ABOUT BITCOIN FROM THE POINT OF VIEW OF MONETARY THEORY

(Treatise)[1]

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The treatise seeks to find the answer to the question whether bitcoin can be considered as money expressly from the point of view general monetary theory. After clarifying certain terminological questions required for the examination of the topic, the treatise makes altogether eight basic statements in order to encourage readers interested in the topic to form their own opinion, especially to take further the statements, make additions, confirm or refute the statements, promote the constructive discussion of the topic, as well as draw the attention of Hungarian thinkers of monetary theory (even more) to bitcoin.

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1. INTRODUCTORY THOUGHTS

Looking back at the history of money, we find an array of *innovations* which threw different light upon people's former opinion about money in different historical periods, irrespective of whether the given innovation proved to be lasting in terms of history or was a dead end. Today's modern money as credit money without intrinsic value appeared at the time of the evolvement of the modern market economy. Despite the fact that certain functions of modern money were taken over by new money substitutes, "quasi money" temporarily or permanently from time to time, modern money has not had a vigorous rival "from outside" that could question the foundation of the existing monetary system.

1 This treatise is an abridged, simplified, updated and partly revised version of the author's thesis on the same subject (hereinafter referred to as the "Thesis"), completed for the postgraduate course at the International Training Centre for Bankers Ltd. and Corvinus University of Budapest in April 2016. The exclusive aim of the treatise is to raise awareness of the topic. Consequently, some parts of the text of the treatise may be the same as the body text of the Thesis, however, in the case of the treatise, all the relevant external sources are extensively referred to. At the same time, the information provided in the treatise is not comprehensive, therefore the reader is kindly advised to study other aspects of this exciting topic either from the Thesis or from other public sources.

Bitcoin became known due to an article written by a still unknown person under the pseudonym *Satoshi Nakamoto*, published in November 2008.[2] *Bitcoin* (with a capital B) represents a new type of decentralised accounting system (divided general ledger accounting)[3], while *bitcoin* (with a lower case b) refers to a unit of open-source virtual currency, a kind of crypto money, generated by the Bitcoin network, regulated by various mathematical algorithms and encryption procedures, through the processing and approval of transactions, that is *mining*. A public general ledger called *blockchain* includes all processed transactions, allowing the confirmation of the validity of each transaction by the users' computers.

The main goal of this treatise is to answer the question whether bitcoin can be considered as money, particularly from the point of view of general monetary theory.

2 METHODOLOGICAL BACKGROUND

Regarding the applied methodology and considering the fact that the definition of money is still highly controversial in monetary theory, henceforth we seek to pay regard to two classical explanatory concepts, the so-called *"convention theory"* (according to which the current form of money evolved as a result of long historical development), as well as to the so-called *"functional theory"* (which determines *a priori* functions of money, then examines which assets are able to fulfil such pre-determined functions).[4]

We also refer to another classification of monetary theory that is based not only on the separation of conventional/functional trends, but also contrasts *quantitative* (dynamic) theories, which seek to explain how the change of the quantity of money affects its value, with *qualitative* (static) monetary theories, which attempt to clarify the essence of money, and do not deal with the changes in its value. According to this classification, along with other theories, functional theory belongs to qualitative monetary theories.[5] In connection with the theories described above, we declare that this treatise does not deal with questions related to the money supply (and cash flow) in depth, however, it occasionally mentions them.

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2 Nakamoto, S. (2008). The study is electronically available at: https://bitcoin.org/bitcoin.pdf (downloaded: 03/12/2017).

3 Depending on the context, Bitcoin may also refer to the protocol operating the Bitcoin system, the open source Bitcoin software or the community using the system in different sources. Neither the procedure of separating the terms Bitcoin and bitcoin is universally accepted. In any case, our treatise follows the terminology above:
https://en.bitcoin.it/wiki/Help:Introduction#Capitalization_.2F_Nomenclature (downloaded: 03/12/2017).

4 On the separation of the two concepts see: Dr. Madár et al. (2002), pp. 43–44.

5 Heller (1945), pp. 349–350 refers to the separation of the two theory groups. An overview of quantitative theories can be found on pp. 328–349 of the monography.

3 BASIC CONCEPTS

3.1 The general and functional concepts of money

In individual sources, bitcoin[6] is often mentioned as *"digital money", "digital means of payment", "digital currency", "virtual means of payment", "virtual currency, "crypto money"* or*"cryptocurrency"*. These terms are often mixed or used as synonyms. In one of its press releases, the National Bank of Hungary (MNB) mentions bitcoin as *a virtual instrument suitable for payment*, carefully avoiding the term "means of payment".[7] But how are these categories related to each other?

In order to answer this question, first of all, we have to define that, from the terms above, what is understood by *money* in its broadest sense. Right at the start, we face difficulties: money does not have an exact standardised definition. According to the general approach, *money* represents all the instruments people use for purchasing goods and services on a regular basis. Accordingly, money can be anything that serves as a generally accepted means of exchange.[8] Economics usually defines money by listing its main functions and mentioning some historical or actual examples.[9] As far as the functions of money are concerned, there may be slight differences between certain theories and today's sources seeking to present and synthetize these theories regarding the number as well as the name of the functions of money.[10] Consequently, we declare that this treatise is based on the basic (technical) functions of money in the narrow sense, according to the following classification: (a) *means of exchange (means of trade)*, which concisely means that money is accepted by everyone; (b) *means of payment* - in this case, the movement of money does not mean the movement of goods; (c) *store of value (means of accumulation)*, which means that money is suitable for storing assets; (d) *measure of value (unit of account)*, based on which money is suitable for representing prices.

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6 Considering that the phenomenon is relatively new, even the spelling of terms related to bitcoin varies in different Hungarian sources. Similarly to the Thesis, in this treatise, we followed the guidance of the *Hungarian Language Services*. In the case of suffixation, we do not use a hyphen: http://www.e-nyelv.hu/2016-02-14/bitcoinnal/ (downloaded: 03/12/2017).

7 http://www.mnb.hu/archivum/Felugyelet/root/fooldal/topmenu/sajto/sajtokozlemenyek/bitcoin_kozl (downloaded: 03/12/2017).

8 Samuelson, P. – Nordhaus, W. (2002), p. 454

9 At the same time, this approach is criticised in *László Mérő's* book: *"This procedure is unacceptable for a real mathematician. He would ask us to define a term accurately by means of already existing terms or exact axioms before making statements about it*." Mérő (2004), p. 25

10 cf.: The Economic Environment of the Bank II The Basics of Macroeconomics – Training Boxes for Bankers [A makroökonómia alapjai – Bankárképző dobozok] (2010), p. 38; Bácskai–Huszti–Simon (2003), pp. 20–21; Vigvári (2008), pp. 75–76

Ideally, an instrument that is considered to be money is able to fulfil all the functions listed above, but of course, the functions can be ranked based on their importance and the strength of the relationship between them. For example, according to *Wagner*, money is primarily a means of exchange and a measure of value, all of its other functions are secondary.[11] Even *Polányi*, who is fairly critical of the approach according to which primitive money was a means of exchange, acknowledges that money as a measure of value is more closely related to money as a means of exchange than to money as a means of payment or accumulation.[12]

3.2 The history of money; forms of modern money

This treatise does not aim to describe the evolvement of money and its main stages of development in depth. Therefore, we would like to ask our readers to accept the textbook definition from the era before the appearance of the bitcoin, as a starting point: "Originally, money was commodity money. Today, according to the most wide-spread name, money is credit money. Credit money is a bank liability that can function as a means of trade, a payment instrument, an instrument for accumulation (saving) and a measure of value. The interpretation above refers to the national money of the domestic economy. World money as a generally accepted national money fulfils the same functions in international payment. Currency functions as world money, while foreign exchange is a currency receivable."[13] In view of the above, *modern money* is an instrument without intrinsic value, artificially generated by the state. Its entry into the economy (generation) and its exit (destruction) takes place with the collaboration of the institutions of the banking system, as modern money as *credit money* can be generated by central banks (banks of issue) and commercial banks.[14] Regarding its origin, money can be generated by *central banks* or *commercial banks.* As for its form, it can be *cash* (banknote or coin – commercial banks are not allowed to generate this type) and *scriptural money* (bank money – which can be generated by both central and commercial banks).[15]

Banknote and *coin* also denote the different forms of a given state's legal tender (the money declared by the state - earlier by the monarch).[16] The legal tender ful

11 Wagner, A.: *Sozialökonomische Theorie des Geldes und Geldwesens*. Leipzig, Winter, 1909. Quotes: Heller (1945), p. 347

12 Polányi (1976), p. 312

13 Bánfi (2008), p. 11 At this point, we declare that, as far as the author of this treatise knows, the author of the referred source is only his namesake.

14 Magyar (2004), p. 35

15 Bánfi (1999), p. 31

16 Pursuant to Article K) of the Fundamentals of the Fundamental Law of Hungary: *"The official currency of Hungary shall be the forint."*

fils the functions of money if its declaration by the state is supported by *general social consensus*. In contrast, scriptural money is money generated by commercial banks, which can be exchanged for legal tender at banks anytime and the issuing bank assumes liability for the exchange, therefore trust in scriptural money corresponds to trust in the bank.[17]

Regarding bitcoin, the history of money could be considered the history of the virtualisation of money, however, we believe that such an approach would be too simplifying and focusing exclusively on the form and material appearance of money. We rather agree with *Polányi*, who claims that "no object is money in itself, but in appropriate circumstances, any object can function as money. In fact, money is a symbol system similar to language, writing, weights or measurements"[18], therefore we cannot talk about the virtualisation of money, maybe only about the virtualisation of the *form* of money.

3.3 Electronic money and its subtypes; digital currencies, virtual currencies, cryptocurrencies

3.3.1. Electronic money in a broader and narrower sense

Actually, the scriptural money generated by the central bank or commercial banks, mentioned in point 3.2 can be regarded as the electronic form of money, as opposed to cash (banknotes and coins) that appears in physical form. At the same time, such classic forms are usually not listed in the category of money in the narrow sense. In the interpretation of the Bank for International Settlements (BIS)[19], all values which are electronically stored on devices such as hard disks of computers or chip cards are considered to be *electronic money* or *e-money in a broader sense*. Consequently, digital currencies, which play a key role in our topic, belong to this broader concept of electronic money, as well, irrespective of the fact whether they are generated by the central bank or automatically, in a decentralised form.[20] However, *in a narrower sense*, only that kind of money that certain

17 The Economic Environment of the Bank II *The Basics of Macroeconomics – Training Boxes for Bankers* [A bank gazdasági környezete II. A makroökonómia alapjai – Bankárképző dobozok] (2010), p. 43

18 Polányi (1976), p. 300

19 BIS (2015), p. 4 http://www.bis.org/cpmi/publ/d137.pdf [downloaded: 2017.12.03.]

20 *BIS* distinguishes between *"electronic money"* and *"digital currency"*. As the issue is related to several sources to be introduced later, we would like to clarify that the term "*currency*" was translated into Hungarian as "*pénznem*" in most cases (sometimes directly as "*pénz*", which is very close to the term "*money*", and occasionally as "*valuta*") in accordance with point 3.2 of the treatise. Our starting point was the fact that in Hungary, foreign currency in the form of banknotes and coins is called "*valuta*", while, in the form of scriptural money, it is called "*deviza*" (see: point 3.3.4. of the treatise). Our treatise focuses on the question how relevant it is to talk about bitcoin - which is not considered to be a legal tender - as a currency or a type of money. The statements of the treatise will give an answer.

countries expressly declare to be electronic money can be considered to be electronic money. Consequently, in most cases, electronic money can be exchanged for bank money issued by the central bank or commercial banks, denominated in the official currency of the given country, at nominal value, or for cash.[21]

Although there are several other classifications, hereinafter we will rely on the division by the BIS, therefore we consider digital currencies in a broader sense to be the subtypes of electronic money.

3.3.2 Digital and virtual currencies

First of all, it is important to declare that regarding the sources, neither abroad, nor in Hungary does a well-established, homogenous terminology exist. However, it is very telling that the already quoted BIS report consistently uses the term "digital currencies" for the relevant instruments, without defining the exact meaning of "digital currency". In this report, the term is used exclusively for the sake of homogeneous terminology, clarifying that such instruments appear exclusively in a digital form.

In the similarly careful discussion paper issued by the International Monetary Fund (IMF), which cannot be regarded as the official viewpoint of the IMF, "digital currencies" are also considered to be the starting point.[22] On the other hand, it should be noted that the meaning of this expression is not entirely the same as that of the term "digital currency" used by the BIS, as according to the IMF electronic money denominated in legal tender belongs to the category of digital currency, as well, while, in the case of the BIS, it only falls into the broader category of electronic money.[23]

Based on the IMF's definition and categorisation, *digital currency* represents some kind of value appearing in digital (electronic) form, which can be denominated in legal tender (e.g. PayPal) or in any other own unit of account. In the latter case, we can talk about *virtual currencies*.[24] Within virtual currencies, *convertible* virtual currencies can be spent on real life products and services or be exchanged for money, as opposed to *non-convertible* virtual currencies which can be used only in a given virtual world (e.g. tokens used in online games belong to the latter category).

In line with the classification above, the European Central Bank (ECB) and the European Banking Authority (EBA) define virtual currency as follows: "a virtual currency is a type of unregulated, digital money, which is issued and usually con

21 BIS (2015), p. 4

22 IMF (2016), p. 8, https://www.imf.org/external/pubs/ft/sdn/2016/sdn1603.pdf (downloaded: 03/12/2017).

23 cf. IMF (2016), p. 8 and BIS (2015), p. 6

24 IMF (2016), p. 8

trolled by its developers, and used and accepted among the members of a specific virtual community"[25], and "VCs [virtual currencies] are defined as a digital representation of value that is neither issued by a central bank or public authority nor necessarily attached to a FC [(conventional) fiat currency], but is used by natural or legal persons as a means of exchange."[26]

For the sake of completeness, we would like to emphasise a fact we already mentioned above, in the case of the BIS: the quoted study by ECB still did not include the following clarification of terminology that can be found in later ECB studies: "Although the term "virtual currency" is commonly used – indeed, it often appears in this report – the ECB does not regard virtual currencies as full forms of money as defined in economic literature. Virtual currency is also not money or currency from a legal perspective."[27]

At this point, it is also necessary to describe the aspects of theoretical differentiation between certain virtual money constructions: based on IMF's classification, regarding the issue of virtual currencies and the operation of systems behind them, *centralised, decentralised* and *hybrid* schemes can be distinguished, differing from each other in the following three main elements: a) *rules on the issue and redemption* of a given virtual currency, b) mechanisms related to the establishment and enforcement of *internal rules on the usage and trading* of a given virtual currency and c) a *payment and settlement procedure*. In the centralised version, a delegated central or private party is responsible for the management of individual areas of operation, while in the decentralised model, the participants of the system are responsible for carrying out this task. In the case of the so-called "hybrid system", a central regulatory body is responsible for the individual functions, while the remaining functions are fulfilled by the participants of the system in a decentralised manner.[28]

3.3.3 Cryptocurrencies

Cryptocurrency is a convertible virtual money generated in a decentralised manner, in the case of which the generation of currency units and the security of transactions are supported by the application of some kind of *cryptographic procedure*.[29]

25 ECB (2012), p.13 http://www.ecb.europa.eu/pub/pdf/other/virtualcurrencyschemes201210en.pdf (downloaded: 03/12/2017).

26 EBA (2014). p. 11, https://www.eba.europa.eu/documents/10180/657547/EBA-Op-2014-08+Opinion+on+Virtual+Currencies.pdf (downloaded: 03/12/2017).

27 ECB (2015), p.4 https://www.ecb.europa.eu/pub/pdf/other/virtualcurrencyschemesen.pdf (downloaded: 03/12/2017).

28 IMF (2016), pp. 8–9

29 cf. IMF (2016), p. 8

Today, there are more than 1000 various cryptocurrencies.[30] At the same time, it is a fact that, based on market capitalisation[31], at the completion of this treatise in early December 2017, the three main cryptocurrencies were *bitcoin (BTC), ether(eum) (ETH) and bitcoin cash (BCH)* (which evolved from bitcoin).[32]

In the framework of this treatise, we deal with bitcoin in detail, as the world's first real decentralised crypto money with the highest market capitalisation, but of course, other crypto money could also be subject to examination from the point of view of monetary theory.

3.3.4 Bitcoin is a decentralised virtual cryptocurrency

Based on the above, in connection with bitcoin, we think that the most appropriate name is ***decentralised virtual (crypto)currency ("Statement I")***, because the terms *electronic money* and *digital money* are too general, *means of payment* is too narrow, considering the fact that investment into bitcoin could increase assets, therefore bitcoin does not necessarily has to be involved in everyday payment transactions. As far the term *virtual instrument suitable for payment* used by the MNB is concerned: the cautiousness on the part of the regulatory-supervisory body is understandable, but, in compliance with the aforementioned statements, this term cannot be considered as standard in this treatise, as we believe that *instrument* has a broader meaning than *money*. Bitcoin has a significantly wider range of use than an instrument that is suitable only for payment.

Adhering to this the current terminology, the accuracy of the term *currency* becomes somewhat relative in the case of bitcoin, as currency usually refers to the legal tender of a given country in circulation of another country, in its physical form, while bitcoin does not have a material form (and is not considered to be a legal tender - for the time being). In view of the above, we conceive the avoidance of the use of *foreign currency* to be expedient. The more general term *currency* or *money* should be used, instead.

Furthermore, we have another comment of semantic character: the word *virtual* - presumably in line with the analysed sources - is still used in the sense of "*close to reality*" or"*apparent*" in our treatise. On the other hand, we reserve the right to return to the meaning of this word in the Afterword.

In accordance with the logic of the aforementioned classification by IMF, we accept that bitcoin is a kind of convertible, decentralised virtual money which

30 The number and market data of available cryptocurrencies is typically changing very rapidly: https://coinmarketcap.com/currencies/views/all/ (downloaded: 03/12/2017).

31 It refers to the product of the stock of cryptocurrencies in circulation and their current exchange rate. We would like to note that due to the lack of regulation of cryptocurrencies and their decentralised character, the terms "market" and official "exchange rate" should be treated distrustfully, but we should consider it to be a fact.

32 https://coinmarketcap.com/currencies/views/all/ (downloaded: 03/12/2017).

applies certain cryptographic mechanisms, therefore we sometimes call it cryptocurrency. However, in our opinion, using the adjectives "virtual" and "decentralised" as well as the prefix "crypto" is not enough to distinguish bitcoin from other currencies (let us think about the situation when we are debiting our bank account opened at a commercial bank through bank card transactions. Our interests are protected by several encryption procedures, e.g. when the data on our bank card are protected or when, in the course of online payment, the communication between the browser we use and the webserver is encrypted).

4 FUNCTIONAL APPROACH

4.1 Means of exchange and payment instrument

In a general sense, an object accepted by market players and used by them for mutual exchange in trade, reducing transaction costs, can function as a *means of exchange*.[33]

According to the *classical approach*[34], objects functioning as money in different historical periods had to have physical and social characteristics other than their actual physical appearance to be able to remain in this role permanently. Following the logic of *Vigvári's* classification, we can make the following statements expressly about bitcoin:[35]

a) *Acceptability* requirement – despite the fact that the number and volume of transactions conducted with virtual money is growing relatively fast, compared with other significant legal tenders in the global economy, the size of this market is still marginal. In the case of bitcoin, we cannot talk about general acceptance or "general social consensus", as it used only by a very narrow group of people on a regular basis. Moreover, there are no reliable data available at all on the number of transactions conducted by users in bitcoin in proportion to the number of transactions conducted by users in the conventional legal tender of a given country.

33 László–Antal (1998), p. 207

34 Most sources agree that classic economics was born when Scottish economist *Adam Smith*'s (1723–1790) book, *The Wealth of Nations*, was published. Other representatives of the trend include: *David Ricardo* (1772–1823), *Thomas Malthus* (1766–1834) and *John Stuart Mill* (1806–0873), see Heller (1945), pp. 14–21

35 Vigvári (2008), p. 78–79

The ECB[36], the EBA[37] and the IMF[38] agree that the lack of general acceptance can be blamed for preventing bitcoin from becoming an acknowledged means of exchange, therefore it is considered to be a very critical point. At the same time, it is very appealing that the official website of bitcoin does not avoid this controversial issue. According to the website, its low acceptance is an obvious disadvantage of Bitcoin: "Many people are still unaware of Bitcoin.. Every day, more businesses accept bitcoins because they want the advantages of doing so, but the list remains small and still needs to grow (...)"[39]

A basic element of acceptance is *trust*, which is a very volatile category: most users are probably satisfied with the security provided by Bitcoin, otherwise they would not conduct transactions in it on a regular basis; however, as Bitcoin was born only a short time ago, no well-founded conclusions can be drawn. The official website of Bitcoin deals with the question in a short, guided way ("Why do people trust Bitcoin?"), which assumes the existence of trust.[40] Since Bitcoin is fully open-source and decentralized, and all transactions and bitcoins issued into existence can be transparently consulted in real-time by anyone, and all payments can be made without reliance on a third party and the whole system is protected by cryptographic algorithms, therefore the following conclusion is drawn by the website: " the network remains secure even if not all of its users can be trusted", and it is established that "Much of the trust in Bitcoin comes from the fact that it requires no trust at all."[41]

We believe that the latter statement is too simplified. In our view, bitcoin is a currency of trust, even if this statement does not manifest itself in trust in some kind of sovereign power or the performance of the national economy, but rather in bitcoin technology itself, the community and the use of money.

b) *Homogeneity* (or from another point of view: exchangeability) requirement: bitcoins are considered to be homogenous in this respect, they have the same features, no bitcoin unit provides more rights to its owner than other bitcoins. On the other hand, each bitcoin has its own individual "story", which can be tracked back in the blockchain.[42]

c) *Divisibility* requirement: bitcoin can be divided into smaller subunits: millibitcoin (0.001 bitcoin = 1 mBTC), microbitcoin (0.000001 bitcoin = 1 μBTC) and satoshi. The latter equals 0.00000001 bitcoin.[43]

36 ECB (2015), p. 23
37 EBA (2014), p. 14; p. 17
38 IMF (2016), pp. 10–17
39 https://bitcoin.org/hu/gyik#mik-a-bitcoin-hatranyai (downloaded: 03/12/2017).
40 https://bitcoin.org/hu/gyik#miert-biznak-az-emberek-a-bitcoinban (downloaded: 03/12/2017).
41 https://bitcoin.org/hu/gyik#miert-biznak-az-emberek-a-bitcoinban (downloaded: 03/12/2017).
42 http://www.businessoffashion.com/articles/opinion/good-money (downloaded: 03/12/2017).
43 https://en.wikipedia.org/wiki/Bitcoin#Units (downloaded: 03/12/2017).

d) *Durability* requirement: due to its virtual character, a bitcoin, as opposed to precious metal coins, can take part in an unlimited number of transactions without wear and tear. In this respect, it can be considered to be durable. On the other hand, bitcoin is exposed to risks arising from user or system errors (not to mention malicious attacks), even if an offline (non-Internet based) backup is made of it. Compared to bitcoin, "traditional money is quite a bit more resilient to human folly."[44]

e) *Portability* requirement: of course, bitcoin as a virtual currency is portable, provided that the user has regular Internet access and the required software, including a virtual wallet that enables "storage" and "transport".[45] Bitcoin transactions, especially cross-border transfers, may be much faster and more cost-effective than transactions in traditional commodity money (including its rudimentary form, the precious metal coin) or modern cash or scriptural money transactions. At the same time, users have to know the whole blockchain to be able to match the coins with the denominations, which might prevent the further spreading of bitcoin owing to the increasing size of the blockchain in the long run. Users might feel the urge to use a less secure architecture that requires only the partial download of the blockchain or to open a virtual wallet at one of the online bitcoin service providers (marketplace, wallet hosting space).[46] In connection with cost-effectiveness, the EBA points out that there is no guarantee that transaction costs will remain at a relatively low level over time. As the number of newly issued bitcoins and the achievable bonus decrease, miners will more and more rely on higher transaction fees so that the money and energy invested into boosting their computing capacity for the sake of mining can return.[47] Moreover, a lot of merchants accept virtual currencies as payment, but they almost immediately convert them to legal tenders, which also entails extra cost.

f) *Scarcity* requirement: the amount of bitcoins in circulation is limited in advance in a transparent manner, as they are regulated by mathematical algorithms. Theoretically, the scarcity requirement is fulfilled, because it can be assessed only on the basis of the current money demand/supply whether the amount of bitcoins is enough for conducting the desired transactions (whether bitcoin is "scarce enough at that moment") and the balance can be long-lasting or not.

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44 https://dailyanarchist.com/2014/04/28/bitcoins-arent-money-theyre-even-better/ (downloaded: 03/12/2017).

45 The range of available wallets is fairly wide: https://bitcoin.org/hu/valasszon-penztarcat (downloaded: 03/12/2017).

46 Tüzes (2012), p. 158

47 EBA (2014), p. 17

g) *Recognisability* requirement: what we wrote about the homogeneity, durability and portability requirements apply to recognisability, as well. Individual bitcoins can be identified by means of appropriate computer programmes. Previous transactions related to a specific coin can be traced back in the blockchain.

In conclusion, we consider bitcoin to be a homogenous, dividable instrument that is available in a limited but increasing circle. Theoretically, the total amount of bitcoins available is limited, however, bitcoin can be regarded as durable, portable and easily identifiable, provided that constantly improving identification technology is available.

In our view, it is important that the current acceptance level of bitcoin is relatively low. We emphasised this fact, as we do not believe that it is decisive concerning the classification of bitcoin from the point of view of monetary theory. As bitcoin is a recently appeared currency and as fairness requires, we should trust in it in the same way as we do in other forms of money with decades, centuries or perhaps millennia of development. For order's sake, we pose the following theoretical question: if the fact that bitcoin can function as a means of exchange only in a limited way was accepted in the strictest sense, would it be worth dealing with other functions of bitcoin? Or could the conclusion be immediately drawn: bitcoin cannot be considered as money?

As opposed to the approach of classical economics, *Polányi* emphasises that, in contrast with modern societies, in which various ways of using money were united on the basis of the use of money as a means of exchange ("money is a payment instrument today, because it used to be a means of exchange"), in archaic (primitive) societies, money was used as a (non-commercial) payment instrument or a measure of value rather than a means of (commercial) exchange. The former two functions were widespread even in areas where the use of money as a means of exchange did not exist. In early communities, different ways of using money institutionalised separately. Prior to using money as a means of exchange, it was used for payment, measuring value or storing assets.[48]

In view of the above, our approach to bitcoin might be either permissive or rigid, it is worth continuing the analysis and examining other functions or money, primarily its payment instrument function.

Consequently, we can talk about money as a *means of exchange* or *means of trade* if it is used in trading goods. According to *Weber*, an object can be called a *payment instrument* if it is conventionally or legally guaranteed that the service obligations of the parties laid down in and enforced by a contract are fulfilled upon the handover of this object. In this case, the transaction fulfils an obligation,

48 Polányi (1976), pp. 305–306, p. 311

therefore it does not necessarily have to refer to exchange.[49] As the latter approach attaches too much importance to "obligations" and "guarantees", which are harder to interpret in the case of bitcoin, our treatise is based on a more general approach represented by *Vigvári*, according to which money functions as a *payment instrument* when the cash flow and the movement of goods are temporarily or permanently separated, which actually serves the permanent or temporary rearrangement of income in space and in time.[50]

Money can also be the means of deferred payments: "it is often more convenient for both the debtor and the creditor to specify a given loan transaction in terms of an amount of money than in the terms of cattle."[51] Based on the above, bitcoin can function as a payment instrument if the consideration of a product or service is paid with it subsequently (e.g. an airplane ticket is purchased with bitcoin or our long-standing debt is settled in bitcoins with the consent of the creditor). In addition, we would like to mention only one service type in the case of which cash flows related to bitcoin are visibly separated from each other in time (and perhaps even in space): it is the topic of *bitcoin loans*.

Bitcoin can be the subject of a loan transaction, as well. This role of bitcoin has been further strengthened by online platforms matching potential creditors and debtors on a "*peer to peer*" basis.[52] The declared aim of certain platforms is to ease the funding problems of those who live in developing countries.[53] The idea itself is to be embraced, but the lack of confidence on the part of regulators in bitcoin will likely to increase on platforms which allow lending to debtors from all over the world who fail to observe fundamental regulations on the avoidance of money laundering and the financing of terrorism. In certain cases, such platforms promise unrealistic yields to investors[54] or use the good faith of creditors and debtors for apparently illegal purposes.[55] Based on our recent experience related to foreign currency loans in Hungary, it is better not even think about the exchange rate risk debtors have to face when taking out bitcoin loans, as bitcoin is a foreign curren

49 Weber, M. (1987): *Economy and Society I* [Gazdaság és társadalom I.] Budapest, publisher: Közgazdasági és Jogi Könyvkiadó, p. 92 Quotes: László–Antal (1998), p. 209

50 Vigvári (2008), p. 75

51 Kohn, M. (2007), p. 93

52 Such platforms are for example *Bitbond* (https://www.bitbond.com/) or *Loanbase* (https://loanbase.com/).

53 "*BTCJam* was founded in late 2012 in order to help people have access to affordable credit. In developing countries (...) interest rates for personal loans can reach over 200% per year, making credit difficult if not impossible to be obtained." https://btcjam.com/about (downloaded: 03/12/2017).

54 https://www.archover.com/the-perilous-world-of-bitcoin-lending-platforms/ (downloaded: 03/12/2017).

55 https://news.bitcoin.com/p2p-lending-regulation-looms-chinas-ezubao-ponzi-scheme-unravels/ (downloaded: 03/12/2017).

cy or foreign exchange for everyone at the moment. It is still uncertain whether creditors would have effective methods to enforce performance.[56]

Of course, in the case of bitcoin loans and bitcoin in general, the regulatory solutions created by individual states play a key role, as they may affect, inter alia, the further spreading of bitcoin, the level of its acceptance, its liquidity, the change of its exchange rate – it is much more difficult to succeed against regulatory "headwind". ***At the same time, we believe that, from the point of view of general monetary theory, it can be declared that bitcoin can function as a means of exchange and a payment instrument, albeit in a limited way, at the moment ("Statement II").***

4.2 Store of value (means of accumulation) and measure of value (unit of account)

In order to scrutinise the aforementioned two functions, first, we should examine whether bitcoin has intrinsic value or not. This point is crucial if we want to determine the relationship between bitcoin and modern money as well as commodity money. This question will be discussed later.

At this stage, our concept is based on the idea that, as opposed to money with intrinsic value, money without intrinsic value does not have (commodity) value "in its own right", but only representative value. In principle, money with intrinsic value could be suitable for satisfying needs even if it is not used as money.

According to the quoted discussion paper by the IMF, similarly to modern money without precious metal collateral, bitcoin has no intrinsic value.[57] By contrast, there is another viewpoint according to which bitcoin has intrinsic value. Its mathematical characteristics, its usability as a means of payment[58], its decentralised character[59] and the connectivity to Bitcoin are considered to be its values (connecting it to a mobile network, certain functions having quantifiable benefits for the user become available).[60] In addition, there are various other arguments for the intrinsic value of bitcoin, e.g. it embodies economic freedom; it allows the poorer layers of society, who do not use banking services on a regular basis, to take part in financial procedures; it is hard to steal.[61]

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56 In connection with the distinction between currency and foreign exchange see paragraph 2 of point 3.3.4.

57 IMF (2016), p. 14

58 https://bitcoin.org/hu/gyik#miert-kepviselnek-erteket-a-bitcoinok (downloaded: 03/12/2017].

59 http://paulbohm.com/articles/bitcoins-value-is-decentralization/ (downloaded: 03/12/2017).

60 https://en.bitcoin.it/wiki/Myths#Bitcoins_have_no_intrinsic_value_.28unlike_some_other_things.29
(downloaded: 03/12/2017).

61 https://bitcoinmagazine.com/articles/you-say-bitcoin-has-no-intrinsic-value-twenty-two-reasons-to-think-again-1399454061 (downloaded: 03/12/2017).

In our view, emphasising the benefits of bitcoin (and Bitcoin) does not change the fact that ***bitcoin has no intrinsic value in the strict sense ("Statement III").*** Similarly to modern money, it is *fiduciary money*, which has neither value, nor can it function as commodity coverage if it is not used as money. To mention a very drastic and simplifying example: if electricity supply or Internet service ceased for any reason in the world, we could not do anything with bitcoin. At the same time, if we had a stone tablet or even a shell, they would have their own intrinsic value. On the other hand, a similar theoretical train of thought may not be worth too much in practice: in an imaginary post-apocalyptic situation, it would not be sure that one shell or more shells would be worth more than a bitcoin. We could sell the shell for (suppose) about HUF 20 (if anyone remembered what the legal tender was) or could exchange it for another good. Gold would be different; however, there is no guarantee that in a utopian world gold or precious metals would still function as money.[62] Based on the above, despite thinking that bitcoin has no intrinsic value in the traditional sense, we believe that it is worth reconsidering whether maintaining the traditional dichotomy "commodity money with intrinsic value – modern money without intrinsic value" is accurate enough or whether it is suitable for the categorisation of cryptocurrencies similar to bitcoin. If our conclusion is that bitcoin may fulfil the generally required functions of money even if it has no intrinsic value, this ambivalence (which involves alternative answers) could prove to be too narrow in certain cases.

Irrespective of the illustrative example mentioned in the previous point, the following question may arise: if bitcoin has no intrinsic value, what kind of elements determine its value? In this context, we refer to the fact that not only money itself, but the definition of factors which affect the value of money is also in the focus of analyses and discussions on money, in both qualitative and quantitative terms. Without describing the items of certain theories in detail, this treatise merely states that the value of money can be affected by objective factors (e.g. issues related to money supply, the supply of and the demand for money) and subjective factors (in particular: individual needs, value judgement), as well.

We would not like to provide a detailed analysis of the money supply, as in our opinion, it would require the modelling of a completely closed, bitcoin-based economy, but it would exceed the ideological and spatial frames of this treatise.

62 Some experts believe that it is a "historical coincidence" that money and metal were regarded as equal in the west for such a long time. In Ancient Mesopotamia, transactions related to agricultural cops and metals were recorded on clay tablets 5000 years ago. Ferguson, N. (2010), p. 30 cf. Polányi (1976), p. 302 and p. 319 "As there was not any paper money in Babylonia in the third millennium, historians considered metals to be the orthodox material of money. In fact, each payment took place in barley." According to *Polányi*, in the products-exchange system of the period, silver serves as a means of settlement, barley as a payment instrument and other crops, e.g. oil, cotton, date as means of exchange.

Consequently, we would like to ask the reader to accept the general statement, which can also be found in the BIS analysis, claiming that *the value of digital currencies, similarly to that of gold and other goods, is determined by demand and supply*. As opposed to traditional electronic money, digital currencies do not qualify as liabilities of any private individuals or organisations, nor are they supported by any public authorities, therefore their value is primarily based on the conviction (belief) that they could be exchanged for other goods or services or legal tenders in the future.[63] The BIS also lays down that the creation of certain currency units (and, as a result, the whole supply) is regulated by a computer protocol, therefore no market player has the opportunity to influence the supply of instruments. The BIS almost conflates the exchange rate of bitcoin with its value when, in the case of subjective individual factors, it also uses the term "*value*" in connection with objective demand/supply elements. The change of the (market) exchange rate of bitcoin, the rate of volatility and the potential deflationary effect arising from the theoretical quantitative limit on bitcoin may be subject to a separate analysis, but here we do not intend to deal with these topics in detail.

However, we refer *Hóman*'s classification – which relates mainly to precious metals –, based on which each type of money has *lawful or nominal value* (the value attached to it by the sovereign power that subjects or citizens are obliged to accept – it is also called the *forced exchange rate* of money), *metal value* (the market value of the precious metal content of money made of precious metal), *currency value* (the value of the given currency compared to the value of the currency of other states or other currencies issued by the money-issuer) and *exchange value* or *purchasing power* (indicating the amount of other goods which can be obtained for a given currency unit).[64] Consequently, bitcoin as a decentralised virtual currency does not have lawful value (however, in our view, it has general nominal value, see the denomination: "1 BTC") and metal value. On the other hand, it has currency value and exchange value. The change of the latter two values can be affected by various economic factors which could be subject to a separate analysis in certain cases.[65]

In the framework of this treatise, we would like to state only that, as bitcoin has no predetermined purchasing value or a fixed exchange rate similar to that of legal tenders, primarily the market rules determine the prevailing exchange rates. In case of bitcoin (as in case of cryptocurrencies in general),,typically, the prices cannot be considered as stable and volatility is higher than for national currency pairs.[66] Therefore, there is no guarantee that the purchasing value of bitcoin will remain constant in time, i.e. the same amount of goods can be purchased with

63 BIS (2015), pp. 4–5
64 Hóman (1991), p. 25
65 A similar thought experiment can be found in point IV.2.3 of the Thesis.
66 IMF (2016), p. 17

bitcoin as at the time of obtaining the virtual currency.[67] In order to consider a given currency to be a real asset storage alternative of other possible financial and real assets, we should presume that the purchasing value of accumulated means of exchange is constant in time, which means that the amount of goods that can be purchased for it at the time of making the purchase decision is the same as the amount that can be sold at the date of receiving the means of exchange.[68]

In the case of bitcoin, a currency with especially uncertain future regulation, it would be examined in a stricter way whether such a presumption is real at all. In our opinion, the question is more reasonable: it has happened many times throughout history that the currencies of certain states drastically lost their value for reasons which were sometimes unforeseeable at the start of using the given currency. This drastic loss of value, however, did not (or did not automatically, without "grace period") affect the conviction that they were currencies.[69] Therefore, we believe that, if no organised currency relations are required for considering a given instrument to be money in the case of conventional money, it would be unfair to judge the performance of bitcoin's function as a store of value (means of accumulation) in a too rigid manner.

There is another question: if bitcoin lost all of its "value" overnight, would it be consoling to users that it has already happened to many other national currencies? However, this aspect is not subject to our monetary theoretical examination.

All in all, as far as monetary theory is concerned, ***we do not think that there is a reason why we should consider bitcoin to be an instrument that is unsuitable for functioning as a means of accumulation ("Statement IV")***, even if holding bitcoins could be (even extremely) riskier than holding traditional currencies in certain cases. The developers of technology should manage such risks, regulators dealing with virtual currencies should enforce consumer protection laws and make risks transparent, while potential users should make environmentally conscious and responsible decisions in the future.

Money as a *unit of account* should be suitable for "expressing the value of all goods, receivables and liabilities per unit. As a result, the relationship between goods, receivables and liabilities, their value for money can be determined, as well."[70]

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67 Moreover, the future "volatility" of purchasing power can be presumed, see: ECB (2015), p. 24 The high exchange rate of bitcoin makes it especially difficult to express the price of everyday consumer goods in 1 BTC. Theoretically, the excellent divisibility mentioned in point 4.1. (the use of "subcompute" units) could facilitate the solution of the problem.

68 Dr. Madár et al. (2002), p. 51

69 One of the most notorious hyperinflation processes took place in Hungary: one golden pengő of 1930 was worth 130 trillion paper pengős of 1946. "As a result, people did not carry a basket to the shops because they wanted to take home the goods in it. They used it for carrying the money." Quotes: Jaksity (2004), p. 49

70 Dr. Madár et al. (2002), p. 51

Accordingly, even in the case of money that has no intrinsic value based on textbooks, measuring of value can be divided into two stages: the stage of *measuring value for money*, "when value is measured, prices are set against money, but practicably independently", and the stage of *value-level measurement,* when "the value level of special goods is expressed against money in the form of prices".[71] It is important, however, that in the precious metal monetary system, prices are expressed by means of a technical instrument called *monetary standard,* which is the *unit of measurement for price* and corresponds to the gold or silver content of the given monetary unit expressed in units of weight. In the case of money without intrinsic value, the measurement for price can be determined by equating the arbitrarily determined amount of money with the arbitrarily determined amount of goods.[72]

Of course, even bitcoin could function as the "arbitrarily determined", abstract unit of account, but, as the EBA points out, currently, bitcoin expresses the value of specific goods and services in legal tender by means of the exchange rate between the given currency and bitcoin, instead of measuring the value of goods and services directly. Actually, the majority of those who also accept bitcoin for their services record their prices in one of the legal tenders, then convert such prices into bitcoins. Moreover, in most cases, the revenue they receive in bitcoin is immediately converted into legal tender, thus reducing exchange risk.[73] In addition, as we have already mentioned when discussing bitcoin as a means of exchange, *the low level of acceptance* and the high *volatility* of exchange rates and the actual purchasing power are the factors which prevent the spreading of bitcoin as a unit of account.[74]

Exchange rates available in different bitcoin markets can differ from each other, which may turn the informative character of bitcoin relative. As a result, it may be harder for bitcoin to function as a unit of account. Another question is whether bitcoin's functions as a means of exchange and a unit of account can be separated. Would the situation be realistically sustainable if bitcoin functioned as a means of exchange and the legal tender as a unit of account or vice versa? According to *László* and *Antal* it is possible that certain instruments or goods serve only as units of account (*numeraire*). At the same time, if the unit of account is not the unit of the means of exchange, unnecessary transaction costs may arise, as, on the one hand, the value of the amount of means of exchange subject to the contract has to be given in units of account, and, on the other hand, if the unit of account is rarely involved in swaps, different purchase and selling price offers in means

71 Bánfi–Hagelmayer (1989), p. 102
72 Bánfi (1999), p. 16
73 EBA (2014), p. 17
74 ECB (2015), p. 24

of exchange may apply to it, which may overcomplicate account, the collection of information and the conclusion of the contract.[75] On the one hand, a similar "task-sharing" can have obvious disadvantages, on the other hand, bitcoin would definitively play a "secondary role". Despite the possibilities described above, we will see what the future holds.

In our opinion, for the time being, bitcoin is not functioning as a unit of account ("Statement V").[76]

4.3 Bitcoin as a world currency

The world currency can have two basic roles: on the one hand, it can function as a *reserve currency* (taking over the previous role of gold). On the other hand, it can be a *key currency* (in relation to which the value/exchange rate of the currency issued by a given country is given). Several governments and international organisations keep their currency reserves in reserve currency. International trading usually takes place in this currency, its exchange rate remains constant for a longer time.[77] Based on the definition above, it can be stated without any detailed analysis that bitcoin is apparently not able to fulfil this function at the moment; there is no available data showing that any governmental or international organisation has started accumulating bitcoin reserves.

In connection with bitcoin, we would like to emphasise again that it is a relatively unregulated, decentralised virtual currency without monetary political control. Its exchange rate is extremely volatile, its general acceptance level and the volume of bitcoin transactions is relatively limited. In spite of this, regarding its cross-border character, ***we believe that bitcoin is a world currency in general ("Statement VI").*** However, we would like to stress our opinion is not based on the rigid approach of the current textbook dogmatics, which describes the existing situation, in which the American dollar (USD) is the dominant world currency, and other currencies also take part in international payment in a limited manner or are part of certain countries' currency reserves. We would rather describe bitcoin's relationship with national currencies, local currencies, early commodity and precious metal currencies. Hopefully, the future will decide to what extent the appearance of bitcoin and other cryptocurrencies will influence the currently prevailing monetary theoretical approaches and the way textbook see the theme.

75 László–Antal (1998), p. 218
76 Cf. IMF (2016), p. 14
77 http://ecopedia.hu/tartalekvaluta (downloaded: 03/12/2017).

4.4 Bitcoin in relation to commodity money and modern money

Bitcoin is in a unique situation: similarly to gold, it is a mine product with limited quantity (in principle). However, other features of bitcoin seems to be more advantageous than those of gold. Such features include its easy - even cross-border - portability, divisibility, homogeneity and, if we exaggerate a bit, its recognisability as opposed to coins with suspicious appearance or weight which are hard to identify. At the same time, if we think of the "heyday of gold", bitcoin is still less accepted. As far as its durability is concerned, it cannot be compared to gold either. Furthermore, bitcoin is too vulnerable to the technology behind it. The most important thing is that bitcoin has no intrinsic value, which brings it closer to money substitutes or modern money at first sight. On the other hand, it is obvious that regarding its origin and form, bitcoin fails to fulfil the criteria of modern money, nor does it belong to monetary aggregates. Modern money is so-called *fiat money*. The Latin word *fiat* refers to the fact that the national currency is selected as the compulsory legitimate payment instrument by the sovereign central power. The quantity and the external exchange rate of modern money, as well as the permanence of its value depend on the financial policy of monetary authorities (the treasury and the central bank).[78]

On the contrary, to the best of our knowledge, bitcoin has not been recognised as a legal tender by any states to date, which, on the one hand, means that it is used exclusively on the basis of the agreement of the parties and not pursuant to the law, and, on the other hand the following criteria are not fulfilled:

a) *compulsory acceptance* - the claimant of a given payment liability (the creditor) shall not refuse payment in the legal tender of the given country unless the parties agreed on other method of payment;

b) *acceptance at full face value* – the monetary value of the given means of payment is the same as the value indicated on it;

c) *opportunity for the debtor* - if the debtor pays his/her debt in the currency, *he/she will be released from payment obligations*.[79]

In could be the subject of a separate analysis (by modelling for example a closed bitcoin-based economy) if it is possible to live without credit nowadays, i.e. to use money that is not considered to be credit money at the same time. As *Becze* writes: "In the large organism that is called a state's economic life, money is considered to be the blood of the organism." or "The essence of credit is similar to oxygen, without which there is no life. Oxygen is carried throughout the organism by the haemoglobin of blood."[80]

78 Bod (2001), p. 63
79 EBA (2014), p. 13
80 Becze (1928), p. 1

Another question may arise: if the state considers a certain means of payment as money, is it really money in an economic sense? Although the followers of the so-called state theory of money may be of different opinion, we quote *Mises*, who believes that the answer to the question above is no: "The state may order anything to be a lawful means of payment (...) However, calling a thing legal tender is not enough to turn it into money in the economic sense"[81]. First of all, we may ask if today's modern money without intrinsic value can be considered as money at all. In the strict sense, based on the differences between the archaic commodity money with intrinsic value and today's modern money without intrinsic value, we could state that at the time when money with intrinsic value ceased to exist, money as an economic category ceased to exist, as well. Another quality, which would require a different theoretical approach and terminology, was born instead.[82]

In this treatise, we do not seek to question the monetary character of modern money, therefore we only refer back to the last paragraph of point 3.2 of the treatise, quoting *Polányi* again, regarding money as a system of symbols, complementing this idea with the acceptance of a textbook statement that had been born before the appearance of bitcoin. According to this statement, the fact that money is commodity or paper refers only to its materiality and not its content. On the other hand, even commodity money had a more general substance that was the same as the substance of paper money without intrinsic value: money expresses social relationship, and as such it is the category of commodity production economy.[83] In order to decide whether bitcoin can be considered to be a category expressing social relationship in the production economy or it has a broader meaning, we believe that it would be necessary to model a closed, bitcoin-based economy in which no legal tender occupies the space required for the development of bitcoin and the macro-processes related to bitcoin can be examined without any influences.

According to *Hayek*, in modern economy, money is rather a characteristic than an object, while the more a stock is exchangeable (liquid) or the more it can be made to be accepted by other, the more it is regarded as money. As far as the role of the state is concerned, *Hayek* puts it in a more definite manner than *Mises*. He argues that contracting parties should be allowed to conclude contracts in any currency, and the issue of money should be free, the monopoly of central banks should be abolished. Of course, it does not mean that "all money need be legal tender, nor even that all objects given by the law the attribute of legal tender need to be money. (...) But the superstition that it is necessary for the government (...) to declare what is to be money, as if it had created the money which could not exist

81 Mises, L. V. (1953): *The Theory of Money and Credit*. London, Jonathan Cape, p. 70 Quotes: László–Antal (1998), p. 213

82 Refers to the dilemma: Bánfi–Hagelmayer (1989), p. 14

83 ebd.

without it, probably originated in the naive belief that such a tool as money must have been 'invented' and given to us by some original inventor."[84]

Some sources analysing bitcoin and looking for its theoretical roots often refer to the works by economists such as *Hayek* and the previously quoted *Mises*, who belong to the so-called *Austrian school*.[85] For the sake of completeness, it should be noted that some economists criticised the views above, e.g. *Friedman, Schwartz* and *Fischer* clearly rejected the quoted assumptions by *Hayek*.[86]

5 AFTERWORD

The further spread of bitcoin as a means of exchange and means of payment is prevented by its limited prevalence; its high volatility and some questions related to the technology may raise doubts regarding its function as a store of value (means of accumulation). Compared with legal tenders, its somewhat secondary role disturbs its function as a measure of value (unit of account), therefore, in its current form, it can fulfil the basic functions of money only in a restricted manner. Furthermore, bitcoin does not embody any existing claims on any specific issuers, therefore it cannot be called credit money. Without being recognised by the state, it fails to fulfil the criteria for modern money which are currently considered to be governing.

At the same time, when compared with primitive commodity money and precious metal money, it performs very well even without intrinsic value, ***therefore we believe that bitcoin should be regarded as the first "prototype" of the modernised and decentralised version of the archaic form of commodity money that is really viable in international environment, as well ("Statement VII").*** Although bitcoin still has to improve a lot, its mere existence (paradoxically: "in its whole virtual existence") should urge the participants of the traditional monetary system to conduct self-examination and/or introduce reforms.

At this point, we declare that in our view referring to bitcoin as a decentralised virtual (crypto)currency is correct (see: ***"Statement I"***). In case an originally scep-

84 Hayek, F. (1990): *Denationalisation of Money* (3rd ed.). London, The Institute of Economic Affairs, pp. 36–39 Quotes: László–Antal (1998), p. 214

85 The popularity of *Hayek* in "crypto circles" is indicated by the fact that a virtual currency advertised to have gold cover, launched in June 2015 was called *HayekGold*: http://hayekgold.co/ (downloaded: 03/12/2017). Not only those who argue for bitcoin, but also those who are against the monetary character of it refer to *Mises*, especially to a statement in his so-called regression theory, according to which money is accepted because it represents a product associated with a certain level of purchasing power. Quotes: ECB (2012), p. 23

86 Friedman, M. – Schwartz, A. J. (1986): Has Government any Role in Money?, *Journal of Monetary Economics* 17(1), pp. 37–62 and Fischer, S. (1986): Friedman Versus Hayek on Private Money: Review Essay. *Journal of Monetary Economics* 17 (3), May, pp. 433–440 Quotes both: IMF (2016), p. 11

tical reader who has been following the topic and our treatise patiently enough so far protests and warns us that our conclusion is incorrect especially owing to the (non-)fulfilment of measure of value (unit of account) function and has several logical flaws, as well, we will refer to our reservation of right (related to the accurate meaning of the word *virtual*) mentioned in the penultimate paragraph of point 3.3.4 of the treatise. We would like to add the following:

The English word *"virtual"* also has several meanings. Some dictionaries mention "*actual, genuine, real, proper, substantive*" in the first place.[87] *"Virtuális"*, a Hungarian word of Latin origin has similar meaning to its English counterpart: depending on the context, it can mean *"possible"* or "*inherent"*, as well.[88] The majority of the sources we quoted - irrespective of having no reference to this fact - use the word *virtual* in a sense that is the most widespread in the common language ("*seeming*, *unreal"*, as the opposite of *"traditional"* or *"real"*), therefore we also relied on this approach. In our view, the virtual character of bitcoin can be expressed the best by using one of the bit provocative synonyms such as *"actual, genuine, real, proper, and substantive"*, but in any case, by using the terms *"inherent"* and *"possible"*.

In our opinion, referring to bitcoin as virtual money is appropriate. However, we should not refer to its virtual role compared to modern money as real money, but to the opposite: we should accept the potential *inherent in bitcoin* (and in cryptocurrencies in general), which revives the main attributes of ancient commodity money and – excluding the features deriving from intrinsic value - of precious metal money. In favourable circumstances, this potential could make bitcoin (and other cryptocurrencies of the future) ***suitable for competition against modern money and becoming an alternative for it, representing a possible new stage of development of money ("Statement VIII").***

Of course, it is tempting to examine bitcoin with a basically risk-seeking and risk-analysing approach, intending to explore possible regulatory trends. In the light of the global economic and financial crisis that broke out in September 2008 and the role of the (international) monetary system in the development of this crisis, we may consider all kinds of unregulated *financial innovation*[89] as suspicious. Our distrust becomes even more intense when we hear news about bitcoin being a

87 Országh–Magay (1998), p. 1692

88 The Hungarian language borrowed the world *virtual* from the French word *virtuel* ('able to exert force, but out of operation') through German, by adding a Latin suffix. It derives from the Latin word *virtus*. In: Tótfalusi (2005), p. 952

89 From a different point of view, it could be an argument for bitcoin that it has been declared to be a decentralised, virtual currency. Bitcoin is not hidden behind the implicit or explicit support of regulators. It is enough to think of the "CDO"s leading to the securitisation of ambiguous loan portfolios and other "magic words" which have become notorious since the 2008 crisis, as they were able to rock the foundation of the global financial system.

"financial bubble", which can be related to various illegal activities, certain forms of (organised) crime and terrorism, as well. Some people use bitcoins in activities similar to pyramid schemes. However, we should note that looking back at the history of money in this respect, we can see that other forms of money were often used/are often used for speculation and other illegal purposes.

Despite being careful, we believe that bitcoin is much more than what its seemingly illegal purposes or risks arising from its infant technology suggest. Several positive solutions, which could be subject to further analysis are related to bitcoin. In addition, we would like to emphasise that in our opinion, the general approach of monetary theory might take us the closest to the immanent cognition of bitcoin (and cryptocurrencies in general). The detailed identification of risks[90] and the thorough consideration of various regulatory aspects, which are undoubtedly essential for getting a comprehensive, genuine picture of the topic, could be only the next step of the analysis. [91]

As far as other aspects of the topic are concerned, without aiming to give an extensive list, we would like to refer to the fact that both the related *mathematical and IT (cryptographic) features* and the challenges *the legal/regulatory side* has to face (including elements of public law, e.g. criminal law or financial law, as well as private law, in particular civil law) might be exciting for researchers dealing with the theme. Furthermore, a more extensive economic analysis could also be interesting: in addition to examining the markets of certain bitcoin products and services from a *microeconomic point of view,* it could be exciting to model from a macroeconomic (monetary) point of view how a closed, bitcoin-based economy could grow, how the aggregated (monetary) supply/demand relations would change, what could happen in the short and in the long run to the value of bitcoin and savings in bitcoin, what kind of possibilities would there be available for intervention for the management of a lasting period of deflation, regarding that, in the case of cryptocurrencies, the whole conventional toolkit of state monetary policy is missing, etc. Taking a look the phenomenon from a distance, we should not ignore the message of the development and spread of cryptocurrencies, which projects the necessity of a *philosophical-political-sociological-cultural-anthropological analysis* of the reasons for social aversion to the sovereign power.

Finally, we would like to refer to our general statement made in the introduction: throughout history, it has occurred many times that the appearance of *financial innovation* fundamentally changed society's image of the character of money. The dematerialisation of (the form of) money is a modern invention and an extremely

90 The EBA material we have already referred to lists more than 70 "low-, medium- and high-level" risks related to virtual currencies: EBA (2014), p. 22

91 In the light of the above, we do not agree with *Knapp*, a representative of the state-theoretical approach, who claims that, as money is created by the state, the theory of money shall be explored by the history of law. Knapp, G. Fr. (1905): *Staatliche Theorie des Geldes*. Leipzig (4th ed., 1923). Quotes: Heller(1945), p. 341

controversial topic. According to *Almási*, we can directly talk about the "death" of "real" money: "Money has become a token. Token money is a mere metaphor: actually, money has become an electronic sign, a number that appears on the screen here and there." As a result, "money has lost all its original features. This metamorphosis, and the two-faced fictive/real money is the most important and most dangerous invention of new capitalism."[92] At the same time, according to *Toffler*, the most important feature of 21st century money is that it formally becomes information, the thing it originally was.[93] In this context, we refer back to *Polányi*, who wrote the following about paper money: "If paper money, which is regarded as a sign, 'symbolises' coins, in our understanding it symbolises a symbol itself, namely money. Symbols not only 'represent' something. Symbols are material, oral, visual or simply imaginary signs, which are involved in a given situation, thus acquiring a meaning."[94]

Undoubtedly, bitcoin is a kind of *innovation*, but it can also be regarded as a *symbol*, and not only *in the narrower sense, as monetary theory defines it* (a new form of *money* that organically evolved based on precedents in monetary theory, a new level in the dematerialisation process of (the form of) money, a new "twist" for money thinkers), *but in the broader sense, as well*, depending on the meaning the members of the Bitcoin community attribute to its existence. In the light of the above, in the eyes of users, bitcoin can symbolise *independence* from power, self-dependence or self-organisation itself (in a more radical sense, for users especially sensitive to cryptoanarchy, *"protest"* against the existing economic-political-power-financial system), *freedom* from the overregulation of the state, *quasi anonymity* under increasing governmental monitoring and supervision (appearance under a pseudonym) or "just" *belief* in continuous technological development, the imprint of the digital future on the present.

In conclusion, we would like to quote *László* and *Antal*'s earlier statements made in connection electronic money to prove the necessity and timeliness of similar monetary theoretical argumentations which can be found in this treatise. In this spirit, our interested readers are encouraged to make their comments related to this exciting and relevant topic: "... Is the change that is taking place around money really so radical that we should dispose of the extensive system of terms based on which we have been interpreting money for centuries? We do not think so. On the contrary, some radical changes, such as the evolvement of precious metal money, the abolishment of the gold standard or today's technical »revolution« prove that the functional approach to money is still relevant."[95]

92 Almási, Miklós (1995): Sundial in *Times Square* [Napóra a Times Square-en] Budapest, T-Twins. Quotes: Csontos–Király–László (1997), *Economic Review* [Közgazdasági Szemle], Vol., July–August, p. 577

93 Toffler, A. (1993): *Change of Regime* [Hatalomváltás] Budapest, Európa Könyvkiadó. Quotes: Csontos et. al. (1997), ebd.

94 Polányi (1976), p. 303

95 László–Antal (1998), p. 206

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