINA, Jan, LUBOŠ JEMELKA, PAVEL VETEŠNÍK, LUCIE WACHTLOVÁ and JAN FLÍDR. *Zákon o spotřebitelském úvěru: komentář* [online]. Prague: C.H. Beck, 2017 [cit. 2022-11-13]. Beckova edice komentované zákony. ISBN 978-80-7400-645-6.

Capital Market Undertakings Act

The Capital Market Undertakings Act comprehensively regulates the provision of services on the capital market, protection of the capital market and protection of investors, public offerings of securities, and the legal regime of the close-out netting arrangements.⁹⁶ Essential in the assessment of activities relating to the capital market are financial instruments which are defined by means of a non-exclusive list in Section 3 par. 1 of the Capital Market Undertakings Act being based on relevant provisions of Directive 2014/65/EU, also known as MiFID II. Based on the individual instruments contained in the provision in question, the categories of financial instruments can be identified as investment securities, collective investment securities, money-market instruments, derivative instruments and emission allowances.⁹⁷ Emission allowances are clearly not relevant for the purposes of assessment relating to DeFi, hence, they will not be further discussed.

With regards to investment securities, the opinions of experts are divided on the matter of whether the securities should be perceived explicitly as defined within the Czech law in their paper or book-entry form or that the euroconform interpretation should be used, which provides for Art. 4 par. 1 (44) of MiFID II a more abstract definition of transferable securities as “*classes of securities which are negotiable on the capital market, with the exception of instruments of payment*”.⁹⁸ The author is inclined to the opinion of *Hobza*, whose argumentation is based on the autonomy of interpretation of the term security and its independence on national legislation due to the objectives of the European Union and the purpose of the EU legislation.⁹⁹

From the definition of transferable securities provided in MiFID II, the formal and substantive criteria can be derived for the euroconform assessment of investment securities under Czech law. The formal characteristics are (i) the transferability and (ii)

⁹⁶ HUSTÁK, Zdeněk, Jan ŠOVAR, Michal FRANĚK, Aleš SMUTNÝ, Klára CETLOVÁ and Daniela DOLEŽALOVÁ. *Zákon o podnikání na kapitálovém trhu: komentář* [online]. Prague: C.H. Beck, 2012 [cit. 2022-11-13]. Beckova edice komentované zákony. ISBN 978-80-7400-433-9.

⁹⁷ HOBZA, Martin. ICO a tokeny optikou práva kapitálového trhu: mohou být tokeny investičními cennými papíry? *Bulletin advokacie*, 2019, v. 3, p. 41-46.

⁹⁸ See also HOBZA, Martin. ICO a tokeny optikou práva kapitálového trhu: mohou být tokeny investičními cennými papíry? *Bulletin advokacie*, 2019, v. 3, p. 41-46 and DĚDIČ, Jan; ŠOVAR, Jan; MIKULA, Ondřej. Proč podle českého soukromého práva nelze uvažovat o (ICO) tokenech jako o cenných papírech. *Právní rozhledy: časopis pro všechna právní odvětví*. Praha: C.H. Beck, 2018, v. 15-16, p. 554 and MINISTERSTVO FINANČÍ. Veřejná konzultace - Blockchain, virtuální měny a aktiva. In: *Ministerstvo financí ČR* [online]. 2018 [cit. 2022-11-13]. Available at: <https://www.mfcr.cz/cs/soukromy-sektor/kapitalovy-trh/cenne-papiry/2018/verejna-konzultace-blockchain-virtualni-33613>.

⁹⁹ HOBZA, Martin. ICO a tokeny optikou práva kapitálového trhu: mohou být tokeny investičními cennými papíry? *Bulletin advokacie*, 2019, v. 3, p. 41-46.

the possibility of being negotiable on the capital market, which is associated with (iii) negotiability in general and (iv) standardization (existence of classes).¹⁰⁰ The author concurs with the analysis provided by *Hobza*, in which it is concluded that, generally, tokens are able to possess these characteristics.¹⁰¹ Furthermore, the substantive aspect of functional comparability with traditional securities, such as shares or other forms of securitised debt, must also be fulfilled.¹⁰² For the purposes of subsequent analysis, the substantive criterion will be simplified in terms of the existence of the most typical economic rights associated with traditional securities – a right to future cash flow or a right to obtain fixed or variable interest. The representative of other non-economic rights is a right to vote, which is not relevant in terms of DeFi tokens used within the essential functions of the applications. The presence of the substantive criterion in DeFi tokens will be assessed in the next chapter.

Collective investment securities are defined in Section 3 par. 3 of the Capital Market Undertakings Act as “*securities representing a share in investment funds or foreign investment funds.*” Again, the issue of the existence of tokens as securities arises. Within Czech law, tokens cannot represent the share in investment funds as they cannot have the form of a security according to the provisions of the Civil Code, however, this condition may not be applicable also in cases of foreign investment funds. According to *Husták*, the distinguishing criterion for collective investment securities is for the fund to be established and operated in accordance with the relevant national legislation.¹⁰³ In the author’s opinion, a distinction must be made between securities for which the private law interpretation is necessary, such as the one based on mandatory corporate law, and the classification more dependent on the public law, which may be the case of investment securities. Assessment of the existence of foreign investment funds based on tokens is out of the scope of this thesis, hence, it will not be further discussed.

¹⁰⁰ HACKER, Philipp and Chris THOMALE. Crypto-Securities Regulation: ICOs, Token Sales and Cryptocurrencies under EU Financial Law. *European Company and Financial Law Review* [online]. 2017, vol. 15, i. 4 [cit. 2022-11-14]. Available at: <https://ssrn.com/abstract=3075820> and HOBZA, Martin. ICO a tokeny optikou práva kapitálového trhu: mohou být tokeny investičními cennými papíry? *Bulletin advokacie*, 2019, v. 3, p. 41-46.

¹⁰¹ HOBZA, Martin. ICO a tokeny optikou práva kapitálového trhu: mohou být tokeny investičními cennými papíry? *Bulletin advokacie*, 2019, v. 3, p. 41-46.

¹⁰² HACKER, Philipp and Chris THOMALE. Crypto-Securities Regulation: ICOs, Token Sales and Cryptocurrencies under EU Financial Law. *European Company and Financial Law Review* [online]. 2017, vol. 15, i. 4 [cit. 2022-11-14]. Available at: <https://ssrn.com/abstract=3075820>.

¹⁰³ HUSTÁK, Zdeněk, Jan ŠOVAR, Michal FRANĚK, Aleš SMUTNÝ, Klára CETLOVÁ and Daniela DOLEŽALOVÁ. *Zákon o podnikání na kapitálovém trhu: komentář* [online]. Prague: C.H. Beck, 2012 [cit. 2022-11-13]. Beckova edice komentované zákony. ISBN 978-80-7400-433-9.

Regarding money-market instruments, Section 3 par. 4 of the Capital Market Undertakings Act specifies as the main criterion that these instruments are normally dealt in on the money market and further lists examples of money-market instruments such as treasury bills, certificates of deposit and commercial papers. On the basis of economic characteristics and from the definition of money markets, it can be derived that money-market instruments are characterized as having a maturity shorter than one year.¹⁰⁴ In par. 5 of the same section are then payment instruments excluded from the scope of financial instruments. In general, the assessment of crypto assets as money-market instruments can be relevant.

Derivative instruments is an umbrella term for financial, commodity and “exotic” derivatives as provided in Section 3 par. 1 (d) – (k) of the Capital Market Undertakings Act. For the purposes of clarity of the analysis, derivatives will be assessed only with regard to their general characterization and not further divided within their specific subcategories. According to *Husták*, derivatives are contracts which can be characterized on the basis of “(i) the derivation from the underlying asset, (ii) the minimum amount of the initial investment compared to other comparable financial instruments and (iii) the performance of the contract takes place in the future, at a time that is longer than that of a spot trade.”¹⁰⁵ These characteristics can generally be present in crypto assets, hence, their assessment will be relevant in subsequent analysis.

3.3. DeFi Tokens and Activities under the Applicable Regulation

Objects and activities provided by the acts in the previous chapter will be assessed within their substantive aspects relating merely to potentially relatable activities present in DeFi as outlined in part [Financial Applications in DeFi](#). Issues relating to the existence of relevant counterparties and hence the possibility of creating valid contractual agreements will not be considered during the assessment. The aim is to analyse whether the DeFi activities can potentially be in the scope of the respective regulations, notwithstanding the conclusions relating to the existence of identifiable counterparties and associated liability for relevant conducts.

¹⁰⁴ BAKEŠ, Milan, Marie KARFÍKOVÁ, Petr KOTÁB a Hana MARKOVÁ. *Finanční právo* [online]. 6th edited Edition, Prague: C.H. Beck, 2012 [cit. 2022-11-14]. Beckovy právnické učebnice. ISBN 978-80-7400-440-7.

¹⁰⁵ HUSTÁK, Zdeněk, Jan ŠOVAR, Michal FRANĚK, Aleš SMUTNÝ, Klára CETLOVÁ and Daniela DOLEŽALOVÁ. *Zákon o podnikání na kapitálovém trhu: komentář* [online]. Prague: C.H. Beck, 2012 [cit. 2022-11-13]. Beckova edice komentované zákony. ISBN 978-80-7400-433-9.

Act on Payment System

Any tokens within the DeFi ecosystem have to be considered whether they fulfil the definition of electronic money if they are issued against the receipt of other tokens. The determining aspects to assess are the issuance against the receipt of electronic money, their purpose being an execution of payment transactions and the existence of a claim on the issuer. A simplified methodology for determining tokens as electronic money is summarized in Figure 4.

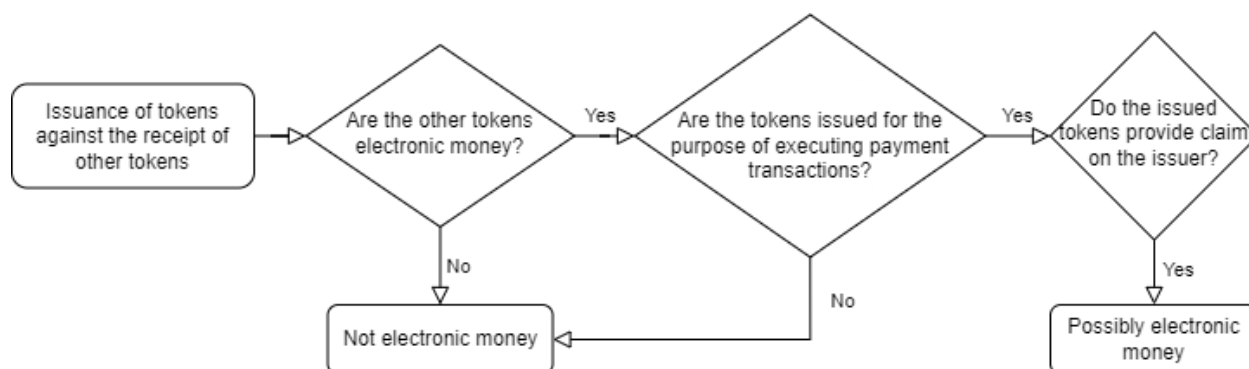


Figure 4: Decision tree for classification of tokens as electronic money.

The tokens issued against the receipt of other tokens, possibly electronic money, are the decentralized stablecoins, tracking tokens in lending, LP tokens and tokens representing the share of assets in case of asset management. From these four DeFi token types, only decentralized stablecoins are issued for the purpose of executing payment transactions. Although it could be argued that because of the existence of exchanges also other tokens may serve for payment purposes in order to acquire different crypto assets, it is not their primary purpose, thus, it will be presumed that they do not satisfy this requirement as the scope could be broadened to any fungible and exchangeable asset. Nevertheless, since decentralized stablecoins issued with the use of collateralization as described above make use of purely on-chain native tokens and coins, it cannot be the case that these tokens are deemed to be electronic money.

In case No. 30 Af 41/2020 – 49 Regional Court in Brno ruled that Bitcoin is neither scriptural nor electronic money because it is not regulated and state-backed issued currency and does not represent a claim. In its statement, Czech National Bank provided similar conclusions regarding the payment tokens.¹⁰⁶ To conclude, since blockchain

¹⁰⁶ ČNB. Je k obchodování s tzv. převodními tokeny nebo k jejich směně vyžadováno oprávnění ČNB?. In: ČNB [online]. 2018 [cit. 2022-11-14]. Available at: <https://www.cnb.cz/cs/dohled-financni-trh/legislativni-zakladna/stanoviska-k-regulaci-financniho-trhu/RS2018-13/>.

native crypto assets are used for the collateralization of decentralized stablecoins and are deemed not to constitute electronic money, the same will apply to the classification of decentralized stablecoins.

Act on Banks

As deposits within the meaning used in the Act on Banks, it will be relevant to consider deposits of tokens constituting electronic money as it is the only form of funds which is viable to exist in the form of tokens. In case the existence of electronic money in the form of tokens is presumed, such tokens can then also be supplied into the smart contract in case of lending and borrowing. In the cases of liquidity providers for constant function market makers and supply of assets for the purposes of asset management, the provisions relating to deposits will not be applicable as these situations are inherently associated with value-changing operations, and a reasonable user should not expect them to resemble a loan.

Regarding lending and borrowing, it is essential to determine whether there exists an obligation of repayment to the users. The existence of an obligation ultimately must be decided based on whether the code allows the funds to be retrieved and fulfils the definition of a valid obligation towards the users. Section 1721 of the Civil Code provides that *“under an obligation, a creditor has the right to a particular performance as a claim from the debtor, and the debtor has the duty to satisfy that right by discharging the debt.”*

In practice, the tokens supplied by the user are exchanged for the tracking tokens, which are issued in return. The question is whether the initial tokens are entrusted and the obligation to return them is created, or merely they are exchanged for tokens with different characteristics (tracking tokens). In the author’s opinion, the transaction should be perceived within the parameters of the particular commands that take place, hence, as the mere triggering of a smart contract based on the exchange of tokens and not the activity constituting entrustment with the existence of the relevant obligation. The reason is that the user supplies the tokens and, in return, receives tokens comprising certain characteristics, such as their automatic increasement (as accrument of interest) and access to the appropriate portion of the pooled tokens. The existence of any other obligations or rights should not be implied by such activity as the protocol can act only within the framework set by the code, hence, always comprising a certain amount of uncertainty and the possibility of failure of the mechanisms based on economic incentives.

Despite the above mentioned, the specific characteristics of the tracking tokens may influence their classification according to the Capital Market Undertakings Act as they are associated with accrual of interest and the possibility to be exchanged for the particular assets from the pool. If the tokens can be characterized as bonds or other comparable securities, the activity may constitute acceptance of deposits. The activity of these protocols may, as a result of the issuance of crypto assets considered as debt securities, satisfy the definition of acceptance of deposits according to the Act on Banks, which will require such protocols to comply with the respective regulation.

Act on Consumer Credit

As outlined in the previous chapter, solely the provision of tokens which satisfy the definition of electronic money will be deemed to constitute a consumer credit. Depending on the conclusion relating to the existence of a relevant counterparty, the activity associated with the borrowing of tokens, as a result of which the user is obliged to return them along with interest, can be deemed to constitute a provision of consumer credit in the form of a loan.

With regards to the DeFi applications as outlined, the only mechanism that may, in the author's opinion, constitute a cash loan is when the user borrows tokens considered as electronic money within the mechanism as described in chapter [Lending and Borrowing](#). If the user is a consumer, such activity would be in the scope of the Act on Consumer Credit. The provision of stablecoins should not be regarded as such due to the non-cash nature of the crypto assets provided.

Capital Market Undertakings Act

As can be derived from the functional mechanisms of DeFi applications, tokens are used to embed and automatically enforce rights and obligations, because of which they may be regarded as investment securities. Specifically, the right to future cash flows is essential for the classification of tokens as such. Smart contracts providing rights resembling those associated with future cash flow can be found in LP tokens and tracking tokens. On the other hand, it can be argued that since these rights for profit are not denominated directly in fiat money, the right does not include future cash flow but is solely a right to a benefit in kind. In the author's opinion, if the tokens obtained in return are also negotiable, their price can be easily determined and hence, in this case, they can be regarded as comparable to profit in the form of money.

Both of the tokens are then additionally associated with a right to retrieve the provided assets, although they always comprise a portion of uncertainty relating to the functionality of the mechanisms. Because of that, these tokens resemble rather a debt security than a company share type of security and, from this perspective, may indeed be potentially regarded as investment security. The threshold of what rights and their extent for the instrument to be considered as investment security is not firmly defined, hence, can be subject to further discussion.

Within the applications as outlined, instruments with set maturity are generally not present. The category of money-market instruments then would be relevant only in specific cases when such smart contracts relating to certain tokens are set with corresponding characteristics. Within the DeFi applications as outlined, tokens resembling money-market instruments are not present.

Finally, protocols providing users with the possibility to speculate on derivative contracts using blockchain technology and smart contracts are to be considered. As it is already clear from the naming of such protocols that their core functionality is to essentially provide derivative contracts or products associated with similar consequences to their user. The protocols, as provided within their model example above, can be considered to base the results of the smart contract mechanisms on the price of their underlying assets in general, allow the use of leverage and provide users with divisible instruments. As a result of the aforementioned, these protocols will generally satisfy the definition of financial instruments in form of derivatives as provided in the Capital Markets Undertakings Act.

4. Introduction to MiCA Proposal

For the purposes of the following description and analysis, the Proposal for a Regulation of the European Parliament and of the Council on Markets in Crypto-assets, and amending Directive (EU) 2019/1937, provided by the European Commission on 24. September 2020 in Brussels will be used.¹⁰⁷ Along with the regulation's text, it also contains an explanatory memorandum which describes the context of the proposal, its legal basis, subsidiarity and proportionality, results of ex-post evaluations, stakeholder consultations and impact assessments, budgetary implications, and other information relating to the proposal. The European Commission published the Proposal as part of the Digital Finance Package, which also included a Digital Finance Strategy, the legislative proposal for a regulation on a pilot regime for market infrastructures based on distributed ledger technology, the legislative proposal for a regulation on digital operational resilience for the financial sector, and renewed Retail Payments Strategy for the EU.¹⁰⁸

The whole Digital Finance Package was adopted with the aim to modernise the regulatory environment for financial services in the EU and the overall European economy while ensuring the competitiveness of the EU's financial sector along with maintaining financial stability and consumer protection standards established so far.¹⁰⁹ *“By making rules more digital-friendly and safe for consumers, the Commission aims to leverage synergies between high innovative start-ups and established firms in the financial sector while addressing associated risks.”*¹¹⁰

At the time of writing of this thesis, the regulation went through negotiations in the Council and the European Parliament, which were concluded by reaching an agreement on the anticipated future shape of the regulation in the form of a new Proposal for a Regulation of the European Parliament and of the Council on Markets in Crypto-assets, and amending Directive (EU) 2019/1937.¹¹¹ The legislative procedure is expected

¹⁰⁷ EUROPEAN COMMISSION. Proposal for a Regulation of the European Parliament and of the Council on Markets in Crypto-assets, and amending Directive (EU) 2019/1937. In: *EUR-Lex* [online]. 2020 [cit. 2022-11-16]. Available at: [https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52020PC0593.COM/2020/593 final](https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52020PC0593.COM/2020/593%20final).

¹⁰⁸ EUROPEAN COMMISSION. Digital finance package. In: *European Commission* [online]. 2020 [cit. 2022-11-14]. Available at: https://finance.ec.europa.eu/publications/digital-finance-package_en.

¹⁰⁹ EUROPEAN COMMISSION. Digital finance package. In: *European Commission* [online]. 2020 [cit. 2022-11-14]. Available at: https://finance.ec.europa.eu/publications/digital-finance-package_en.

¹¹⁰ EUROPEAN COMMISSION. Digital finance package. In: *European Commission* [online]. 2020 [cit. 2022-11-14]. Available at: https://finance.ec.europa.eu/publications/digital-finance-package_en.

¹¹¹ Digital finance: agreement reached on European crypto-assets regulation (MiCA). In: *The European Council and the Council of the European Union* [online]. 2022 [cit. 2022-11-16]. Available at:

to be finalized in February 2023, and the regulation shall be fully applicable after 18 months after the date of its entry into the force, while some of its provisions shall apply already after 12 months.¹¹²

The new agreed version differs from the original Proposal provided by the European Commission in a number of details. The crucial one for the purposes of this thesis is the exemption of crypto assets services from the scope of the regulation when provided in a fully decentralised manner without any intermediary.¹¹³ This provision was added to the regulation during the negotiations between the Council and the European Parliament, and it practically excludes from the scope of the regulation the whole DeFi ecosystem in the form outlined above.

When the author began writing this thesis, there was no consensus on the matter of the Proposal's applicability to DeFi which raised many questions regarding the eventual implications to it. Although this issue is settled with the newly agreed version of the regulation, the author decided to continue with the original topic of the thesis to demonstrate what could have been the conclusion if such an exemption had not been implemented.

In the following chapters, an introduction to MiCA will be provided, including the origins of the Proposal and a brief description of reasons which motivated legislators to cover the topics included in MiCA. Furthermore, the aims desired to be achieved by its adoption and the scope, along with the taxonomy of tokens suggested by the Proposal, will be outlined.

Subsequently, emphasis will be given to the relationship between MiCA and DeFi. It will be assessed how it addresses the specifics of the DeFi system, such as the aspects of decentralization and the permissionless nature, and whether the individual fundamental financial applications fall under the scope of the Proposal. Finally, the consequences

<https://www.consilium.europa.eu/en/press/press-releases/2022/06/30/digital-finance-agreement-reached-on-european-crypto-assets-regulation-mica/>.

¹¹² EU Delays Vote on MiCA Crypto Legislation Until February. In: *CoinDesk* [online]. 2022 [cit. 2022-11-16]. Available at: <https://www.coindesk.com/policy/2022/11/04/eu-delays-vote-on-mica-crypto-legislation-until-february/> and THE EUROPEAN PARLIAMENT AND THE COUNCIL OF THE EUROPEAN UNION. Proposal for a Regulation of the European Parliament and of the Council on Markets in Crypto-assets, and amending Directive (EU) 2019/1937. In: *Council of the European Union* [online]. 2022 [cit. 2022-11-16]. Available at: <https://data.consilium.europa.eu/doc/document/ST-13198-2022-INIT/en/pdf>. 13198/22 RGP/jk ECOFIN.1.B.

¹¹³ Recital 12a of the New Proposal.

derived from the analysis of MiCA and its impacts on DeFi will be presented and evaluated from the perspective of legal compliance.

4.1. Background

Crypto assets gained the attention of EU regulatory bodies with the boom of initial coin offerings in 2017 and 2018, followed by a steep crash in the market capitalisation of the crypto asset industry.¹¹⁴ ICOs were used as a source of funding for start-ups through token sales related to the issuer's project in exchange for other more established crypto assets or fiat money. Shortly after the crash, most of the projects failed or turned out to be a fraud, causing the investors' capital to vanish.¹¹⁵ Based on the findings of *Zetzsche, Buckley, Arner* and *Föhr*, ICOs were associated with many consumer protection issues, however, due to the unprecedented nature of the situation and unique technological and cross-border characteristics of the offerings, the legal framework often did not provide many opportunities for regulatory bodies to take immediate action.¹¹⁶

In reaction to the events of 2017 and 2018, the European Banking Authority and the European Securities and Markets Authority began to monitor the market with crypto assets more closely based on a mandate from the European Commission contained in the 2018 FinTech Action plan.¹¹⁷ As a result of the monitoring and assessment of the applicability of EU legislation, ESMA created advice on Initial Coin Offerings and Crypto Assets¹¹⁸, and EBA issued a report with advice for the European Commission on crypto assets¹¹⁹. Both of the documents were taken into consideration in the course of preparation of the Proposal.

¹¹⁴ ESMA highlights ICO risks for investors and firms. In: *European Securities and Markets Authority* [online]. 2017 [cit. 2022-11-14]. Available at: <https://www.esma.europa.eu/press-news/esma-news/esma-highlights-ico-risks-investors-and-firms> and the Explanatory Memorandum of MiCA Proposal.

¹¹⁵ SEDGWICK, Kai. 46% of Last Year's ICOs Have Failed Already. In: *Bitcoin.com* [online]. 2018 [cit. 2022-11-14]. Available at: <https://news.bitcoin.com/46-last-years-icos-failed-already/>.

¹¹⁶ ZETZSCHE, Dirk A., ROSS P. BUCKLEY, Douglas W. ARNER a Linus FFHR. The ICO Gold Rush: It's a Scam, It's a Bubble, It's a Super Challenge for Regulators. *SSRN Electronic Journal* [online]. 2017 [cit. 2022-11-14]. ISSN 1556-5068. Available at: doi:10.2139/ssrn.3072298.

¹¹⁷ EUROPEAN COMMISSION. Communication from the Commission to the European Parliament, the Council, the European Central Bank, the European Economic and Social Committee and the Committee of the Regions, FinTech Action plan: For a more competitive and innovative European financial sector. In: *EUR-Lex* [online]. 2018 [cit. 2022-11-14]. Available at: [https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52018DC0109.COM\(2018\)109 final](https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52018DC0109.COM(2018)109%20final).

¹¹⁸ EUROPEAN SECURITIES AND MARKETS AUTHORITY. Advice on Initial Coin Offerings and Crypto-Assets. In: *European Securities and Markets Authority* [online]. 2019 [cit. 2022-11-14]. Available at: <https://www.esma.europa.eu/document/advice-initial-coin-offerings-and-crypto-assets>. ESMA50-157-1391.

¹¹⁹ EUROPEAN BANKING AUTHORITY. Report with advice for the European Commission: on crypto assets. In: *European Banking Authority* [online]. 2019 [cit. 2022-11-14]. Available at:

ESMA in its advice presented an analysis that some of the crypto assets may fall under the scope of current EU financial regulation as financial instruments, depending on the national implementation of EU law. Furthermore, ESMA articulated its concerns “*about the risks [the crypto assets sector] poses to investor protection and market integrity*” and identified “*the most significant risks as fraud, cyber-attacks, money laundering, and market manipulation.*”¹²⁰ On the other hand, it also stated that “*the development of tokenisation, i.e., the representation of traditional assets on DLT, could bring benefits, although it is still at a very early stage.*”¹²¹ EBA in its report concluded that most of the crypto assets do not fall within the scope of EU law, identifying only a limited number of cases which could possibly be qualified as electronic money. Similarly, it highlighted the need for consumer protection and market integrity.

Another impulse for legislators to pay more attention to the crypto asset industry was brought by ambitious plans of Facebook (now Meta) regarding the stablecoin project Libra (later renamed to Diem), which ultimately opened discussions about stablecoins in general and their possible future impact on financial stability.¹²² The emergence of “global stablecoins” and risks associated with them in case of a wider adoption are explicitly mentioned by the European Commission in MiCA’s explanatory memorandum and is also reflected in the scope of MiCA as regulation of stablecoins is one of its main topics.

The European Commission conducted several stakeholder consultations throughout the years 2019 and 2020 to obtain information regarding the position of the public towards possible EU legislation covering crypto assets, including stablecoins, crypto assets falling within the scope of already applicable EU law and usage of distributed ledger technologies in financial services. As can be derived from the explanatory memorandum, the Commission concluded from the consultations that

<https://www.esma.europa.eu/sites/default/documents/files/documents/10180/2545547/67493daa-85a8-4429-aa91-e9a5ed880684/EBA%20Report%20on%20crypto%20assets.pdf>.

¹²⁰ EUROPEAN SECURITIES AND MARKETS AUTHORITY. Advice on Initial Coin Offerings and Crypto-Assets. In: *European Securities and Markets Authority* [online]. 2019 [cit. 2022-11-14]. Available at: <https://www.esma.europa.eu/document/advice-initial-coin-offerings-and-crypto-assets>. ESMA50-157-1391.

¹²¹ EUROPEAN SECURITIES AND MARKETS AUTHORITY. Advice on Initial Coin Offerings and Crypto-Assets. In: *European Securities and Markets Authority* [online]. 2019 [cit. 2022-11-14]. Available at: <https://www.esma.europa.eu/document/advice-initial-coin-offerings-and-crypto-assets>. ESMA50-157-1391.

¹²² ZETZSCHE, Dirk Andreas, Douglas W. ARNER and Ross P. BUCKLEY. Decentralized Finance (DeFi). *SSRN Electronic Journal* [online]. 2020 [cit. 2022-02-16]. ISSN 1556-5068. Available at: doi:10.2139/ssrn.3539194

stakeholders support the establishment of the regulatory regime for crypto assets mainly due to the need for legal certainty and with the aim to promote a sustainable crypto asset industry in the EU. Other reasons mentioned were the prevention of regulatory arbitrage or the need for the existence of redemption rights with regard to stablecoin issuers.¹²³

MiCA, in the form in which the European Commission proposed it, is clearly inspired by an already existing EU financial legislation, namely MiFID II, Prospectus Regulation, Market Abuse Regulation, Payment Services Directive and Electronic Money Directive.¹²⁴ However, as was discussed in the chapter [Comparison of Selected Features with Traditional Financial System](#), the current financial system significantly differs in certain characteristics, therefore, discrepancies may arise when applying the traditional financial rules to the decentralized and permissionless system as they remove the intermediaries which are supposed to be the ones adhering to the regulation.

4.2. Regulatory Aims

The aims of the proposed regulatory framework for crypto assets, which are not covered by currently applicable EU law, are outlined in the explanatory memorandum of the Proposal. The aims stated there are (i) legal certainty, (ii) support of innovation, (iii) consumer and investor protection and market integrity, and (iv) financial stability. The Proposal further specifies its aims in recitals of the regulation, which can serve as an interpretive tool in case of ambiguous or disputed terms.

Legal certainty can be beneficial for both the industry, as well as the users. A sound legal framework can attract entrepreneurs if it is more advantageous for their businesses than what is offered in other jurisdictions. Regulatory arbitrage is a common phenomenon in the crypto asset industry, mainly due to the permissionless and, therefore, cross-border nature of the technology.¹²⁵ On the other hand, *“lack of an overall Union framework for crypto-assets can lead to a lack of users’ confidence in those assets, which will hinder the development of a market in those assets and can lead to missed opportunities in terms of innovative digital services, alternative payment instruments or*

¹²³ The Explanatory Memorandum of MiCA Proposal.

¹²⁴ MAIA, Guilherme and João VIEIRA DOS SANTOS. MiCA and DeFi ('Proposal for a Regulation on Market in Crypto-Assets' and 'Decentralised Finance'). *SSRN Electronic Journal* [online]. [cit. 2022-03-14]. ISSN 1556-5068. Available at: doi:10.2139/ssrn.3875355.

¹²⁵ MATTHEWS, Chris. Crypto entrepreneurs have engaged in regulatory ‘arbitrage’ to avoid oversight, says SEC’s Gensler. In: *MarketWatch* [online]. 2021 [cit. 2022-11-14]. Available at: <https://www.marketwatch.com/story/crypto-entrepreneurs-have-engaged-in-regulatory-arbitrage-to-avoid-oversight-says-secs-gensler-11634825783>.

new funding sources for Union companies. In addition, companies using crypto-assets will have no legal certainty on how their crypto-assets will be treated in the different Member States".¹²⁶ Hence, the existence of a legal framework also supports the system's reliability and may result in more opportunities for the entrepreneurs and, ultimately, the users. Moreover, the establishment of a framework on an EU level will prevent regulatory fragmentation, which could influence the competition in the internal market of the EU.¹²⁷

From the Proposal, it is evident that the European Commission is aware of accelerating trends in innovative technologies and the advantages they can bring to EU citizens. The Crypto asset industry is one of them, therefore, the Commission aims to provide a regulatory regime which will be beneficial for the development of the underlying technologies and ultimately support the whole EU's economy. As it is stated in recital 5 of the Proposal, *"Union framework on markets in crypto-assets should not regulate the underlying technology and should allow for the use of both permissionless and permission-based distributed ledgers."*¹²⁸ The Commission sees opportunities in connection with blockchain technologies in areas of digital representations of value or rights, capital-raising for small and medium-sized enterprises and payment mechanisms.¹²⁹

Furthermore, the European Commission is articulating in its proposal the need for consumer protection and market integrity rules with regard to crypto assets. The reasoning is straightforward, according to recital 3 of the Proposal, there are currently no rules for the issuance of the majority of the crypto assets and related services, which includes the trading platforms, exchanges for crypto assets and their custody. Because of that, the users are exposed to risks such as information asymmetry or market manipulation. These must be considered and balanced with the previously mentioned aim – support of innovation, as a higher regulatory burden can potentially be a discouraging factor for the entrepreneurs and may result in already mentioned regulatory arbitrage to the detriment of the EU and its citizens.

With regard to financial stability, the opinion of the European Commission that crypto assets do not pose a threat to the economic system corresponds to the statements of ESMA and EBA mentioned above. However, the Commission sees the potential of

¹²⁶ Recital 4 of MiCA Proposal.

¹²⁷ Recital 4 of MiCA Proposal.

¹²⁸ Recital 5 of MiCA Proposal.

¹²⁹ Recital 2 of MiCA Proposal.

systemic risks in the category of stablecoins as they may become more widely accepted, which can result in their higher market capitalization and, thus, greater importance.

4.3. Taxonomy of Tokens

According to Art. 3, par. 1 (2) of MiCA, crypto assets are defined as “*digital representation of value or rights which may be transferred and stored electronically, using distributed ledger technology or similar technology*”. The Proposal does not go into detail regarding the technical specifications of DLT and describes it as “*a type of technology that supports the distributed recording of encrypted data.*”¹³⁰ As outlined in the chapter [Blockchain](#), blockchain is, in fact, a special type of DLT, therefore, the Proposal operates with broader category than crypto assets merely issued on a blockchain, however, based on the provided characteristics, it can be concluded that the terms *crypto assets* and *tokens* can be used interchangeably and MiCA does so when defining three sub-categories of crypto assets as (i) utility tokens, (ii) asset-referenced tokens and (iii) electronic money tokens (or e-money tokens), although, not all the crypto assets have to necessarily fall under one of the three sub-categories.

Asset-referenced tokens and e-money tokens are distinct categories for stablecoins as described in chapter [Stablecoins](#). Already from the existence of such distinction it is evident that the legislator puts more emphasis on the regulation of stablecoins, which were mentioned to possibly represent systemic risks in case of their wider adoption, and because of this, it sets stricter regimes for them and refers to such tokens in two different terms although they both fall under the broader category of stablecoins.

Utility token “*is intended to provide digital access to a good or service, available on DLT, and is only accepted by the issuer of that token.*”¹³¹ According to the definition, the range of associated goods or services is very broad and will also include financial services provided on a blockchain. The definition further restricts the provision of good or service only to the acceptance of the issuer of the token, however, the tokens issued on blockchains are theoretically acceptable by anyone who decides to link access to the provision of goods or services to them. The question that arises with regard to the explicit wording of the provision is whether the crypto asset would still be referred to as the utility token also in cases when other providers undertake the obligation to provide their goods or services to the holders of the specific tokens. In the author’s opinion, the fact of the

¹³⁰ Art. 3 par. 1 (1) of MiCA.

¹³¹ Art. 3 par. 1 (5) of MiCA.

existence of a different provider of the goods or services than the issuer does not affect the substantial nature of the utility token, therefore, the definition would still be applicable.

Asset-referenced token is a crypto asset that aims to maintain stable value by reference to more than one fiat currency or one or more commodities, crypto assets or combinations thereof. This sub-category ultimately separates stablecoins pegged to one particular fiat currency, which is a legal tender, from all the other kinds of stablecoins. Interestingly, the definition uses the term *referring to the value* rather than *backing*, *collateralization* or similar, which suggests more flexibility in achieving the desired aim of stabilizing the value of the tokens and defines the tokens with regard to their aim rather than the actual situation. The Czech and Spanish language versions of the Proposal confirm the use of *referring* in the meaning of “relating to something”. This category of crypto assets reflects the influence of Facebook’s intentions with regard to the project Libra (Diem), which was supposed to create tokens referring to a weighted basket of multiple currencies.¹³²

Electronic money token, similarly to asset-referenced token, is a crypto asset aimed to be of a stable value, however, by referring only to a single fiat currency that is legal tender. The term *referring* is used again in the definition, thus, offering the same conclusion as in the case of asset-referenced tokens. Moreover, it is required to be used mainly as a means of exchange, which brings questions regarding possible assessments of such a purpose in practice. Also, the purpose is not explicitly mentioned in the definition of asset-referenced tokens, which suggests that, opposite to e-money tokens, it could also be a store of value. Nevertheless, this is contradicted in recital 41 of MiCA, from which the intention to keep the main purpose of both assets as a means of exchange can be derived.

As it is explained in recital 10 of the Proposal, stablecoin referring its value to one fiat currency does not necessarily fall under the definition of electronic money as defined in Art. 2, par. 2 of Directive 2009/110/EC, due to the usual absence of a direct claim on the issuer to provide holders of the stablecoins with corresponding fiat currency at par or because the relevant redemption period is limited. Hence, the framework for e-money tokens is supposed to be as wide as possible to cover such gaps in the law and set strict

¹³² How the Diem payment system works. In: *Diem* [online]. [cit. 2022-11-14]. Available at: https://www.diem.com/en-us/vision/#how_it_works.

conditions similar to Directive 2009/110/EC for all crypto assets which refer their value to one fiat currency.

The classification of significant asset-referenced tokens and e-money tokens depends on the EBA's evaluation of listed criteria and results in a stricter regulatory regime for the issuers of such tokens. The list of criteria includes the size of the customer base of the promoters, size of the shareholders of the issuer or any third-party entity operating, investing, taking custody of or distributing the reserve assets, value or market capitalization of the tokens, number and value of transactions, size of the reserve of assets of the issuer, the significance of issuer's cross-border activities and interconnectedness with the financial system.

4.4. Scope of the Regulatory Regime

The territorial scope of MiCA, in accordance with Art. 2 par. 1 of MiCA, is delimited by the territory of *the Union*. By *the Union*, it is meant the territory corresponding to the official member states of the European Union. This requirement might appear problematic in connection with activities that take place on a blockchain, as with the use of the internet in general.

The personal scope of MiCA is defined negatively in Art. 2 par. 3 of MiCA, as to what entities and persons the regulation does not apply to. *A contrario*, MiCA then must apply to all the other non-excluded entities and persons, which might not often correspond to the nature of DeFi and the form of control over the protocols on a blockchain, as will be discussed in chapter [Relation to Decentralization](#).

Among excluded entities are the European Central Bank and national central banks of member states regarding their activities as monetary or other public authority, which provides space for the issuance of central bank digital currencies outside MiCA's regime. Further excluded are insurance undertakings and undertakings carrying out the reinsurance and retrocession activities as defined in Directive 2009/138/EC, liquidators and administrators with regards to insolvency procedures, persons providing crypto asset services for their parent companies, their subsidiaries or sister companies, the European investment bank, the European Financial Stability Facility and the European Stability Mechanism and public international organisations.¹³³ The reasons for the exclusion are

¹³³ Art. 2 par. 3 of MiCA.

not specified in the explanatory memorandum nor in the recitals of the Proposal, hence, the exact reasonings behind it can only be estimated.

Furthermore, credit institutions authorised under Directive 2013/36/EU (Capital Requirements Directive IV) are exempted from certain provisions with regards to authorisation to issuance of asset-referenced tokens, own funds requirements and authorisation of crypto asset service providers.¹³⁴ Investment firms authorised under Directive 2014/65/EU (MiFID II), when providing crypto asset services equivalent to the investment services for which they are already authorised, shall also not be subject to certain provisions regarding the authorisation for crypto asset service providers.¹³⁵

The material scope of the Proposal is according to Art. 2 par. 1 of MiCA regulation of persons engaged in the issuance of crypto assets and provision of services related to crypto assets. As it is further defined in Art. 3 par. 1 (6) of MiCA, the definition of issuers is broad and comprises any legal person who offers any crypto asset to the public or seeks to have it listed on a trading platform for crypto assets. From the definition of issuers, it can be derived that the regulation addresses the issuance as the offer of a crypto asset to the public or the process of seeking to list it on a trading platform, which are two very different operations.

The term *offer to the public* is again defined broadly in Art. 3 par. 1 (7) as “*an offer to third parties to acquire a crypto-asset in exchange for fiat currency or other crypto-assets*”, without any additional information as if it includes an offer also from third parties or not. The term is often used in EU securities law, as for example in Prospectus Regulation, where it is defined in a different way under Art. 2 (d) as “*a communication to persons in any form and by any means, presenting sufficient information on the terms of the offer and the securities to be offered, so as to enable an investor to decide to purchase or subscribe for those securities.*” Due to the strong inspiration and substantive relation of MiCA to EU securities laws, for the interpretation of the offer according to MiCA, it might be relevant to consider at least a comparison with the definition provided in other EU regulations. Moreover, the definition of the offer in Prospectus Regulation adds that it “*also applies to the placing of securities through financial intermediaries*”, however, placing under MiCA is associated with the provision of crypto asset services¹³⁶, and

¹³⁴ Art. 2 par. 4 and 5 of MiCA.

¹³⁵ Art. 2 par. 6 of MiCA.

¹³⁶ Art. 3 par. 1 (9) (f) of MiCA.

according to its definition in Art. 3 par. 1 (15) of MiCA, it excludes situations where the offer takes place.

Often it will be the case that the relevant entity is not even directly responsible for the mechanism which effectively causes the creation of the tokens on the blockchain (issuance in literal meaning): as the activities associated with the issuance according to the definition used in MiCA do not correspond to the factual creation of the crypto assets. Again, these requirements are not reasoned in the explanatory memorandum nor in the recitals, hence, one of the conclusions might be that the legislators desired to institutionalise the industry's structure and mainly focus on regulating the intermediaries. In practice, the term *issuer* may be confusing since the issuer of crypto assets in literal meaning does not have to correspond to the issuer according to MiCA. The issuer, in the literal meaning, will be the entity responsible for the emission of the tokens on the blockchain in the first place.

The Proposal then requires the issuer of the crypto asset to be a legal person from which it can be derived that only legal persons can legally issue crypto assets, although it seems unusual to directly define the entity conducting the particular activity rather than define the activity itself and then attach requirements associated with it for the parties interested in conducting it, similarly to crypto asset services and their providers in Art. 53 par. 1 of MiCA. Furthermore, it appears that the requirement on issuers to be *a legal person* is an inconsistency in terminology as, for instance, in Art. 4 par. 1 (a) of MiCA, the requirement on issuers of crypto assets other than asset-referenced tokens or e-money tokens is to be *a legal entity*. The same condition of an issuer to be a legal entity applies to asset-referenced tokens¹³⁷. Issuers of e-money tokens, however, according to Art. 43 par. 1 (a) of MiCA in conjunction with Art. 2 par. 1 of Directive 2009/110/EC are required to be legal persons. In the Czech and Spanish language versions of the Proposal, the term legal person is used identically in both situations, hence, the inconsistency in the English version will be presumed to be a drafting mistake and not further discussed.

Although the definition of crypto assets is quite extensive and comprises all of the crypto assets associated with all types of values and rights issued via DLT, in accordance with Art. 2 par. 2 of MiCA, the crypto assets which fall under the scope of currently applicable EU financial law are excluded, hence, in practice, they will constitute a special category of crypto assets not affected by MiCA but regulated by already applicable EU

¹³⁷ Art. 15 par. 2 of MiCA.

financial law. Out of the scope of the Proposal are financial instruments, electronic money (not when qualified as electronic money tokens), deposits, structured deposits and securitisation, all of them as defined in relevant EU laws – MiFID II, The E-Money Directive, the Deposit Guarantee Schemes Directive and the Securitisation Regulation.

Crypto asset services are defined in Art. 3 par. 9 of MiCA by means of an exhaustive list of activities relating to crypto assets, which are further specified in Art. 3 par. 1 (10)-(17) of MiCA. The list includes:

- i) the custody and administration of crypto-assets on behalf of third parties;*
- ii) the operation of a trading platform for crypto-assets;*
- iii) the exchange of crypto-assets for fiat currency that is legal tender;*
- iv) the exchange of crypto-assets for other crypto-assets;*
- v) the execution of orders for crypto-assets on behalf of third parties;*
- vi) placing of crypto-assets;*
- vii) the reception and transmission of orders for crypto-assets on behalf of third parties;*
- viii) providing advice on crypto-assets.*

4.5. Relation to Decentralization

Firstly, it is important to note that MiCA does not address decentralization in any way, neither in the binding content of the regulation nor in its explanatory memorandum. Crypto assets are therefore defined notwithstanding the aspects of decentralization of their underlying distributed ledger technology¹³⁸, however, from the definition of DLT¹³⁹, it can be derived that there at least must be the possibility of distribution of the relevant data among multiple nodes, which means at the layer related to sustaining the ledger.

Because of the inspiration of MiCA in existing EU financial law, it aims to regulate the intermediaries conducting the issuance of crypto assets or provision of crypto asset services. For this reason, it requires the issuers of all crypto assets to constitute legal entities. In practice, however, active users and contributors to the protocols tend to remain anonymous and seek to delegate the decision-making power to the community of users through tokenization and governance solutions associated with it as described in the chapter [Governance, Voting and Decentralized Autonomous Organizations](#). Such

¹³⁸ Art. 3 par. 1 (2) of MiCA.

¹³⁹ Art. 3 par. 1 (1) of MiCA.

decentralized governance may then result in actions effectively regulated by MiCA but without an identifiable intermediary to be held accountable for them. To be more precise, on the governance decisions may be dependent the deployment of the relevant smart contract, which then executes the approved actions automatically, without further intervention or control over it of an implementing body. The smart contracts then can be constructed in a way that only the user interacting with them may be eligible to trigger certain functions and the community conducting the governance of the protocol cannot interfere with it anymore in any way.

In case the decentralization as described is presumed to be present within the deployment and the governance of the protocols, the responsible entity for conducts associated with it is the community of governance token holders or a DAO, which is not a legal person as MiCA presumes within its requirements for crypto asset issuers¹⁴⁰ and crypto asset service providers¹⁴¹. Nevertheless, the Proposal does not exclude such entities from its personal scope, hence, when these entities participate in conduct within the material scope of MiCA, they do so not in accordance with the proposed regime and relevant sanctions provided in MiCA may apply to them.

The questions of accountability concerning such illegal actions arise. The structure of such communities usually differs from traditional corporations, and the daily operations are not managed by certain management body, such as directors or board of directors. Instead, the adjustments to the protocol are presented by the core team of community members and later voted on by the whole community holding the governance rights. In this way, the decision-making power, along with the decision-making responsibility, is spread among the number of pseudo-anonymous accounts on blockchain consisting of individuals or incorporated companies behind them.

The decentralized governance brings numerous practical questions for which MiCA or other laws did not account for, and it brings new concepts into the legal environment not only on the practical level but also to theoretical aspects of for the time being known models. Do the individuals participating in the relevant governance mechanism form a partnership for such purposes, and should they be responsible for the results of their common actions jointly and severally? What about the situation when somebody votes in favour of one proposal and at the same time against another one and

¹⁴⁰ Art. 3 par. 1 (6) of MiCA.

¹⁴¹ Art. 53 par. 1 of MiCA.

both of the proposals are accepted and eventually form a fundamental component of the protocol? And what if somebody voted in favour of the proposal and, in fact, has been misled regarding the actual content of the proposal?

Even in case of a decision effectively ordering a certain method of a remedy to be carried out by the community or DAO, with the presumption of sufficient decentralization, there is no guaranteed way on how to reach out to an adequate number of their members who can be situated across various jurisdictions, hence, different legal regimes may apply to them. The cross-border aspects and collisions of law should be taken into, along with the anonymity of the users, ultimately resulting in the nearly impossible task of enforcement of such decisions. However, the state of decentralization of each protocol is always to be considered on a case-by-case basis.

A possibly identifiable entity in the process of adoption of the respective proposals might be the developers of the protocol who create the proposals influencing it. These developers, however, only create the idea of the code and do not represent the authority responsible for its adoption. They often do so by way of open-source contribution and are not mandated to change the state of the protocol based on their discretion. Moreover, it might often be the case that proposals of multiple developers form the final state of the protocol without them sharing the same intentions and ideas of how it should be construed, hence, the final version can be a compilation of different aims.

Since DeFi in its ideal form is based on the principles as described in chapter [Aspects of Decentralization](#), it can be argued whether it falls under the scope of financial regulation at all. The lack of actionable intermediaries in practice differentiates DeFi protocols from traditional financial market participants and results in different structures with different possibilities. It is the centralized entities that MiCA aims to regulate, and it is not taking into account the possibilities offered by blockchain and decentralized governance, although it aims to regulate some of the associated aspects. When practically there are no intermediaries to be regulated, the legislation can hardly be enforced, which creates a regulatory grey area as the protocols will be functional and accessible for EU citizens but most probably not in compliance with the regulation. With the use of pragmatic interpretation, this situation may effectively lead to the conclusion that it was not desired to regulate such actions and that the Proposal does not, in fact, include DeFi in its scope. However, in the author's opinion, for the purposes of legal certainty, it would

be preferred to base such a legal conclusion on more explicit wording, and it would be suitable if a clause reflecting the omission of DeFi protocols from the Proposal's scope would be added directly into the binding text of the Proposal.

5. Analysis of DeFi Financial Applications under MiCA

For the purposes of analysis of DeFi applications under the scope of MiCA, the products and services as explained in part [Financial Applications in DeFi](#) will be used. In the following chapters, it will be determined whether the on-chain activities associated with each of the outlined financial applications fall under the scope of MiCA. The purpose of this analysis will be the assessment of the use cases listed and whether they can be considered within the material scope of MiCA, meaning whether the activities associated with them will include the issuance of crypto assets or any of the crypto asset services as defined by the Proposal.

The creation of crypto assets in the meaning of their existence on a blockchain is an essential part of DeFi, which also allows the composability of the system, and it is used to associate transferable rights or values in the virtual environment with a particular entity and its account. The question at hand is whether the issuance of crypto assets overlaps with the issuance of crypto assets on blockchain within DeFi products and services and whether those services will fall under the definitions of crypto asset services under MiCA.

It is important to note that MiCA does not refer to the term decentralized finance explicitly, therefore, any implications for the DeFi system will have to be inferred from the substantive content of its provisions. One of the reasons for the omission might be that at the time the European Commission began to draft the Proposal, DeFi was not very articulated in the public space, and its classification as a category with its own characteristics was only being formed, let alone it was being prepared to be regulated by the legislators. The awareness concerning DeFi changed in the summer of 2020, which is referred to as DeFi Summer, during which DeFi applications became widely popular in the crypto asset community, and the market capitalisation of associated tokens surged significantly, resulting in recognition of the system by the public.¹⁴²

5.1. Stablecoins

Stablecoins according to MiCA are defined as asset-referenced tokens and e-money tokens depending on what assets they are referring to. Stablecoins relevant for DeFi for the purposes of this thesis and analysis are considered the decentralized and

¹⁴² Why Decentralised Finance (DeFi) Matters and the Policy Implications. In: *OECD* [online]. 2022 [cit. 2022-11-14]. Available at: <https://www.oecd.org/finance/why-decentralised-finance-defi-matters-and-the-policy-implications.htm>.

algorithmic variants maintained with the use of smart contracts. From the defining characteristics of stablecoins, it is clear that all of them will be considered asset-referenced tokens or e-money tokens since they aim to peg their value to one or more fiat currencies, commodities or their combinations.

According to recital 26 of MiCA, “*algorithmic ‘stablecoins’ that aim at maintaining a stable value, via protocols, that provide for the increase or decrease of the supply of such crypto-assets in response to changes in demand should not be considered as asset-referenced tokens, provided that they do not aim at stabilising their value by referencing one or several other assets.*” This statement is inherently contradictory as it claims that algorithmic stablecoins are not supposed to be referencing to other assets, which is, in fact, one of their characteristic aspects as stablecoins, otherwise, *referencing* would have to be used as *backing* or *collateralizing*, which would be inconsistent with the previously derived meaning in chapter [Taxonomy of Tokens](#).

Explanation from another point of view might suggest that algorithmic stablecoins are supposed not to maintain their value by mere reference to the assets but that for price stability is solely responsible the mechanism which is influencing the amount of the supply in circulation. Such a situation, however, is never possible since there always must exist a point of reference to achieve the aim of being of a stable value. If there is an asset or basket of assets towards which it pegs its value, the crypto asset is then referencing to it.

Moreover, would be considered as algorithmic stablecoins the ones which stabilize their value by way of a combination of collateralization and mechanism on control of their supply? The statement also raises a question of whether it was the intention of the legislator to exclude algorithmic stablecoins out of the scope of MiCA and whether a mistake was made in the explanation of the goal or whether there was a mistake in the general presumption of what algorithmic stablecoins represent and what they aim to achieve. Due to the incomprehensibility of the recital, it will not be further taken into account and will be considered a drafting error.

Asset-referenced tokens will then be the stablecoins, both decentralized and algorithmic, which aim to maintain a stable value by not referring to only one fiat currency but to several fiat currencies, commodities, crypto assets, or combinations thereof. Beginning with the authorisation of issuers of such tokens, the first question

arises with regards to who will be, in fact, the issuer. Later, a distinction must be made between the decentralized and the algorithmic stablecoins.

Issuers of the tokens according to MiCA will be the ones offering such stablecoins, either as asset-referenced tokens or e-money tokens, to the public in exchange for fiat currencies or other crypto assets¹⁴³ or seek an admission on a trading platform¹⁴⁴ for which the authorisation, including the approval of crypto asset white paper, will be required¹⁴⁵. As mentioned above, the offer to the public means a situation in which one party offers to third parties to acquire the crypto assets in exchange also for other crypto assets, which can be interpreted extensively as possibly including also different than sale contracts to gain disposition of the crypto assets, especially when the terminology used in different definitions in MiCA often explicitly mentions “*purchase or sale contracts*”¹⁴⁶. The activity of issuance of stablecoins by the protocols thus can be affected by the Proposal as it can be concluded that it comprises the offer of stablecoins in exchange for other crypto assets.

Finally, there is a question of whether some of the crypto asset services take place in the process related to the issuance of stablecoins and whether these services are included within the regime of issuance of asset-referenced/e-money tokens, or if the issuers need special authorisation for the activities concerning the mechanism within which the decentralized stablecoins are in fact created and operated. Relevant crypto asset services for this case might be the custody and administration, operation of a trading platform for crypto assets, exchange of a crypto asset for other crypto assets or execution of orders for crypto assets on behalf of third parties, which takes place during the liquidation process. The Proposal provides different requirements on issuers of asset-referenced/e-money tokens and on service providers, while at the same time does not mention that the authorisation with regards to any of these activities would also include the other one, hence, it can be concluded that separate authorisation is needed for the provision of the crypto asset services next to the issuance of asset-referenced/e-money tokens in case the mechanism fulfils criteria of the relevant crypto asset service. Subsequently, the crypto asset services will be evaluated only with regards to the

¹⁴³ Art. 3 par. 1 (6), (7) of MiCA.

¹⁴⁴ Art. 3 par. 1 (6) of MiCA.

¹⁴⁵ Art. 15 par. 1 of MiCA.

¹⁴⁶ E.g. Art. 3 par. 1 (12) or (13) of MiCA.

decentralized stablecoins as algorithmic stablecoins may comprise many different mechanisms and practically cannot be assessed in general.

The custody and administration of the provided crypto assets are performed by the smart contract, which is not under anyone's control, and no other entity than the individual locking the assets in exchange for the stablecoins, or the one who is triggering the liquidation when the conditions are met, have access to the assets locked within the smart contract. Possibly, the provision could apply to the deployer of the code or the community approving such deployment, however, they, in fact, do not have access to the private cryptographic keys, which would allow manipulation with the tokens used as collateral. In the author's opinion, since there is no custodian or administrator with direct control over the relevant cryptographic keys, the provisions regarding the custody and administration of crypto assets on behalf of third parties will not apply to the locking of crypto assets in case of issuance of decentralized stablecoins.

Exchange of crypto assets for other crypto assets according to Art. 3 par. 1 (13) of MiCA is relevant in the moment of the provision of decentralized stablecoins in exchange for the collateral. During the initial provision of stablecoins, they are issued (in literal meaning) within the transaction comprising the supply of the assets into the smart contract. The provision of stablecoins is associated with the existence of an accruing interest, which is typical for loans. At the same time, the user over-collateralizes the number of stablecoins issued in exchange while retaining the right to recover the provided assets and thus only loses possession and not the ownership of the assets. For these reasons, the agreement is not to be characterised as a sale contract but rather as a non-cash loan agreement. The protocol's purpose is to allow the utilization of the value of crypto assets still owned by the original user, which should also be reflected in the economic grounds of relevant agreements. Therefore, the crypto asset service of exchange of crypto assets for other crypto assets does not occur during this particular transaction.

However, the crypto asset service of exchange of crypto assets for other crypto assets according to Art. 3 par. 1 (9) (d) in connection with Art. 3 par. 1 (13) of MiCA does occur during the liquidation, as the protocol permanently exchanges the provided stablecoins for the collateral initially supplied by the user. Moreover, it further exchanges the obtained collateral with a third party for the appropriate amount to essentially repay the user's debt.

5.2. Lending and Borrowing

A slightly different approach to the issuance (in literal meaning) of decentralized stablecoins is taken by the mechanism of lending and borrowing of crypto assets which allows the provider of crypto assets as collateral to borrow different crypto assets, however, the user, in this case, interacts with a pool of existing crypto assets provided by other users, hence, new assets are not used with regards to the resources constituting the loan. The process thus consists of two phases: (i) supplying (lending) the crypto assets into the pool and (ii) borrowing the crypto assets from the pool. Neither lending nor borrowing are explicitly addressed by the Proposal as a crypto asset service. Subsequently, each of the phases will be discussed separately to determine possible overlaps of the scope of MiCA with the respective processes concerning the provision of loans.

During the lending phase, the assets are provided by the user. To track the provision of the assets and distribute interest, users are provided with tracking tokens. This operation constitutes the issuance of crypto assets in the form of an offer to the public as described above. The main purpose of the tracking tokens is that they can be redeemed for the underlying crypto asset, or to access the borrowing service, hence, they will fall under the definition of utility tokens¹⁴⁷. At the same time, the tokens have the attributes of stablecoins as they practically correspond to their underlying asset, although their primary purpose is not to maintain a stable value by referring to a crypto asset, hence, in the author's opinion, should not be classified as asset-referenced tokens according to the MiCA definition. Due to the tokens' attached right to accrue interest, their classification could result in being deemed as financial instruments, as also explained in chapter [DeFi Tokens and Activities under the Applicable Regulation](#), which would simultaneously prevent the classification of the tokens as utility tokens as well as asset-referenced tokens, since financial instruments are out of MiCA's scope in accordance with Art. 2 par. 2 (a) of MiCA.

It must be admitted that there is a place for a discussion regarding the final classification of the tracking tokens, and it may be possible that the tokens can eventually be considered utility tokens or asset-referenced tokens. The regulatory regime of issuance of tokens as within the meaning used in the Proposal is then to be considered. MiCA

¹⁴⁷ Art. 3 par. 1 (5) of MiCA.

prohibits in Art. 36 the provision of interest, or any other benefit related to holding of asset-referenced assets, however, the provision applies only to issuers of asset-referenced tokens and crypto asset service providers¹⁴⁸, and the interest or other benefit cannot be provided for “*the length of time during which a holder of asset-referenced tokens holds asset-referenced assets*”.¹⁴⁹ From this, it can be concluded that if the token obtained for the provision of the assets into the lending pool is classified as the asset-referenced token and, at the same time, accrues interest, such a mechanism would not be compliant with MiCA. Nevertheless, the provision of the assets to the other party for remuneration is not prohibited by this provision, and since the tracking tokens are also possibly classified as utility tokens, it would not be prohibited to provide interest to the lenders.

During the lending phase, the crypto asset service of exchange of crypto assets for other crypto assets must be considered when the tokens are provided into the lending pool in exchange for the tracking tokens. Opposite to the issuance of stablecoins, the provision of the assets could be considered as a sale contract within the meaning of Art. 3 par. 1 (13) of MiCA, since the assets are provided in exchange for the tracking tokens with which rights to borrow and to reclaim the original assets along with accrued interest are associated. Although the general purpose of the transaction is to lend assets to the protocol’s pool, the mechanism uses utility tokens that technically embody the functions connected with the loan. Furthermore, the tokens are provided for an unspecified time period, and the user loses the ownership of the provided tokens as the protocol then further distributes them to other users. The right to retrieve their equivalents does not exhaust as long as there are sufficient resources in the respective pool of assets. It could also be argued that the tokens provided by the protocol are sold to the user with the possibility of recovery of the originally provided assets through a buy-back reservation.

Although the protocol’s purpose is lending and borrowing of crypto assets and not their exchange, to adhere to this terminology with regards to the respective contracts, the exchange of the tokens would have to be classified as a reciprocal loan of tokens. This conclusion is theoretically possible but does not fit the nature of the protocol’s functions, hence, the author presumes as a more appropriate approach to regard the transaction as a sale.

¹⁴⁸ Art. 36 of MiCA.

¹⁴⁹ Art. 36 of MiCA.

Also, it can be stated that the crypto asset service of custody and administration of crypto assets does not occur during the operation. Since the user transfers the fungible assets to be managed by the protocol, he does not own the assets anymore, therefore, there is no safekeeping or controlling of the assets on behalf of the users by the protocol as defined in Art. 3 par. 1 (10) of MiCA.

With regards to the borrowing phase, when the loan is provided, the user acquires the crypto assets for a fee accrued to the debt tokens, while the collateral remains locked within the user's wallet. As a result of this operation, it can be argued that the offer to the public according to the definition in Art. 3 par. 1 (7) of MiCA does occur due to the exchange of assets for other crypto assets in the form of a fee, and hence the protocol may be again deemed to issue tokens within the meaning used in Art. 3 par. 1 (6) of MiCA.

Furthermore, in case of liquidation, the borrowed tokens are permanently exchanged for tracking tokens used as collateral within the user's wallet, which are then sold to a third party for the appropriate amount of assets needed to repay the debt. This activity results in the crypto asset service of exchange of crypto assets for other crypto assets according to Art. 3 par. 1 (9) (d) in connection with Art. 3 par. 1 (13) of MiCA.

Flash loans are used to provide assets for certain transactions with instant repayment, during which the user does not purchase or sell crypto assets used to fund the transaction but merely borrows them for the particular action, hence, the operation does not include any activity constituting any of the crypto asset services within the meaning of MiCA. The transaction may, however, result in classifying the flash loan mechanism as the offer of crypto assets to the public according to Art 3. par. 1 (7) of MiCA since the user acquires crypto assets in exchange for a fee in the form of a crypto asset, although it acquires them only for the purposes of a single transaction. Since the definition of the offer to the public uses the verb "*acquire*" in its wording, opposite to more specific "*buying and selling*" as used, for example, in Art. 3 par. 1 (11) of MiCA, it can be derived that the provision aims at a wider range of situations in which flash loans can potentially be included.

5.3. Exchanges

The activities of exchange of crypto assets for other crypto assets are explicitly covered within the meaning of crypto asset services of (i) operation of a trading platform for crypto assets, and (ii) exchange of crypto assets for other crypto assets, provided under Art. 3 par. 1 (11) and Art. 3 par. 1 (13) of MiCA. The distinction must be made

between those two services on the basis of the parties concluding the relevant agreements. According to Art. 3 par. 1 (13) of MiCA, the exchange is defined as “*concluding purchase or sale contracts concerning crypto-assets with third parties against other crypto-assets by using proprietary capital*”. Thus, for an activity to be regarded as a service of exchange of crypto assets for other crypto assets, it must include the usage of proprietary capital for the purposes of conclusion of purchase or sale contracts of crypto assets. This requirement narrows the provision's application only to trades where the price is determined by the crypto asset service provider, who is also one of the parties to the contract.¹⁵⁰

On the other hand, according to Art. 3 par. 1 (11) of MiCA, the definition of operation of a trading platform for crypto assets comprises activities of management of platforms which serve for third parties to interact for the purposes of conclusion of purchase or sale contracts by way of exchanging crypto assets for other crypto assets. The exchange prices on trading platforms are then determined based on the fulfilment of buy and sell orders of the users.

Further, the distinction of crypto asset exchange mechanisms under DeFi must be made to analyse them in light of the provisions of MiCA. As provided in the chapter [Exchanges](#), the mechanisms can be divided into decentralized order book exchange, constant function market maker, smart contract-based reserve aggregation and peer-to-peer exchange protocol.

Decentralized order book exchanges gather orders of the users to trade crypto assets and match them using smart contracts. The traders either accept the market order straight away from other users or lock their assets into the smart contract when placing the respective order, which is fulfilled when other traders accept the order or cancelled in case the user no longer wants to conduct the trade. The mechanism then functions as a trading platform according to Art. 3 par. 1 (11), however, to constitute a crypto asset service within the relevant meaning, it is required for the trading platform to be managed. The aspect of management relates to the decentralization of the protocol and arguably also to active control over it. In case the management would be deemed to be present, the activity of the decentralized exchange would constitute a crypto asset service under Art. 3 par. 1 (9) (b) of MiCA, although the decentralized exchanges can be managed only within

¹⁵⁰ MAIA, Guilherme and João VIEIRA DOS SANTOS. MiCA and DeFi ('Proposal for a Regulation on Market in Crypto-Assets' and 'Decentralised Finance'). *SSRN Electronic Journal* [online]. [cit. 2022-03-14]. ISSN 1556-5068. Available at: doi:10.2139/ssrn.3875355.

the limits of decentralized governance mechanisms, which may differ across different platforms and not all of them may allow incorporation of further changes after the deployment. The unalterable platforms then can be considered as certainly without a possibility of any management.

Moreover, as the exchange operates with placed orders of the users and their subsequent fulfilment, it can be argued that the activity may, at the same time, fall under the definition of reception and transmission of orders on behalf of third parties according to Art. 3 par. 1 (16), although, in practice, the users' interactions are facilitated autonomously based on their directions, only using the predefined framework of the exchange allowing them to do so. The question is then whether there is the transfer of the orders and if the execution relies on the processing of such mechanism and the attribution of such process to the protocol. It could be argued that the framework only allows the users to be able to make those conducts more effectively and in one place, while at the same time, it does not influence the flow of the orders in any way. However, the orders are practically included in the protocol's smart contracts, where they are interoperable with other orders and executed appropriately. Because of this, in the author's opinion, the crypto asset service of reception and transmission of orders for crypto assets on behalf of third parties and potentially even the execution of orders for crypto assets on behalf of third parties will be facilitated during the discussed protocol's activities.

Constant function market maker, on the other hand, operates on the basis of the creation of trading pairs with corresponding pools of assets and provides the traders with an exchange price determined according to the ratio of assets within the particular trading pair. In this way, the price is established automatically by the protocol, and traders have the possibility to accept it or not. With regards to the characterization of the mechanism under the provision of Art. 3 par. 13, which defines the exchange of crypto assets for other crypto assets, the protocol allows the interaction in the form of purchase or sale contracts concerning crypto assets, although it is questionable whether using proprietary capital. The question is whether the ownership of the assets used by the protocol to conclude the respective contracts belongs to the entity behind the protocol (if there is any) or to the liquidity providers. In the author's opinion, as liquidity providers provide tokens into the trading pair pools of assets, they do so in exchange for tokens representing their share in the pool along with a right to a portion of the fees obtained from the interaction with the pool by traders, hence, they give up on the ownership of the tokens in favour of

the protocol and in exchange for the LP tokens. Thus, it can be presumed that the protocol uses proprietary capital to conclude the respective agreements and hence constitutes a provision of crypto asset service of exchange of crypto assets for other crypto assets.

Moreover, the exchange of crypto assets for other crypto assets also takes place when the liquidity providers provide their capital into the liquidity pools as they obtain in exchange the so-called liquidity provider tokens. At the same time, the provision of liquidity provider tokens, as well as the possibility to acquire crypto assets within the exchanges' primary function, can be deemed to fulfil the definition of the offer to the public, which would result in the characterization of the activity as issuance of crypto assets in accordance with Art. 3 par. 1 (6) of MiCA. However, the pool of crypto assets, and therefore the offer of the crypto assets to the public, is not solely dependent on the protocol as usually anybody can create pools with any tokens using the protocol's framework without the need for authorization, which contradicts the idea of regulation of the issuer – the protocol and the entity behind it.

In the case of smart contract-based reserve aggregation, the exchange of assets does not occur directly within the protocol's mechanism, but the mechanism is used to facilitate the trade by choosing the most advantageous liquidity provider or providers and transfers the order to them. In essence, the protocol reads the prices provided by various decentralized exchanges, compares and analyses them and then chooses the best option for the user. To characterize the activity as the exchange of crypto assets, the definition provided in Art. 3 par. 1 (13) would have to be interpreted extensively and does not correspond to the true nature of the protocol. It is more appropriate to consider the protocol's activity as the crypto asset service of reception and transmission of orders¹⁵¹, as it processes the orders of the users to buy or sell the crypto assets and then transmits them to the chosen third-party crypto asset exchange.

Peer-to-peer exchange protocol operates similarly to decentralized order book exchanges, although it does not comprise the complex processing of the overall liquidity but separates each trade and provides access to each agreement individually. Nevertheless, the difference between these two types of protocols does not impact the manner of formation of the agreements and thus does not influence the characterization of the protocol's activities. Furthermore, due to the framework's simplicity, the protocol will probably have an even lower need for any management, therefore, the activity of the

¹⁵¹ Art. 3 par. 1 (9) (g) of MiCA.

protocol does not constitute the crypto asset service of the operation of a trading platform for crypto assets under the regime of MiCA. However, it can constitute the crypto asset service of reception and transmission of orders for crypto assets on behalf of third parties and potentially even the execution of orders for crypto assets on behalf of third parties.

5.4. Derivatives

Derivative contracts in the model form described in chapter [Derivatives](#) can be characterized as financial instruments under the Capital Market Undertakings Act corresponding to the interpretations derived from the MiFID II as outlined in chapter [DeFi Tokens and Activities under the Applicable Regulation](#). Because of the exclusion of crypto assets that qualify as financial instruments provided in Art. 2 par. 2 (a) of MiCA, the issuance and related services will not be in the scope and hence not regulated by the Proposal.

5.5. Asset Management

The facilitation of creating managed pools of assets based on smart contracts and on-chain governance is not specifically regulated by MiCA, however, the particular activities associated with it may again comprise the issuance of crypto assets or some of the crypto asset services as defined under MiCA. The protocol for asset management is used as a tool and subsequently does not interfere with the relationship between the creators of the managed pools, the managers and third parties which allocate their resources and use the services offered by the portfolio managers. The protocol, therefore, should not be associated with the arrangements made by its users as they are the ones ultimately creating and using the on-chain management. The facilitation is solely composed of the provision of code according to set parameters.

A difference must be made between actions associated with the protocol facilitating the creation of manageable portfolios on the one hand, and the activity of persons creating and managing the portfolio with respect to the parties allocating their assets on the other hand. This distinction is ultimately reflected in the accountability for the relevant actions and influences the assessment with regard to the respective parties. It is the aim of this thesis to assess only the services provided by the protocol as long as they might be comprised of potentially regulated activity.

The protocol's activity, as the facilitator of the processes between the creator of the portfolio and the users, does not entail the management of the assets itself, but may

serve to receive and transmit the orders on behalf of the users to buy or sell assets. This activity will be present during the provision, withdrawal and rebalancing of the assets, as these are often the processes that the protocol will profit from due to the possibility of incorporating additional fees into these transactions. The activity then corresponds to the crypto asset service of the reception and transmission of orders for crypto-assets on behalf of third parties provided under Art. 3 par. 1 (9) (g) of MiCA.

In general, during the provision of crypto assets for the purposes of their management, the issuance of new crypto assets and, at the same time, their offer according to Art. 3 par. 1 (6) and (7) of MiCA takes place, as new tokens are created representing the share in the pool of all the provided tokens. At the same time, these crypto assets are exchanged, which corresponds to the crypto asset service of exchange of crypto assets for other crypto assets under Art. 3 par. 1 (9) (d) of MiCA.

The custody and administration of crypto assets on behalf of third parties come into consideration when the users provide their assets into the pool, which can be practically controlled by its manager. However, similarly to other situations when tokens are exchanged for other tokens, also in this case, the author is of the opinion that the assets provided by the users were effectively traded for utility tokens which are associated with the possibility of being exchanged for the assets representing the portion of the pool in the future. Because of this reason, the assets are not held in custody on behalf of third parties.

Conclusion

As it was outlined in the introduction, this thesis aimed to describe the basic mechanisms of DeFi and blockchain in general, provide an overview of the financial applications included within the DeFi ecosystem along with model examples for the purposes of subsequent legal analysis, and then assess these applications with regards to the regulated objects and activities according to the applicable Czech financial regulation. Further, the objective was to establish some of the important aspects of the MiCA Proposal, its origins, and mainly its scope under which the DeFi financial applications outlined previously were to be subsumed, and the potentially regulated activities highlighted.

First, Decentralized Finance was defined as a system of financial operations based on blockchain, used for conducting activities within a predefined and decentralized framework, and associated with composability, non-custodality, permissionlessness, automatization, openness, and community governance. Further, the fundamental functioning of blockchain as a specific type of distributed ledger technology introduced with Bitcoin and its implications for the existence of DeFi and crypto assets in general were explained, along with the mechanism of smart contracts and their automatic execution. Then, tokens, coins and transactions were put into the context of transferability of value and tokens were differentiated into categories based on their economic functions. The characteristic features derived mostly from the technical capabilities of DeFi and its underlying technology regarding transparency, access and control over the assets were compared with the traditional financial system. Described was also the way of governance of decentralized protocols through the use of DAOs and governance tokens and what decentralization means, how it can be associated with the blockchain and protocol layer and its relevancy for security and attributability for the related conducts.

Specific financial applications provided in DeFi were selected and described, including the technical processes required for subsequent analysis. The chosen applications comprised the mechanisms for issuance of stablecoins, lending and borrowing, exchanging crypto assets in a decentralized way, provision of derivatives, and asset management. Each of the applications was described in more detail, considering their economic functions and the activity relevant for future analysis.

With regards to Czech financial regulation, the author chose to assess DeFi in light of the Act on Payment System, the Act on Currency Exchange, the Act on Banks, the Act

on Consumer Credit and the Capital Market Undertakings Act. The analysis was carried out by defining the scope of the chosen regulation from which the regulated objects and activities were derived and used for the assessment of those found in DeFi applications.

From the assessment of DeFi objects and activities under the applicable regulation, it was evident that the laws were indeed not addressed to regulate the decentralized financial system and often could not be applied to it since crypto assets are not interchangeable with fiat money according to the definitions provided. It was often the case that the regulation defined its points of interest with different characteristics than those that are inherent to DeFi. However, it was not entirely excluded that fiat money could not exist in the “on-chain world” in the form of electronic money.

The conclusions regarding the applicability of the financial laws were that the Act on Payment System is not applicable to DeFi as the relevant decentralized tokens are not issued against the receipt of electronic money or are not primarily issued for the purposes of executing payment transactions. Similarly, the Act on Currency Exchange will not apply as it relates solely to fiat currencies in their physical form. Under the Act on Banks, it will be possible to consider the issuer of tokens which satisfy the definition of debt securities as a regulated entity. The crypto assets possibly characterizable as financial instruments according to the Capital Market Undertakings Act, and hence also considerable as debt securities, are LP and tracking tokens. The Act on Consumer Credit comes into consideration only when the user of the lending and borrowing protocol borrows and thus also repays tokens that can be considered electronic money.

Furthermore, it was established that one of the triggers for regulating crypto asset markets by the EU was the ICO bubble, followed by a severe crash. The MiCA Proposal was then prepared in light of the previous events with set objectives to ensure legal certainty, support of innovation, consumer and investor protection, market integrity, and financial stability. The Proposal intended to achieve these aims by way of regulating the issuance of crypto assets and crypto asset services, and further defined crypto asset categories as utility tokens, asset-referenced tokens, and electronic money tokens.

Despite the fact that during the writing of this thesis an agreement comprising a new and updated version of MiCA was concluded by the Council and the European Parliament, effectively excluding all crypto asset services provided in a fully decentralized manner, the assessments were conducted with regard to the original version proposed by the European Commission with the aim to prove whether it would initially

affect the activities included in DeFi. MiCA proposed by the European Commission did not comprise any statements regarding decentralized conducts, and it, therefore, constituted the basis for the hypothesis that its provisions would also create serious implications for DeFi. However, even without the explicit exclusion of decentralized services from the scope of MiCA, it could be argued using a pragmatic interpretation that it should not apply to DeFi based on its aim to regulate the centralized intermediaries.

The analysis of DeFi from the perspective of MiCA and its scope was conducted for each of the applications separately and proved the validity of the original hypothesis that the DeFi activities would indeed fall under the scope of the MiCA Proposal. Both the issuance of crypto assets and the crypto asset services were present during the outlined actions, potentially compelling the same conditions to decentralized protocols as to the centralized intermediaries.

The attempt to regulate DeFi activities under MiCA in its form proposed by the European Commission would most probably create a regulatory grey area as it would be practically impossible to enforce such regulation towards properly decentralized DAOs. The author therefore considers the approach agreed upon by the Council and the European Parliament to exclude such activities from the scope of MiCA as reasonable and beneficial for the future of DeFi.

Abbreviations

Act on Banks	Act No. 21/1992 Coll., on Banks
Act on Consumer Credit	Act No. 257/2016 Coll., on Consumer Credit
Act on Currency Exchange	Act No. 277/2013 Coll., on Currency Exchange
Act on Payment System	Act No. 370/2017 Coll., on Payment System
AML Act	Act No. 253/2008 Coll., on selected measures against legitimisation of proceeds of crime and financing of terrorism
AMM	Automated Market Maker
Capital Market Undertakings Act	Act No. 256/2004 Coll., Capital Market
Undertakings Act	
CeFi	Centralized Finance
Civil Code	Act No. 89/2012 Coll., the Civil Code
DAO	Decentralized Autonomous Organization
DeFi	Decentralized Finance
DEX	Decentralized exchange
EBA	European Banking Authority
ESMA	European Securities and Markets Authority
EU	European Union
ICO	Initial coin offering
LP	Liquidity provider
MiCA	Proposal for a Regulation of the European Parliament and of the Council on Markets in Crypto-assets, and amending Directive (EU) 2019/1937, provided by the European Commission on 24. September 2020 in Brussels
MiFID II	Directive 2014/65/EU of the European Parliament and the Council of 15 May 2014 on markets in financial instruments and amending Directive 2002/92/EC and Directive 2011/11/EU
New Proposal	Proposal for a Regulation of the European Parliament and of the Council on Markets in Crypto-assets, and amending Directive (EU) 2019/1937,

agreed by the Council and the European Parliament in 2022

Proposal

Proposal for a Regulation of the European Parliament and of the Council on Markets in Crypto-assets, and amending Directive (EU) 2019/1937, provided by the European Commission on 24. September 2020 in Brussels

Prospectus Regulation

Regulation (EU) 2017/1129 of the European Parliament and of the Council of 14 June 2017 on the prospectus to be published when securities are offered to the public or admitted to trading on a regulated market, and repealing Directive 2003/71/EC.

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Personal experience with using DeFi applications.

Active and passive involvement in DeFi and crypto asset communities on Twitter and Discord.

Decentralizované finance z pohledu české finanční regulace a návrhu MiCA

Abstrakt

Decentralizované finance představují nový systém pro alokace finančních prostředků využívající technologii umožňující existenci nereplikovatelných digitálních dat, se kterými lze nakládat v rámci předem definovaného rámce automatizovaných procesů prostřednictvím blockchainu. Jejich rozvoj přinesl nejen nové ekonomické příležitosti, ale také řadu rizik a právních otázek. Vzhledem k tomu, že decentralizované finance jsou v počáteční fázi svého vývoje, nejsou dosud pevně stanoveny relevantní právní otázky týkající se jejich zařazení do stávajícího a budoucího právního rámce. Tato práce si klade za cíl odpovědět na ty otázky, které se týkají aplikovatelnosti vybrané české finanční regulace a návrhu nařízení Evropského Parlamentu a Rady o trzích s kryptoaktivy předloženého Evropskou komisí, jakož i ověřit hypotézu, že široká působnost návrhu MiCA by mohla ovlivnit ekosystém decentralizovaných financí. Nejprve byly nastíněny důležité technické základy decentralizovaných financí a jejich specifika a byly vybrány relevantní finanční aplikace pro další posouzení. Následně byly tyto aplikace porovnány s působností vybraných českých finančních předpisů, konkrétně zákona o platebním styku, zákona o směnářské činnosti, zákona o bankách, zákona o spotřebitelském úvěru a zákona o podnikání na kapitálovém trhu. Následně byl představen návrh nařízení MiCA, který předložila Komise, a jeho východiska, cíle a oblast působnosti, na jejichž základě bylo následně posouzeno, zda návrh MiCA bude regulovat i činnosti spojené s aplikacemi v rámci decentralizovaných financí. Z provedené analýzy vyplynulo, že česká finanční regulace se na decentralizované finance s určitými výjimkami většinou nevztahuje. Na druhou stranu, nebýt decentralizace a záměru návrhu MiCA regulovat zprostředkovatele, zahrnoval by návrh MiCA také regulaci vydávání kryptoaktiv a služeb v oblasti kryptoaktiv vyskytujících se ve většině činností v rámci systému decentralizovaných financí. Zjištění vztahující se k české úpravě a k Návrhu MiCA mohou posloužit k usnadnění orientace při určování rozhodujících charakteristik decentralizovaných financí pro účely současné regulace, jakož i pro snahy tuto oblast regulovat v budoucnu.

Klíčová slova

DeFi, decentralizované finance, krypto aktiva, MiCA

Decentralized Finance from the Perspective of Czech Financial Regulation and MiCA Proposal

Abstract

Decentralized Finance constitutes a new system for allocating resources by using irreplicable digital data that can be processed within a predefined framework of automatic operations based on blockchain technology. Its development has brought not only new economic opportunities but also a number of risks and legal issues. Since Decentralized Finance is in its early stages, relevant legal questions relating to its positioning within the existing and forthcoming legal frameworks are still not firmly established yet. This thesis aims to answer those relating to the applicability of selected Czech financial regulations and the European Commission's Proposal for a Regulation of the European Parliament and of the Council on Markets in Crypto-assets, as well as validate the hypothesis that the wide scope of the MiCA Proposal could influence the ecosystem of Decentralized Finance. First, the important technical foundations of Decentralized Finance and their specifics were outlined, and relevant financial applications were established for further assessment. Subsequently, the applications were compared with the scope of the chosen Czech financial regulation, namely the Act on Payment System, the Act on Currency Exchange, the Act on Banks, the Act on Consumer Credit, and the Capital Market Undertakings Act. Then, the Commission's MiCA Proposal was introduced along with its background, aims and scope, which were then used to assess whether the MiCA Proposal would also regulate the activities associated with Decentralized Finance applications. The provided analysis concluded that the Czech financial regulation was mostly not applicable to Decentralized Finance with certain exemptions. On the other hand, the MiCA Proposal and its regulation of issuance of crypto assets and crypto asset services would include most of the activities occurring within the Decentralized Finance system as outlined if it were not for the decentralization and the aim of the MiCA Proposal to regulate the intermediaries. The findings relating to the Czech regulation and the MiCA Proposal may serve to facilitate the navigation in determining aspects of Decentralized Finance for the purposes of current regulation, as well as for the efforts to regulate this area in the future.

Keywords

DeFi, Decentralized Finance, crypto assets, MiCA