Wroclaw, January 17, 2023

ABSTRACT

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The Mechanism of Cryptocurrencies Creation using Blockchain Technology. The Case of Bitcoin.

Cryptocurrencies are a relatively new phenomenon in the online space, as the first one was created in 2009. It was Bitcoin (BTC), the legendary virtual currency invented by Satoshi Nakamoto. This is a pseudonym for the person or people who helped develop the special Bitcoin software and introduced the concept of cryptocurrency to the world. On the practical side, Bitcoin doesn't exist without Blockchain, as that technology builds its IT layer. It uses to store and transmit information about transactions made on the Internet. It should be mentioned that Blockchain on its own has unlimited applications outside the world of cryptocurrencies.

Bitcoin creation is carried out using high-performance computers that check millions of 64-element combinations per second by trial and error in search of the appropriate string known as a hash. Bitcoin mining is a complex computational and technological process of validating the BTC transactions over the Peer-to-Peer network. It is very energy-consuming because it is based on the specific consensus algorithm, so-called Proof of Work, which is a waste of electricity method of reaching an agreement on adding new blocks to the main chain by Bitcoin-miners and maintaining Blockchain integrity by network nodes. The immense power consumption causes a substantial ecological footprint by emitting carbon dioxide into the atmosphere, posing threats to the natural environment. The Bitcoin mining process also contributes to generating large amounts of electro-waste at the end of the mining rig's lifecycle. It is only fair to add that the term "Bitcoin-miner" is only a metaphor, as it refers to traditional miners who search for gold in the ground but has no relation to this profession.

Bitcoin, like other altcoins, is treated by mainstream economics and particularly by monetary policy as a private, contractual unit of account, not as money in the traditional sense. It is not a surrogate for money issued by the central bank and guaranteed by the state. Bitcoin does not fulfil all the functions of fiat money, with particular reference to safe haven and store of value. It is not legal tender in business, everyday transactions, cash or credit deals. It does not have universal and unlimited acceptability in purchasing-sale operations and settling obligations. Bitcoin is incapable of displacing fiat money from circulation and electronic payments, especially since monetary authorities in many countries are extensively working on the latest concept of Blockchain-based digital money issued by the central bank (Central Bank Digital Currency/CBDC). Nevertheless, it will be an innovative monetary policy tool that could soon revolutionize how central banks carry out their anti-inflationary mission.

As a matter of fact, Bitcoin is only a payment system, similar to systems such as PayPal, Dotpay, Skrill, Google Pay, Apple Pay, PayU or Tpay. Nakamoto explicitly confirmed it in his manifesto "Bitcoin: A Peer-to-Peer Electronic Cash System". Bitcoin should rather be regarded as a social innovation in private, decentralized financial settlements, operating with the consent of both parties to the transaction. BTC is a unique variation of digital barter, fulfilling the requirements of direct exchange in a commodity-for-commodity formula, which was characteristic of pre-money exchange in the early stages of trade development. In other words, Bitcoin should be treated as an IT curiosity and an experiment in non-monetary settlements on the ground of private finance outside officially functioning payment systems supervised by the state regulators.

In the broader socio-political context, Bitcoin, and indeed the entire cryptocurrency world, attempts to embody the libertarian philosophy, which proclaims the importance of personal freedom and the

radical idea of the free market in the modern economy without government interference. Moreover, Libertarianism advocates dismantling state institutions, including the abolition of the central bank as an independent monetary authority and its fiat money. Finally, it is worth noting that on the theoretical ground, the concept of Libertarianism as an extreme faction of modern liberalism is closest to the views of Murray Rothbard, an American follower of the Austrian School or in Poland to the approach of Mises Institute in Wroclaw.

The purpose of this study was to investigate the process of Bitcoin creation using Blockchain technology. Furthermore, the aim was to point out when mining can be profitable for cryptocurrency miners considering the BTC/USD exchange rate and the cost of electricity in different countries. The author's research carried out in that dissertation fills a cognitive gap in the issue of Bitcoin's creation, taking into account the cost-effectiveness calculation of its mining since, so far, only partial and incomplete studies in this field have been available. Furthermore, due to the complexity of the subject matter, the study is quite extensive, as in-depth research and analysis were conducted combined with a detailed discussion of the latest literature.

The structure of the study is typical. The doctoral thesis contains an introduction, five chapters and conclusions. The first chapter is devoted to Blockchain as a revolutionary solution in the form of a distributed cryptographically secured database. There were also showed the applications and uses of this new technology outside the world of cryptocurrencies, in various fields of social activity such as economy, culture and politics. Chapter two has presented the origins of cryptocurrencies, their characteristics and unique features with a particular focus on Bitcoin. This section of the dissertation has also outlined the endless process of creating new varieties of cryptocurrencies by private issuers. Chapter three presents the process of Bitcoin mining using high-performance computers. There was explained the role of electricity in this procedure. This chapter has analysed the economic profitability of Bitcoin mining. It has also been proven the impact of Bitcoin mining technology on the high-efficiency graphics cards market. The fourth chapter presents the concept of speculation and the mechanism of price bubble development. Selected examples of speculative bubbles so far in the history of the world economy were characterized. Furthermore, this section has depicted a comparative analysis of the price mania on Bitcoin with the classic scheme of the development and bursting of a speculative bubble, according to J. P. Rodrigue. The fifth, the final chapter has pointed out the commodity origins and nature of circulating money issued by central banks. As the pioneering cryptocurrency with the largest market capitalization, Bitcoin was negatively verified in terms of its ability to perform all the functions of traditional fiat money. Therefore, it has been treated as a modern form of barter exchange, not fiat money.

An econometric module as a subchapter was included in this final part of the study. There were built single-equation models and subjected to the statistical verification procedure. They were a valuable addition to the research and analysis. Calculations using Statistica 13, MS Excel 2016 and GRETL 2021c programs showed, among other things, that the Bitcoin exchange rate is not correlated with two key macroeconomic categories, namely with the inflation and the rate of change in Gross Domestic Product. The speculative nature of Bitcoin was confirmed by the significant correlation between the frequency of searches for the word "BITCOIN" on Google Trends and the valuation of BTC; when the Bitcoin exchange rate increased, it also increased the number of searches for this name on the web and vice versa. It had also been proven that there was a strong correlation between the rapid build-up of the Bitcoin price bubble and the considerable increase in the price of graphics cards from Nvidia and AMD. The powerful graphics cards of these companies were used to build Bitcoin rigs employed in mining the virtual currency BTC.

The in-depth analysis and the author's calculations in the dissertation have enabled summarizing the main research results and formulation of interesting and inspiring conclusions. The study has explicitly shown that Bitcoin mining practised by individual cryptocurrency miners was usually unprofitable due to increasing electricity prices, rising so-called difficulty index and Bitcoin's exchange rate volatility. It was proven in the dissertation that the entire Bitcoin network consumes vast amounts of electricity, often more than the electricity consumption by countries such as

Colombia, Chile and Austria. Moreover, one Bitcoin transaction consumes equal power energy equivalent for half a million VISA transactions.

The results revealed that the interest in cryptocurrencies like Bitcoin and altcoins would not be as dynamic as was commonly assumed. The statement is supported by the fact that the knowledge of cryptocurrencies among the younger generation is relatively low, as this is usually a group advocate who often uses various technological developments. The results indicated that cryptocurrencies are only profitable under favourable circumstances when someone is willing to accept them as a high-risk gamble. It could pay off, but there is also a strong chance the investor could lose all of his money. Bitcoin and other cryptocurrencies often make for high-risk, high-reward choices under conditions of the extremely high volatility of their valuation and speculative nature.