dr hab. Witold Srokosz, prof. UWr
UNIVERSITY OF WROCŁAW
Ph.D Tomasz Kopyściański
WSB UNIVERSITY

The basis of the model of electronic means of payment without the issuer

Abstract

In practice, there is only one kind of the electronic means of payment without the issuer – EMPWI – it is a cryptocurrency. Its functioning is based on the technology of a blockchain. However, taking into account the technological progress that has recently taken place in the area of payments, the possibility of other solutions in the future cannot be excluded, which justifies starting discussion on the model of EMPWI. So, the aim of the publication is to indicate the basis of the model. In the area of legal sciences were used elements of the method of dogmatic and comparative law, and in the area of economic sciences was conducted a comparative analysis on functioning cryptocurrency mechanisms in relation to economics theories described in the literature. The findings indicated the most important bases on which can be supported the economic and legal model of EMPWI. These include ideas of the means of payment without the issuer, the idea of distributed and decentralized EMPWI creation system, broad functionality going beyond the payment function, the need to establish mechanisms preventing reproducing financial pyramid scheme by EMPWI and the potential possibility of fulfilment money functions by EMPWI.

Key words: blockchain, financial innovation, cryptocurrency, virtual currencies

This publication is a part of the project funded by the National Science Center based on the decision no. DEC-2013/09/B/HS5/00019

1. Introduction - Concept of electronic means of payment without the issuer

Currently operating on the market means of payment, assuming the issuer criterion, can be divided into these that have the issuer and those that have not. Among means of payment having the issuer, assuming as a criterion their legal nature, should be distinguished the legal means of payment, regulated electronic money, unregulated electronic money including virtual currencies and securities and also other documents acting as means of payment, which in turn, considering their form of occurrence, can be divided into the existing in the material form, electronic form and dematerialized securities. Whereas the means of payment without the issuer, also considering their form of occurrence, can be divided into gold and other bullions and electronic means of payment without the issuer, of which in practice there are only cryptocurrencies (Diagram no.1).

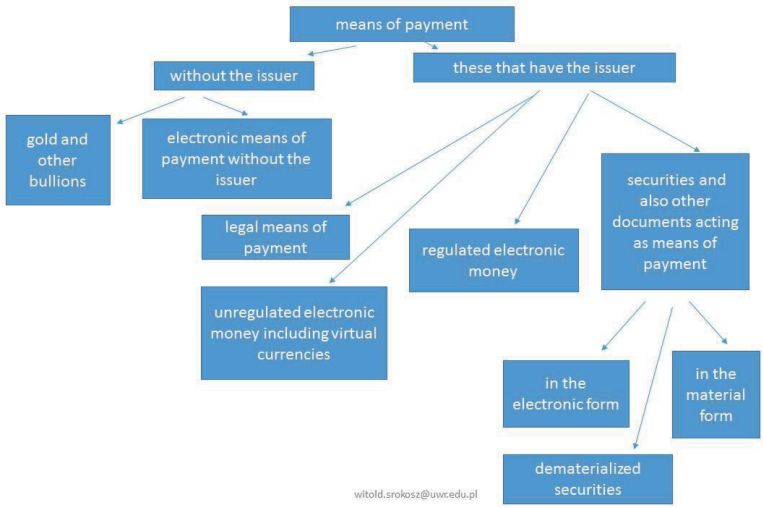

Diagram no 1: Means of payments. Source: (own compilation)

Electronic means of payment without the issuer – EMPWI, including first of all cryptocurrencies, are certainly private money and together with local money and centralized virtual currencies belong to a broad category of the community currency.

The concept of EMPWI has no legal definition. About their essence, as legal as economic, decide three essential elements considered in a close mutual relation:

- Concept of means of payment,
- An electronic form,
- Lack of the issuer.

First means of payment used by a man – copper, gold, silver - did not have the issuer. They are normally present in the nature. EMPWI are their equivalent, except that they exist in the cyberspace, they have no material substrate – for their existence is sufficient an environment created by modern computers connected to the Internet network. Gold, silver and other bullions do not appear in the trade by themselves. This is a man, who exploits them out of the earth and places them on the market, paying for goods and services. Similarly in case of EMPWI, the action of a man is required, who prepares the specialized software and next uses it to create individual electronic means of payment. Despite this human intervention, due to the applied technology, suitable software and connection through Internet network of the devices on which this software can work, it is not possible to identify a specific natural or legal person having a status of the issuer of a single unit of the electronic means of payment. Inability to identify such a person also means that there is no person (legal or natural) who is responsible for the market value of such means of payment. Therefore, it must be an impersonal system creating units of electronic means of payment. For each currently functioning cryptocurrency, such a system works through the application of Peer – to – Peer technology of the blockchain (formed from the properly verified transactions by using Merkle's tree), cryptography technologies using the private and public key (the most popular is RSA code) and the hash function. Currently, it

is over 600 systems of cryptocurrency, most of them are of no practical significance. One of the biggest, having the largest capitalization and importance, is e.g. Bitcoin, Ethereum and Litecoin.

	Date of creation	Sum of all currently existing units	Price (USD)	Market capitalization (USD)	Average daily transactions
Bitcoin	2009-01-09	16 065 282	1 020,2	16 387 154 916	232 235
Ethereum	2015-07-31	85 113 752	8,1	691 441 446	51 898
Litecoin	2011-10-08	49 152 717	4,6	227 174 083	3 821
Darkcoin(Dash)	2014-01-19	6 994 699	11,5	80 123 078	1 108
Dogecoin	2013-12-08	107 501 705 952	0,00022	23 832 751	8 918
Peercoin	2012-08-19	23 752 194	0,26	6 007 383	326
Namecoin	2011-04-19	13 189 482	0,26	3 464 319	465
Blackcoin	2014-02-24	75 876 611	0,03	2 070 585	1 354
Auroracoin	2014-01-24	14 325 676	0,11	1 579 715	342
Novacoin	2013-02-09	1 706 979	0,69	1 177 462	240

Table 1: The main types of cryptocurrency as at December 31, 2016.
Source: own study based on the data available https://bitinfocharts.com/

The table 1 presents that even among the main cryptocurrency there are significant differences in the capitalization of the market price and the average number of transactions using the cryptocurrency. Between cryptocurrencies there are also some technical differences, eg. Litecoin differs slightly from Bitcoin in terms of encryption way, creation of new units, and forecast the maximum number of units planned to be placed on the market (84 million compared to 21 million for bitcoin). It does not change the fact that in economic terms the nature and effects of the compiled cryptocurrency are now very close.

- cryptocurrency are fully "virtualized", in contrast to the traditional currency they do not have equivalents in the form of notes or coins
- Total decentralization of issuing and the introduction of units on the

market, which is a consequence of the lack of a central server and operating in a P2P network
- The issue of the cryptocurrency is implemented by users in terms of P2P networks by solving complex mathematical equations
- Independence of governments and financial institutions, which is reflected in the lack of supervision of state bodies over the cryptocurrency issuing and its use in trade
- The functioning of cryptocurrency is based on the principles of cryptography, and trust is based to a large extent on the evidence of a cryptographic
- No intermediaries in the transactions using cryptocurrency
- The functioning of the cryptocurrency is based on open source applications, which is designed to provide transparency of the process of creating a cryptocurrency
- Anonymity, which is connected with the fact that in opening an account no personal information is required and do not require identification.
- Transactions are irreversible - solution to the problem of double spending of available resources ie. *double spending*[1].

2. Distributed creation system of electronic means of payment without the issuer, as the key element of the model

The various technological aspects of the model of EMPWI may change. It is therefore necessary to establish such element of the model, which despite the technological changes remains the same. It seems that for the electronic means of payment without the issuer such a permanent element is the distributed creation system of electronic means of payment. This system relies on Internet network and its characteristic feature is the possibility of communication of computer programs (customers) installed in users computers (there may be also other devices – e.g. mobiles). The basic idea

[1] P. Everaere, I. Simplot-Ryl, I. Traoré, *Double spending protection for e-cash based on risk management*, [in:] Burmester M., Tsudik G., Magliveras S., Ilić I. (eds.), *Information Security*, Springer, Berlin- Heidelberg 2011, pp. 394-408.

of electronic means of payment without the issuer is that the single user, controlling a single device with installed computer program is not able to create the electronic means of payment. Only the entirely developed system decides on the creation of new means of payment, wherein the individual users have no influence on this decision. The number of created resources and the time of creation is predetermined (e.g. in Bitcoin system it is now 12.5 BTC every 10 minutes) and stored in algorithms, which individual users cannot change. The additional important feature is the dependence, in obtaining new electronic means of payment by the user of the system, on the performance of his specific work for the system. In currently existing systems of cryptocurrencies, the possibility of obtaining by the user a reward in the form of a new cryptocurrency (so called kicking of new currency) depends on the computing power provided by him to the system, through which is possible, among others, to carry out payments. New cryptocurrencies are assigned at random and the probability of winning is dependent on the assigned computing power by the particular user and by the power assigned by the remaining users. Decentralization of the system guarantees the absence of an entity that controls the system and has an ability to affect its functioning, and the distribution of the system guarantees in turn the durability and inviolability of information stored in the system and generated by the system. Currently, these features of the system are implemented through the blockchain technology, but in the future there may appear a new technology, which also will allow for decentralization and distribution of the system. For now, the blockchain technology, or more broadly, distributed ledger technology (LTD) is evolving rather more towards the creation of new functions, others than the initial payment function. It is primarily about creating intelligent contracts, and then, based on these contracts, decentralized autonomous organizations - DAO. The development of these two systems proceeds in two ways – the first direction uses the already existing system of the most popular cryptocurrency – Bitcoin. There are created then such solutions as RSK or Bloq that enable creating intelligent contracts based on Bitcoin

side chains, which complement its primary function which is the payment function. While the second direction is set out by the systems with main purpose to create intelligent contracts. Such the most developed system is Ethereum, providing „decentralized virtual machine" and its own comprehensive programming language Solidity. A competitive language Lisk proposes a solution, which does not require a special new programming language for writing intelligent contracts, but allows using JavaScript. Despite the fact that these systems are focused on intelligent contracts, they still create their own electronic means of payment (for Ethererum it is Ether, for Lisk it is the unit called LSK).

3. Model of electronic means of payment without the issuer and the financial pyramid scheme

One of key features relating to the cryptocurrency market is the occurrence of so called network effect, of which the economic usefulness for the two groups of participants increases together with connecting new owners to the platform.[2] This results in a privileged position of the first owners of the cryptocurrency units in relation to the remaining owners. Even more, creating cryptocurrencies is profitable for their creators due to the fact that they are created ex nihilo (at the beginning of development of the system it is not necessary to involve a large computing power, and hence electric energy, for performing work called Proof-of-Work). An increase in the number of users translates to the widespread use of cryptocurrency, which in turn increases the potential, market value and above all the opportunity of exchanging the possessed units to the traditional currency or real goods or services. Concerns, whether cryptocurrencies are not or are not becoming the pyramid schemes, are mainly caused by the rapid increase in the number of new cryptocurrencies (altcoins), whose

[2] D. Ron, A. Shamir, *Quantitative analysis of the full Bitcoin transaction graph*, 2012, https://eprint.iacr.org/2012/584.pdf, pp. 1 ff; B. Segendorf., *Have virtual currencies affected the retail payments market?*, Sveri-ges Riksbank, Economic Commentaries, 2014, no 3, http://archive.riksbank.se/Documents/Rapporter/Ekonomiska_kommentarer/2014/rap_ek_kom_nr02_140617_eng.pdf

development and market behaviour are surprisingly similar. In the initial phase the new cryptocurrency arouses great interest, skilfully fed by the promotion, followed by a relatively dynamic growth in the number of users and value in relation to traditional currencies.

Quite often, soon after it, follows a breakdown of the market resulting from the sale of a large number of cryptocurrency units, bringing quotes in relation to traditional currencies close to zero.

Features of a cryptocurrency system make, that such the system can be seen as a financial pyramid of a completely new character and course. The main argument supporting this fact is a significant imbalance in terms of the distribution in value of units held in each of the described cryptocurrencies. A small number of users, about 2% in the case of Bitcoin, have an effective control over more than 90% value of the total market. Therefore, it may lead directly to the situation where a small group of users make benefit at the expense of the vast majority. In addition, the risk factor associated with functioning of cryptocurrencies is difficult or even impossible to estimate due to motives for action of this particular small group of users who currently hold the dominant value of cryptocurrencies. An estimation of this risk is basically impossible at least because of the standard feature of the cryptocurrencies system which is the anonymity. It is not known, which individuals or organized entities have dominant shares in particular cryptocurrencies. In this context, there are interesting results of tests carried out on the basis of Bitcoin, indicating that more than half of Bitmonet is accumulated on accounts only and currently not used for purposes of a transaction. Specifics of the cryptocurrencies development suggest that these are people who were active users in the initial period in functioning of the particular cryptocurrency. It is impossible, however, to personalize these people, and thus to determine their intentions and purposes.

The lack of common and explicit knowledge on this subject generates a huge asymmetry of information in forecasting volatility of cryptocurrencies in relation to the traditional currencies or financial

instruments. One decision on a cryptocurrency exchange by the user holding 30% value of the market, for example to US dollar, may result in the total collapse of the market. It comes to the peculiar socio-economic paradox. On one hand, the distribution of cryptocurrencies and the ability of performing their role as alternative money depend on the common growth of confidence. However, such an increase in confidence and consequent wider use of cryptocurrencies in payment transactions will bring best benefits just to the primary holders of the cryptocurrency who have the largest market share. They may be tempted to take advantage of the situation and to monetize the value of their assets by exchanging them to a traditional currency, which thus could cause the collapse of the cryptocurrency market. Thus a situation arises, where a possible increase in using cryptocurrency may be also the biggest risk factor for its further development.

The model of electronic payment instrument should avoid the trap the cryptocurrencies fell into and to adopt such a form which excludes its identification with the scheme of financial pyramid. It is not enough to limit the anonymity of users, in particular while exchanging electronic means of payment for legal means of payment, which in any case is necessary, primarily to prevent laundering monies and the financing of terrorists and also to prevent tax frauds. It is necessary to introduce a proper public-legal mechanism which counteracts using EMPWI systems for constructing financial pyramids. Such the mechanism should be inscribed in the model of EMPWI. This mechanism may include e.g. the introduction of high financial penalties for providers of the software supporting a specific system, classified formally by the competent authorities as having features of a financial pyramid (e.g. in the case of cryptocurrencies they are called Portfolios) and financial penalties for the people who are involved in developing the system, even if they act socially without remuneration. But the most important way to fight the tendency of transforming EMPWI systems into financial pyramids is an adequate action of information carried out by professional public entities

(e.g. supervision authorities) and the appropriate education program of Internet users.

4. Money in the electronic means of payment without the issuer

The essence of money is determined by its performed functions. To recognize any means as money is a matter of convention. In economic terms, here decides the common acceptability, which allows for making assumption that all means which fulfil the function of money must be considered by definition as money (Schaal, 1996).

The function of a measure of value is identified as the ability to determine the value of goods expressed in money in the form of price. In this sense cryptocurrencies obviously perform this function because with their help it is possible to express and thus to compare the value of goods and commodities functioning in the trade. This remark no doubt, should also apply to all electronic means of payment without the issuer. Nevertheless, the possibility of direct determination of the price expressed in cryptocurrency, and more broadly – in EMPWI is very limited, if not impossible.

To the function of the measure of value is very closely related the ability of money to play the role as means of exchange. Cryptocurrencies have also this feature and this function is performed by cryptocurrencies at the most intensive level among all functions of money. They should also fulfil this function within the model of EMPWI.

A development of the means of exchange function is the presence of money as means of payment which is expressed in an ability to regulate all financial obligations, in particular taxes, wages, borrowing and repayment of loans.[3] From an economic perspective, there are serious doubts whether cryptocurrencies perform this function. Also, there are doubts, to what extent cryptocurrencies, because of their features, include the potential to perform this function in a perspective of longer time.

[3] M. Noga, (red.), *Makroekonomia ze szczególnym uwzględnieniem polityki pieniężnej*, CEDEWU, Warszawa 2012, p. 76.

One of the immanent features of cryptocurrency is its independence from governments and other public authorities. This fact causes a natural contradiction, which limits the operation of the traditional financial system based on cryptocurrencies, in particular, of such key link as tax system. Basically, spreading cryptocurrencies as money would require a complete reorientation of economic relations, in particular with regard to the current role of the state and the organization of the public finance system. Considering this, there should be distinguished two types of EMPWI. These, which can be approved as a whole by the state and become the legal means of payment or only partially perform selected functions of the legal means of payment (e.g. the possibility to pay taxes). And those, which do not have an approval of the state – for the best, they are not prohibited by the state, and above all, they are neither in a whole nor in part the legal means of payment (currently, they are exclusively cryptocurrencies). The model should cover these two types of EMPWI.

It should be emphasized that the separation of semantic content in each function of money is arbitrary.[4] The means of payment, playing role of money, fulfil the above mentioned functions simultaneously, as well as having one function determines fulfilment of the next. In the present application of cryptocurrencies in the economy it cannot be assumed that they meet all specified functions to the same extent and that they are complementary in fulfilment of these functions. In addition, there are serious doubts to what extent, and if at all, the cryptocurrencies are able to fulfil some of functions, primarily the function of means of payment. This means that in economic terms the cryptocurrencies are now closer to the financial instrument that to the money. But it does not change the fact that the prospects of cryptocurrencies development and their possible application in the role of public money will be determined by their acceptability and public confidence.

[4] S. Owsiak, *Podstawy nauki finansów*, Wyd. PWE, Warszawa 2002, p. 108.

States, as part of their monetary sovereignty, emit through central banks banknotes and coins, which are legal means of payment. And as a rule, only these banknotes and coins are money in the legal sense.[5]

So, opposed to the economy, where the concept of money is very broad, in the legal sense, the concept of money is considered very narrow – as banknotes and coins. However, the concept of money may appear in the legislation, and then it should be determined by means of interpretation, whether the concept is used in the narrow term - as banknotes and coins, or in a broader economic perspective.

So the cryptocurrencies, and more broadly – EMPWI, from the strictly legal perspective are not the money, because they are not created by the states as part of their monetary sovereignty, which is now manifested by the fact that they are not banknotes and coins being legal means of payment. On the other hand cryptocurrencies, and in the future other types of EMPWI, can perform functions of money in economic terms (although not necessarily perform them now), which in fact is recognized by the legislator of New York State, who indicates these functions in the definition of virtual currencies (including also cryptocurrencies).

5. Legal challenges to the model of electronic means of payment without the issuer

The first and primary concern is to establish the legal substance of EMPWI. In the first place it should be considered whether EMPWI should be uniformly perceived in the framework of each method of legal regulations (civil law, administrative law and penal law). Such uniform understanding can be difficult due to the nature of interpretation on the part of regulations where language interpretation is preferred, as e.g. in the tax law or in the penalty law.

Electronic means of payment without the issuer, like bitcoins (and also other cryptocurrencies, e.g. litecoins or dogcoins), defined individually (e.g. 1 BTC), and not as a system, are only records in the register which

[5] R. M. Lastra, *International Financial and Monetary Law*, Oxford 2015, pp. 14 ff.

is the blockchain. These records represent some subjective value. For convenience, for such records can be applied, used in relation to legal means of payment, the concept of a monetary unit understood as an abstract measure of value. Simultaneously, the fact, that in public law and penalty law regulations there is no prohibition to use the electronic means of payment without the issuer, opens the possibility of using them basing on the principle of freedom of agreements. For example, in Poland, as it has already been stated in the literature[6] , the cryptocurrencies (and also other EMPWI) can be seen, on the basis of article 358^1 § 2 of the Polish Civil Code (further called k.c.), as „other than money measure of value", provided that the parties stipulate in an agreement that the amount of benefit will be determined according to the measure of value which is the specified cryptocurrency (EMPWI). A similar possibility exists in legal systems of other countries.[7] This approach corresponds to the perception of cryptocurrency as an abstract measure of value, i.e. the monetary unit.

By Polish law, the bitcoin is undoubtedly the property right and it is a sort of property (article 44 k.c.)". Similarly the cryptocurrency (including bitcoin) is seen in other countries. EMPWI should be qualified in the same way.

The recognition of cryptocurrency as the property right opens the possibility of applying to cryptocurrencies, and wider to EMPWI, several institutions of civil law (e.g. cryptocurrencies can be included to the estate and be a subject to inheritance).[8]

From the legal perspective, the cryptocurrencies cannot be qualified as financial instruments, because they neither have an issuer, nor are created by an agreement. Financial instruments either have an issuer (e.g. shares) or are created by an agreement (e.g. derivatives). For similar reasons the EMPWI cannot be qualified as financial instruments.

[6] K. Zacharzewski, *Bitcoin jako przedmiot stosunków prawa prywatnego*, Monitor Prawniczy 2014, Nr 21, p. 1132.

[7] W. Zeldin, *Netherlands: Local Court Ruling on Bitcoin Transaction*, 4 czerwca 2014, http://www.loc.gov/law/foreign-news/article/netherlands-local-court-ruling-on-bitcoin-transaction.

[8] K. Zacharzewski, *Praktyczne znaczenie bitcoina w wybranych obszarach prawa prywatnego*, Monitor Prawniczy 2015, Nr 5, pp. 186 ff.

In American doctrine, already in 2011 was risen the subject of qualifying the bitcoin as financial instrument on basis of USA law, but with negative results. It was found first of all that the bitcoin is neither a bill of exchange or promissory note nor a bond, more broadly –neither a stock nor an investment contract.[9]

The statement, that cryptocurrencies cannot be considered in legal terms as financial instruments, does not exclude the possibility of using cryptocurrencies and in general EMPWI for construction of financial instruments, e.g. cryptocurrencies can be the basic instrument for derivatives (derivative contracts). Derivatives based on cryptocurrencies are supervised in the USA by the Commodity Futures Trading Commission (CFTC) in accordance with regulations of the Commodity Exchange Act (CEA). To apply these regulations, CFTC qualifies cryptocurrencies as a commodity.[10]

First of all, however, due to the fact that cryptocurrencies, from a legal perspective, are part of the property (they are property in the legal sense), they may be the subject of an investment. This is noticed by one of the British supervising institutions - Financial Conduct Authority (FCA), recognizing cryptocurrencies, including the bitcoin, as an investment asset.[11] Cryptocurrencies, and also EMPWI, can be purchased on the own behalf and on own account hoping for a favourable resale in the future. There is also a possibility of conducting business by buying and then reselling cryptocurrencies (more broadly - EMPWI) to third parties. Such activities are carried out in practice – as the example may be the American company Bitcoin Savings and Trust, which accepted only bitcoins from their customers (did not operate legal means of payment) for further investment. According to Federal Court of the USA, this

[9] R. Grinberg, *Bitcoin: An innovative alternative digital currency*, „Hastings Science & Technology Law Journal" 2011, no. 4(1), pp. 194 – 199 and references cited therein.

[10] T. I. Kiviat, Beyond Bitcoin : *Issues In Regulating Blockchain Transactions*, Duke Law Journal. Dec2015, Vol. 65 Issue 3, p. 594 ff.

[11] Annual Report 2013/2014 – FCA, Markets Practitioner Panel, page 17, published on https://www.fca.org.uk/your-fca/documents/markets-practitioner-panel-annual-report-2013-14.

company, despite the fact that it did not accept legal means of payment, conducted investment activities and was a subject to regulations.

Currently, there is no specific EU regulation on carrying out payments by the electronic means of payment without the issuer, including first of all cryptocurrencies. In general, so far as in the middle of 2016, the European Parliament does not have the will to regulate the functioning of virtual currencies at the EU level, for the best, recognizes such a need in counteracting against the money laundering and the financing of terrorism. The European Union has already started legislation works on the appropriate change of Directive 2015/849 on prevention of using the financial system for money laundering and the financing of terrorism. This takes into account that in practice the cryptocurrencies are intensively used for money laundering, among others due to the fact, that they ensure a substantial anonymity (but not full anonymity) especially when used together with TOR system, they have global impact, they are easy to store, while unauthorized persons (e.g. law enforcement agencies) have very difficult access to them due to the possibility of using the sophisticated encryption methods, so called portfolios. Cryptocurrencies, in particular bitcoins, are favourite means of payment for hackers and serve criminals to make payments in so called Deep Web (Darknet), which is on-line black market, where, among others, they are used as payments for drugs, pornography, counterfeit documents and also weapons and ammunition. Currently, cryptocurrencies are an important element of cybercrimes and it is feared that they may be used for the financing of terrorism. The growing importance of cryptocurrencies in the money laundering and in the financing of terrorism has already been recognized by The Financial Action Task Force, who dedicated them a lot of attention in two reports on virtual currencies – „Virtual Currencies: Key Definitions and Potential AML/CFT Risks" of June 2014 and „Guidance for a Risk-Based Approach to Virtual Currencies" of June 2015. In the model of EMPWI must be inscribed the appropriate regulation for counteracting the using of EMPWI for money laundering and the financing of terrorism.

So far, there is also no national legislation concerning payments in cryptocurrencies (and more broadly – in virtual currencies) in any of the member states of the European Union. Other countries of the world also do not have such particular regulations – this applies even to the federal law of the USA, where cryptocurrencies are the most popular. However, proposals for such regulations are reported (suitable regulations intend to enter France and Japan) and in the event of a major spread of cryptocurrencies, the intervention of the legislator seems to be necessary.

Against this background, distinguishes the state of New York, which announced on 24 June 2015 a separate, specific legal regulation for economic activity in the area of virtual currencies, including in particular cryptocurrencies, introducing so called BitLicense (further called NY regulation)[12]. This regulation concerns not as much payments using cryptocurrencies, but rather focuses on defining terms and conditions for licensing economic activities using virtual currencies, items of capital requirements, and defining public law responsibilities in counteracting against the money laundering and the financing of terrorism, in consumers protection and also, what constitutes a significant new regulatory, covers the area of cybersecurity of licensed entities. It also introduces the world's first definition of virtual currency, which can also contribute to define cryptocurrency. This regulation is an excellent starting point and a model for possible attempts of the overall regulation of functioning EMPWI. It is particularly important to reflect on the need and scope of the regulation concerning licensing of economic activities by using EMPWI.

The lack of regulations for payments by EMPWI, primarily including cryptocurrencies, inevitably means lack of detailed legal regulations for the protection of consumers using cryptocurrencies. Certainly, the use of EMPWI carries a specific risk for consumers, largely resulting from the lack of an entity responsible for the correct execution of transactions in a decentralized and distributed EMPWI system. Regulations for the

[12] N.Y. COMP. CODES R. & REGS. tit. 23, § 200 (2015), http://www.dfs.ny.gov/legal/regulations/bitlicense_reg_framework.htm; http://www.dfs.ny.gov/legal/regulations/adoptions/dfsp200t.pdf.

State of New York, regarding the activities carried out with use of virtual currency, indicate the direction to regulate the protection of customers using cryptocurrencies.

To cryptocurrencies (and more broadly EMPWI) cannot be applied the detailed regulations on electronic money, due to the lack of issuer. In the European Union, it refers to Directive 2009/110/WE and to the national regulations implementing this directive.

Transactions using cryptocurrencies (EMPWI) are also not included in the scope of directives PSD and PSD 2, because EMPWI are neither legal means of payment nor the electronic money. Thus to the national regulations implementing the directive PSD are not applied to cryptocurrencies (EMPWI). Possible legal regulation of transactions using cryptocurrencies should be, as it seems, carried out by amending the directive PSD 2 – certainly, it will be not a simple procedure. However, as indicated already, the European Union does not have the will to make such changes.

Possible spreading of cryptocurrencies or other EMPWI will intensify the already existing legal problems and the emergence of the new. In addition to the problems, which have already been partially discussed in this article, the attention should be paid to those, resulting from payments based on the distributed and decentralized system of creating the electronic means of payment. In the case of cryptocurrencies, this is the payment seen as a change in the registry record (in the blockchain). Here comes the question about the moment of performance of an obligation, or the responsibility for the correctness of transaction. The challenge is to determine the extent to which EMPWI pose a threat to the money being the legal means of payment and to the monetary sovereignty of the state, as well as how to ensure legal protection of this sovereignty against EMPWI. A separate catalogue of problems constitutes the EMPWI taxation and also counteraction against using EMPWI to tax evasion and making tax frauds.

6. Conclusions

It seems that already now attempts can be made to build the model of EMPWI, so far on the basis of the practice relating to the functioning of cryptocurrency systems. It is based on:

- The idea of means of payment without the issuer
- The idea of decentralized and distributed system of creating the electronic means of payment without the issuer
- The wide functionality beyond the payment function (intelligent contracts, DAO)
- The need for mechanisms to counteract falling by EMPWI into the financial pyramid scheme
- The potential for fulfilling by EMPWI the function of money,
- The possibility of recognition by EMPWI parties „the measure of value other than money"
- Qualifying EMPWI as the property right and as a sort of property
- Legal possibility to use EMPWI for constructing financial instruments
- Covering EMPWI by regulations counteracting the money laundering and the financing of terrorism.

With the spreading of EMPWI, there will be needed still wider intervention of the legislator in the functioning of means of payment. Most of all the intervention will be required in the area of public law. In the course of time, it might be necessary to determine terms and conditions for licensing the economic activity using EMPWI, or changes in the tax law or in the law for protection of consumers.

LITERATURE REFERENCES

P. Everaere P., I. Simplot-Ryl, I. Traoré, Double spending protection for e-cash based on risk management, [in:] Burmester M., Tsudik G., Magliveras S., Ilić I. (eds.), Information Security, Springer, Berlin- Heidelberg 2011,

Grinberg R., Bitcoin: An innovative alternative digital currency, „Hastings Science & Technology Law Journal" 2011, no. 4(1),

Kiviat T. I., Beyond Bitcoin : Issues In Regulating Blockchain Transactions, Duke Law Journal. Dec2015, Vol. 65 Issue 3,

Lastra R. M., International Financial and Monetary Law, Oxford 2015,

Noga M., (red.), Makroekonomia ze szczególnym uwzględnieniem polityki pieniężnej, CEDEWU, Warszawa 2012,

Owsiak S., Podstawy nauki finansów, Wyd. PWE, Warszawa 2002,

Ron D., Shamir A., Quantitative analysis of the full Bitcoin transaction graph, 2012, https://eprint.iacr.org/2012/584.pdf

Segendorf B., Have virtual currencies affected the retail payments market?, Sveri-ges Riksbank, Economic Commentaries, 2014, no 3, http://archive.riksbank.se/Documents/Rapporter/Ekonomiska_kommentarer/2014/rap_ek_kom_nr02_140617_eng.pdf

Schaal P., Pieniądz i polityka pieniężna, Wydawnictwo PWE, Warszawa 1996,

Shadab H. B., Regulating Bitcoin and Block Chain Derivatives, October 9, 2014, http://www.cftc.gov/idc/groups/public/@aboutcftc/documents/file/gmac_100914_bitcoin.pdf

Zacharzewski K., Bitcoin jako przedmiot stosunków prawa prywatnego, Monitor Prawniczy 2014, Nr 21,

Zacharzewski K., Praktyczne znaczenie bitcoina w wybranych obszarach prawa prywatnego, Monitor Prawniczy 2015, Nr 5,

Zeldin W., Netherlands: Local Court Ruling on Bitcoin Transaction, 4 czerwca 2014, http://www.loc.gov/law/foreign-news/article/netherlands-local-court-ruling-on-bitcoin-transaction/