Czech University of Life Sciences Prague

Faculty of Economics and Management

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Bachelor Thesis

Alternative currencies based on blockchain technology as an alternative to traditional currencies

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Objectives of thesis

The main aim of the thesis is to analyze the current regulation of cryptocurrencies and to estimate its future regulation in terms of the current integration of this alternative currency in different countries. The second partial goal of the study is to show the advantages of cryptocurrencies such as bitcoin over traditional money and point out its disadvantages and risks.

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After the literature analysis and definition of terms, a case study will be conducted. Since our goal is to analyze the current regulation of cryptocurrencies and to estimate its future regulation in terms of the current integration of this alternative currency in different countries, countries that have already begun to regulate this currency and have allowed entrepreneurs to accept it as a means of payment will be analyzed. Those are Japan, Germany and China. It will analyze what motives these countries had for the introduction of bitcoin, and what steps were taken for this.

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Declaration

I declare that I have worked on my bachelor thesis titled "Alternative currencies based on blockchain technology as an alternative to traditional currencies" by myself and I have used only the sources mentioned at the end of the thesis. As the author of the bachelor thesis, I declare that the thesis does not break copyrights of any their person.

In Prague on 15.3.2021 _____

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Alternative currencies based on blockchain technology as an alternative to traditional currencies

Abstract

This work deals with cryptocurrencies as an alternative method of payment. Cryptocurrencies are a phenomenon of the last ten years, but in recent years they have become deeply known and part of everyday life.

The main aim of the thesis is to analyze the current regulation of cryptocurrencies and to estimate its future regulation in terms of the current integration of this alternative currency in different countries. The second partial goal of the study is to show the advantages of cryptocurrencies such as bitcoin over traditional money and point out its disadvantages and risks.

In this work, the main attributes of cryptocurrencies, their history of origin, essentials of cryptocurrencies, their advantages and disadvantages are analyzed. The practical part compares three countries in the context of legalization and work of cryptocurrencies: Germany, Japan and China. The main finding was that cryptocurrencies are regulated differently in these countries.

Keywords: AML regulation, Bitcoin, blockchain technology, blockchain, cryptocurrency, monetary policy.

Alternativní měny založené na technologii blockchain jako alternativa k tradičním měnám

Abstrakt

Tato práce se zabývá kryptoměnami jako alternativním způsobem platby. Kryptoměny jsou fenoménem posledních deseti let, ale v posledních letech se staly hluboce známými a součástí každodenního života.

Hlavním cílem práce je analyzovat současnou regulaci kryptoměn a odhadnout její budoucí regulaci z hlediska současné integrace této alternativní měny v různých zemích. Druhým dílčím cílem studie je ukázat výhody kryptoměn, jako je bitcoin, oproti tradičním penězům a poukázat na jejich nevýhody a rizika.

V této práci jsou analyzovány hlavní atributy kryptoměn, jejich historie vzniku, základy kryptoměn, jejich výhody a nevýhody. Praktická část porovnává tři země v kontextu legalizace a fungování kryptoměn: Německo, Japonsko a Čína. Hlavním zjištěním bylo, že kryptoměny jsou v těchto zemích regulovány odlišně.

Klíčová slova: Bitcoin, blockchain technologie, blockchain, kryptoměna, měnová politika, regulace AML.

Table of content

List of figures

List of tables

1 Introduction

Due to the growing digitization across various sectors that is occurring today, relatively new digital currencies - cryptocurrencies - are also gaining in importance. The oldest and best-known representative of the cryptocurrency market is Bitcoin, which originated as an electronic payment system, but unlike the monetary system that currently exists, the foundations of its operation are based on algorithms and mathematics. In addition, in 2017, Bitcoin was recognized as a legal means of payment in Japan (Zenmarket, 2020), designated as an intangible asset similar to money by the French Commercial Court, or has been considered private money in Germany for some time (CNBC.com, 2020). On the contrary, there are also countries such as Algeria or Macedonia, in which Bitcoin is considered illegal, currently it is a relatively current and discussed issue in which various countries or specific entities express somewhat fragmented views and it is possible to observe very different approaches to the reception and regulation of cryptocurrencies worldwide. (Library of Congress, 2020)

Therefore, this thesis maps the development of this phenomenon from its inception to the present day and thus provides the reader with an introduction to the functioning of this system, while also providing some comparison of both these systems. The theoretical part defines the concept of money, its origin and brief development, also characterizes three basic functions that money as a payment should fulfill the means. The second chapter further defines what cryptocurrencies are and describes their origin and creation, the space is mainly devoted to the cryptocurrency Bitcoin, which with its market capitalization occupies the largest market share, it also explains the principle on which new bitcoins are created.

The practical part is a case study that represents three countries which have legalized bitcoin as a regulated currency. Basing on this case study there will be an estimation on how and under which conditions crypto currencies can be accepted as alternative currency.

Cryptocurrencies are a part of one electronic payment system that has different characteristics from the current monetary system. It is not so long since cryptocurrencies emerged, so their development is at an early stage compared to the monetary system, but if

it continues at the same pace, in theory, cryptocurrencies could become in competition with the current system.

Due to the relatively short development of cryptocurrencies, the work hypothesizes that this system is not yet sufficiently developed to become an alternative to the monetary system in its current form. For this reason, it can be assumed that the cryptocurrency system does not yet fulfill all the functions it would perform if cryptocurrencies were accepted as a standard means of payment.

2 Objectives and Methodology

2.1 Objectives

Now we are approaching a new era, when technologies reach a new level and again lead to a radical change in money. Thanks to cryptocurrency, people can resist the financial policies of states that want to control them. It can help countries like Venezuela, Syria, etc. where the actions of the authorities have led to the impossibility of normally running out of money.

The main aim of the thesis is to analyze the current regulation of cryptocurrencies and to estimate its future regulation in terms of the current integration of this alternative currency in different countries. The second partial goal of the study is to show the advantages of cryptocurrencies such as bitcoin over traditional money and point out its disadvantages and risks.

2.2 Methodology of the thesis

In this literature review I'll interpret of using blockchain technology for transactions. Literature review will include studying of the books and articles focused on the cryptocurrencies as means of payment. Nowadays there is a lot of sources that describe and specify the essence of bitcoin as alternative means of payment. But for this thesis I have primarily chosen following authors and sources: "BlockChain Technology: Beyond Bitcoin" by Crosby M., Nachiappan P., Pattanayak, Verma S. and V. Kalyanaraman. In this article authors describes concept of work blockchain technology and some specific applications in financial and non-financial sectors. But before describing the theory of cryptocurrencies, it is necessary to study the essence of money. For this, textbooks will be used, including a book Hetzel, R., & Mehra, Y. *The Behavior of Money Demand in the 1980s. Journal of Money, Credit and Banking.* It includes theories of money aggregates. Further, articles from academic resources will be used, for example, Jstor and Web of Science.

Since cryptocurrency is associated with the risk of anonymity, it is also necessary to talk about the risks associated with bitcoins. The risks of cryptocurrencies and their consequences are described in the book of Schwarz C. D., Manheim, D. et al. (2019).

Terrorist Use of Cryptocurrencies: Technical and Organizational Barriers and Future Threats. Further, the work will describe how the field of blockchain and cryptocurrency developed. The history of blockchain development is described in the book of Swammy, S. & Thompson, R., 2018: *Crypto uncovered: the evolution of bitcoin and the crypto currency marketplace.*

After the literature analysis and definition of terms, a case study will be conducted. Since our goal is to analyze the current regulation of cryptocurrencies and to estimate its future regulation in terms of the current integration of this alternative currency in different countries, countries that have already begun to regulate this currency and have allowed entrepreneurs to accept it as a means of payment will be analyzed. Those are Japan, Germany and China. It will analyze what motives these countries had for the introduction of bitcoin, and what steps were taken for this.

Further, with the help of synthesis, a prospective analysis will be carried out, and the prospects for the development of cryptocurrencies as an alternative payment service will be described.

3 Definition of money

When talking about alternative payment methods in the form of cryptocurrencies, first of all, it is necessary to talk about traditional money and its essence. Therefore, the first chapter will be devoted to money, its regulation and their circulation in the economy.

The theoretical definition explains the concept of money as an asset that serves as medium of exchange. According to Ieee Spectrum (2012), it has three functions:

- store of value, which means that money allows deferring consumption until a later date,
- unit of account, as it allows assigning a value to different goods without need to compare them.
- medium of exchange—an easy and efficient way to trade goods and services with one another.

This asset had various forms during modern civilization. Today's economies are based on so-called fiat money, by this term we mean money with forced circulation not covered with precious metals. Although money cannot be exchanged for gold or other precious metals with a fixed weight, as was the case in gold. standard, it is now possible to buy precious metals for them at market prices. With the abolition of the gold standard, the issuance of money became completely independent of the availability and mining of precious metals.

Based on the degree of liquidity, it is possible to divide the form of money into so-called monetary aggregates, according the division below (Hetzel, Mehra, 1989, pp. 455-463):

- M1 = cash in circulation + current account deposits with banks,
- M2 = M1 + savings deposits in banks + term deposits in banks,
- M3 = M2 + euro currency deposits in domestic banks,
- M4 = M3 + deposits in non-banking institutions on domestic market + short-term securities on domestic market,
- M5 = M4 + other securities in DM.

If the above aggregates show that today's money does not only take the form of banknotes and coins, but also entries in bank accounts or securities. The share of cash circulation, i.e. banknotes and coins, occupies only a small percentage in the entire system; the creation of new money takes place primarily through the provision of bank loans, not e.g. printing banknotes.

The definition of monetary aggregates is important especially for monetary policy and the associated regulation of money in circulation, the content of individual aggregates may differ depending on the central bank instruments used in individual countries, however, the above classification is sufficient as a general overview.

Because money is not covered by precious metals or other commodities, its value depends primarily on people's trust in the central bank and its activities, which maintain the stable value of money. If the central bank failed to achieve its goal - by the Czech Republic, according to the Constitution of the Czech Republic and the Act on the Czech National Bank, we mean the care for price stability – money would gradually lose all its functions, and people would be forced to look for alternatives.

3.1 Creation of new money

One of the basic functions of the Central Banks is the emittance of cash. It is erroneously stated that the Central Bank has a monopoly on the issuance of money in general, so it should be emphasized that the Central Bank's monopoly on money emittance only concerns currency, which implies that the Central Bank is the only bank in the country allowed to issue cash (banknotes) and coins and also creating electronic money and multiplying money in the Economy of the country.

Money also arises from the activities of commercial banks, which, although they cannot issue banknotes and coins, create new money through the bank loans they provide. Money is generated in such a way that a bank credits a certain amount to a client's account without at the same time debiting the same amount from another client's account.

When providing a loan, banks do not have to dispose of deposits from other clients, thus crediting the provided loan to the client's current account increases the money supply in bank accounts. Central Banks are guarantors of this process. With the tools of monetary and fiscal policy, they influence economic activity, thus influencing the creation of loans provided to households and companies, and at the same time, by setting rules and limits.

They ensure control over the entire monetary system. Central banks play an important role as lenders of last resort. This means that in the event that commercial banks face liquidity and solvency problems and jeopardize the stability of the overall national monetary system, the central bank may provide a rescue loan to the commercial bank (Berger, 2019).

This money multiplication is limited to the amount of money in the economy that cannot be used by banks for lending. This money is represented by required minimal reserves that commercial banks keep in the central bank as deposits. This money cannot be lent to the clients of banks and it is kept in order to guarantee liquidity and solvency from the commercial bank in case that something goes wrong (Berger, 2019).

In fact, with this approach, commercial banks are financial intermediaries who can use for active operations deposit of bank clients. In addition, commercial banks can borrow from each other at very favorable interest rates (interbank interest rate for loans of the banks). And this money can be used for further loans to the clients. One of the options is that commercial banks borrow money from the Central Bank. It also depends on the monetary policy of the Central bank, particularly if it promotes restrictive or expansionary policies (Gangopadhyay, 2008).

Monetary policy with this approach is based on:

- direct limitation of the monetary base that the Central Bank creates. Assuming a relatively stable multiplier, the central bank can influence banks' creation of additional money supply and thus inflation.
- indirect influence on the multiplier itself. The central bank can set the required reserve ratios, thus affecting the availability of funds for lending banks.

3.2 Brief history of money turnover

The concept of money has existed since the beginning of human civilization. Money allows us to trade what we have for what we want or need. The form of money has changed over the years and consisted of all sorts of possible forms. This chapter briefly illustrates the development from the livestock exchange to the almost cashless economy of today. Although the various modes of exchange are divided into smaller subchapters, they did not always take place separately, as indicated, in fact they intermingled.

Barter

About 3500 BC. transactions took place between people through exchanges of various commodities, whether in the form of livestock, salt, grain, or in Africa, China and India in the form of shells, canvases or even slaves, everything was exchanged that people agreed to have some value for them. However, the exchange in kind was very inefficient and complicated due to high transaction costs, so other, faster and easier ways were sought (Time, 2020).

Metal coins

The beginning of money, in the form of coins made of precious metals, can be dated to about the 7th century BC. n. l., they probably appeared on the territory of today's Turkey, in the Lydian Empire. They were called dumps, small lumps of a mixture of gold and silver. Unlike exchanging items, they brought a number of benefits, were easily divisible, but still did not lose their value. However, it should be mentioned that gold was not available in all areas, e.g. in Europe, after the fall of the Roman Empire until the turn of the 1st and 2nd millennia, it was paid for imported goods by the already mentioned slaves.

Paper money

In the second century, the Chinese issued the first leather banknote, which was made of the skin of a rare white deer. Paper notes appeared in the 7th century during the Tang Dynasty but became more widely used later. In 1290, the European explorer Marco Polo was overwhelmed by the Chinese paper currency during his travels, and some historians attribute it to him that he introduced paper money to Europeans.

The first banknote was published by Stockholm Banco in 1661. The banknotes could be exchanged for silver coins in the bank. In a meanwhile, the Sweden bank has issued more banknotes that exceeded the amount of silver in the Bank, and that was the reason why it went bankrupt (Allen, 2009).

Gold standards

The gold standard was an innovative concept that combined the best aspects of paper money with aspects of coins. It allowed central banks to make money, but it was covered in precious metals. In 1844, it was decided by the Bank Charter Act in England that banknotes issued by the Bank of England must be fully covered by gold. This act meant the introduction of a complete gold standard for the British currency. Later, in 1879,

gold became the official standard of value in the United States. In 1933, as a result of the Great Depression, the United States abandoned the gold standard, allowing the government to pump money into the economy and stimulate its recovery. After the Second World War, within the Bretton Woods monetary system, only the dollar to which other currencies were pegged was covered with gold, but in 1971 this system completely disappeared (Jílek, 2013).

Credit cards

The first credit card was created in 1946, introduced by John Biggins, allowing merchants to send receipts to the bank, which then charged customers who used the card. A few years later, in 1958, she introduced her Bank of America credit card, a revolving credit card. However, federal regulations limited its application to the state of California. In 1970, the magnetic stripe on the payment cards was improved, at the same time the first ATM to read the magnetic strips was put into operation and which was already permanently connected to the banking information system (Time, 2020).

Electronic money

In 1990, chip technology was introduced, which made it possible to store a large amount of information and carry out verification processes directly at points of sale. Mastercard has also developed a system to enable global operation of smart cards. The emergence of the Internet became the birth of online shopping, and in 1997 European banks began offering primitive versions of mobile banking for the then-smartphones. The establishment of PayPal in 1998 in California enabled its users to use the Internet to make payments and transfer money.

Currently, around 180 different currencies are used worldwide, with the five most traded being the US dollar, the euro, the British pound, the Japanese yen and the Australian dollar (Fxssi.com, 2020). According to Leonhardi (2019), only 8 % of this amount represents cash in circulation, ie. banknotes and coins.

3.3 Money from the point of view of selected economic schools

This chapter presents the views of the main representatives of two selected schools of economics – Austrian and Keynesian. With regard to the topic of the work, issues that

are directly related to the topic of the work were selected within these economic directions, especially their view of money and subjects operating in the monetary system.

3.3.1 Austrian School of Economics

The Austrian school was founded in the second half of the 19th century and was inspired by the work The Fundamentals of Carl Menger's Economics in 1871, but only by his followers Eugen von Böhm-Bawerk and Friedrich von Wieser. Friedrich August von Hayek and Ludwig von Mises are among the best-known representatives of the Austrian school (Fraser Institute, 2020).

One of the cornerstones of the Austrian school is the monetary theory of the business cycle. The theory suggests that the occurrence of business cycles and imbalances in the economy is not a natural phenomenon, but can be caused by money, and especially by bank loans. The expansion of bank loans spreading through the banking system keeps interest rates artificially below the free market rate, which sends a false signal to productive segments of the economy; according to Mises (2019), false signals result in poor investment. The only way in which the economy should cut interest rates is to increase savings, then companies would have more money to finance their investments. According this theory, if the Central Bank begins to stimulate the economy and artificially lower interest rates, it will motivate companies to finance long-term investments, despite the fact that there has been no increase in savings, which distorts their interim preferences. Poor investment and over-consumption in the economy are resulting in an economic boom followed by a crisis. Mises finds the causes of economic cycles clearly in the monetary policy of the central bank (Oppers, 2002).

Hayek suggests neutral money as one possible solution to this problem, which should have no effect on relative prices or interest rates. However, he himself later concluded that no real money could achieve such characteristics

In addition to “concerns about the credit expansion of commercial banks under the auspices of the central bank as a 'lender of last resort,” another feature of the Austrian school is the fear of government intervention and a budget deficit. At the end of his work, Hayek proposes the abolition of the government's monetary monopoly, which should prevent recurring waves of depression and unemployment. He finds the cause of repeated crises in government interventions. It suggests the possibility of competition in the currency market, which could ultimately lead to an offer of better money than has ever

been produced by the government in history. According to Hayek, competition between currencies will “lead to the discovery of today's unknown possibilities in the monetary field” (Oppers, 2002).

In the 19th and early 20th centuries, the world's most successful currencies were exchangeable for fixed amounts of gold or other precious metals. Oppers (2002) formulated an argument called the money regression theorem, which says that people accept a medium of exchange only if they see that it has some value and can indeed be exchanged for other things. The only way to find out is to see if this tool has been used in a previous period of time. This sequence can be observed up to the first degree, in which a certain type of money was used as a medium of exchange, and in order to be accepted by the first recipients, it must have a value independent of its use as a medium of exchange, in other words, it is a commodity.

3.3.2 Keynesianism

The origins of Keynesianism can be dated to the Great Depression. This school of economics is named after its main representative, John Maynard Keynes, who in his book The General Theory of Employment, Interest and Money of 1936 presented his main ideas on which this line of thought is based. Representatives of this school are proponents of state intervention in the economy (Sarwart, 2014).

The Keynesian view of economic cycles is basically that fluctuations are caused by changes in aggregate demand. When aggregate demand falls, producers are unable to produce as much as before and must adapt in the short term. However, adjustment by reducing production costs is difficult, mainly because wages are rigid downwards. Producers are therefore forced to reduce the number of their employees rather than reduce their wages, which is reflected in higher unemployment. If fewer people work, spending will also fall, resulting in even greater changes in aggregate demand. The Keynesian model says that if the unemployment rate is higher than the natural rate of unemployment, a change in fiscal and monetary policy can help reduce economic fluctuations. The natural unemployment rate is the lowest unemployment rate achievable in the economy. The relationship between unemployment and inflation is described by the Phillips curve, which suggests that there is an inverse relationship between the unemployment rate and inflation (Sarwart, 2014).

In his book The General Theory of Employment, Interest, and Money (1936), John Maynard Keynes developed the concept of liquidity preference. He argued that individuals prefer to hold liquid assets (money) over other income assets (e.g. securities). Keynes formulated three motives that affect liquidity demand, namely the transactional motive, due to the time mismatch between income and expenditure, the prudential motive, due to hedging against possible contingencies, and the speculative motive, which affects the demand for money based on current interest rates, if the interest rate is high, people tend to hold securities and vice versa, if the interest rate is low, they prefer to hold cash. This last motive is related to one of the functions of money, which Keynes emphasized, ie to serve as a store of value (Blinder, 2015).

3.4 Functions of money

With the gradual development of money, three basic functions have been formulated, which money, as a generally accepted means, fulfills them – the means of exchange, the accounting unit and the store of value. But the most important thing is that, with the help of money, central banks conduct monetary policy and regulate banking sector.

Means of exchange

The basic function that money, as a generally accepted asset, must fulfill is to serve as a medium of exchange. In this function, they facilitate the sale and purchase of goods or services between two parties and thus eliminate the inconvenience that could occur if the exchange of goods took place in a barter manner. People do not have to look for suitable counterparties for their exchange, and money reduces their transaction costs. For a currency as a medium of exchange, it is important that it represents a value standard that is accepted by all parties to the exchange. Money in the form of a medium of exchange should have a constant intrinsic value and stable purchasing power (Samuelson, 2009).

Entity

The use of money as a unit of account is a tool that can be used to measure the market value of goods, services, receivables and other assets or liabilities. The entity must be divisible, countable and interchangeable (Samuelson, 2009).

Value preserver

Another function that money should perform is to preserve value. In the past, people considered currency to be a relatively safe form of wealth and compared to money with risky assets such as stocks, money can be described as relatively risk-free. Today, from a long-term perspective, people prefer to hold their wealth more in the form of non-monetary assets, e.g. real estate or land, or have their money deposited in savings accounts. It is especially important for money in the form of savings to maintain their purchasing power, which is inversely proportional to changes in the price level. If the price level rises, the purchasing power of money decreases, and vice versa.

However, people usually keep part of their wealth in money, mainly due to their high liquidity and possibility of immediate use (Samuelson, 2009).

4 Cryptocurrencies

The term cryptocurrency is a term for one of the types of digital currencies. It is difficult to define this term to include all the properties that can be found in individual cryptocurrencies. However, it is possible to define at least some basic properties that are common to all cryptocurrencies, ie they are purely digital, decentralized and use cryptographic principles to confirm transactions. Cryptocurrency transactions are irreversible, pseudo-anonymous, usually cheap and fast (Turpin, 2014).

Thus, the term cryptocurrency can be understood as a designation for a payment system in which there is no central authority acting as an intermediary needed to confirm the transaction. This is done with the help of data encryption, which on the one hand enables decentralization of the system, and at the same time ensures anonymity and security of transactions. The system is purely digital, which means, among other things, that the coins created in this system are intangible and exist only in electronic form.

Attempts to introduce digital currencies have taken place earlier – before the emergence of cryptocurrencies, they are described in more detail in the following chapter (European parliament, 2018).

4.1 Development of cryptocurrencies

The first attempts to create digital currencies took place in the second half of the 20th century. Many cryptographers and economists have tried to create digital money, but most attempts have not been very successful.

The first concept of digital currency, which outlined a system of anonymous transactions, appeared as early as 1982, and eight years later the first major digital currency was created, called e-cash, and its author was cryptographer David Chaum. Since then, several academic papers have been published by other cryptographers that have sought to improve the security and efficiency of digital currencies. Soon other currencies began to appear, some of them already very similar to Bitcoin, e.g. CyberCoin, Visa Cash, Liberty Dollar, E-gold and others. However, the lack of decentralization, transparency and security eventually led to the cessation of all these attempts (Nasdaq, 2018).

The beginning of cryptocurrencies can be dated to 2009, when the first of them was created – Bitcoin, with its high market capitalization currently occupies a dominant

position in the market. It was not long before other cryptocurrencies began to appear, and since most of them are very similar to Bitcoin, they are called altcoins. Around 2014, they began to gain in popularity together with Bitcoin. At the time of writing, there are more than five thousand of these alternative currencies; the current overview can be found, for example, on the Coinmarketcap website. Many of these alternatives are not worth much attention, but a separate chapter is devoted to the most well-known ones (Nasdaq, 2018).

4.2 Bitcoin as one of the first World-known cryptocurrencies

Bitcoin was first introduced to general public in October 2008 through the article "Bitcoin: A Peer-to-Peer Electronic Cash System". The author of the White Paper is an anonymous developer known by the pseudonym Satoshi Nakamato. Whether it is one person, a man or a woman, or a group of people is still not known exactly, it should be noted that the complete secrecy of the author's identity is rather an advantage for Bitcoin (Popper, 2015). Although this person's identity has been 'traced' several times, all speculation has always been refuted.

In the Nakamato article, Bitcoin is presented as an electronic monetary system that is completely decentralized, which means that it is not dependent on any central authority. A system in which transactions are verified by cryptographic evidence, so that together, any two parties can enter into a transaction directly with each other without the need for a trusted third party (Antonopoulos, 2015). There is a theory that Nakamoto created Bitcoin in response to the global financial crisis in 2008 (Bustillos, 2013). Nakamoto offers a solution to the double-spending problem, which was also the reason for the failure of some previously introduced digital currencies. It is basically a duplication of your own money, which can then be paid twice. The problem of double spending was standardly solved through a trusted third party.

Nakamoto solves it using a peer-to-peer (client-client) distributed server, which generates computational evidence of the chronological order of transactions (free translation, Nakamato, 2008).

About two months after the publication of the White Paper and the publication of the open-source code, the first, so-called genesis, block was mined on January 3, 2009, and the first 50 bitcoins were created with it (Antonopoulos, 2015). It was the author of this system himself who launched the network and demonstrated to his observers how the

whole system works. Thus, new coins are created through a process called mining, which is described in more detail in the following chapter. At present, it is already possible to buy bitcoins on several online exchanges, and users then have them stored in their software or hardware wallets. To receive or send bitcoins, the wallet generates addresses and the user also has a private key, which is used to confirm bitcoin transactions.

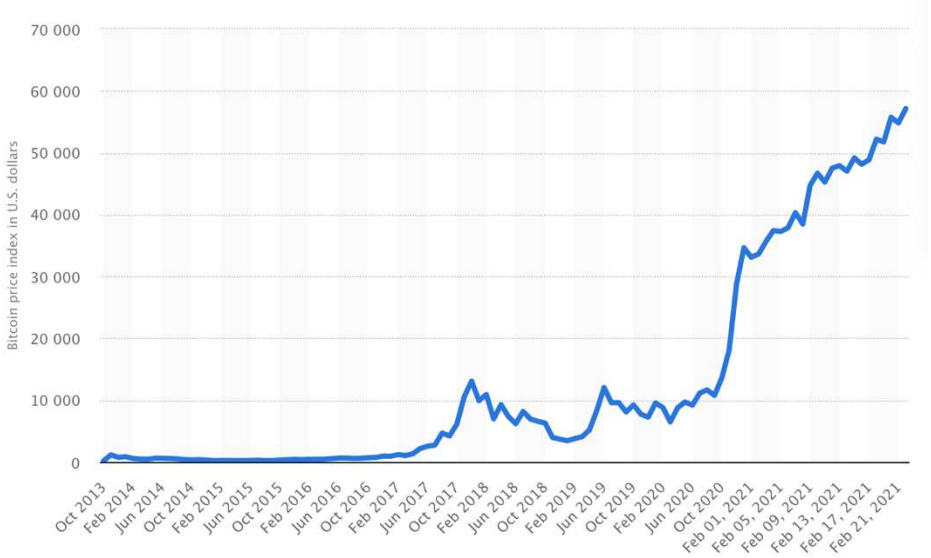
4.3 The risks and opportunities of cryptocurrencies

Crypto currencies are a very risky instrument, just like blockchain technology itself. Therefore, it is necessary in this thesis to analyze the risks of cryptocurrencies, and then judge the need to regulate them, as well as predict the reality that these instruments will become an alternative currency.

Risk 1: Volatility of price

Chart 1 shows the development of the bitcoin price from 2013 to 2021. The rise in the price of bitcoin was several dozen times, which made this asset a speculative instrument.

Figure 1 Price of bitcoin 2013-2021 (USD)



Source: Statista.com, 2021

When there is such volatility of an asset, investors see a room for great profit. This is the reason of high risk for inexperienced market participants which have no experience in speculating activities with highly volatile instruments. Digital coins can be a tool for generating high returns, but only in the hands of experienced investors. It should also be

noted that, unlike securities that have a specific issuer, bitcoin and other cryptocurrencies have no guarantees. Bitcoin has no other value than a speculative price. At the same time, there are many market actors in the cryptocurrency market who regulate the price of bitcoin by investing large amounts of funds in this currency. The cryptocurrency market is therefore unstable, as it is at the stage of formation. It requires specialized knowledge and skills that are often incomprehensible to beginners. While high volatility may seem attractive to investment, there are numerous risks in this entirely new area.

As known from the text above, bitcoin is limited in emission, and, like any other limited resource, with a decrease in the number of bitcoins, the unit cost of each next one increases. This causes some speculative interest among people who invest in cryptocurrencies in order to profit from changes in the rate of these currencies. Indeed, the value of bitcoin has been steadily growing in recent years. However, unlike other investment instruments, the value of cryptocurrencies is impossible to predict. Bitcoin is not tied to national currencies, or to other assets that can be valued and capitalized. No one guarantees the par value, which, in the case of other investment instruments, is tied to the sum of the assets of the issuing company or to its debt obligations. There is no guarantee of the reverse sale of cryptocurrencies, that is, a guaranteed sale by the state or the issuer in the event of a collapse of the financial or investment market. There is virtually no leverage to regulate and control the speculative risk of the bitcoin owner. There is an interest based on excitement and belief in a parallel future of blockchain.

But volatility can be an opportunity as well. Since risks in short-term investments are connected with higher profit from assets or investment instruments, people can earn money on cryptocurrencies by trading with them. Nevertheless, every investor should understand that cryptocurrencies are an unprotected asset that changes its value solely based on the market situation.

Risk 2: Anonymity

Cryptocurrencies are in fact anonymous instruments. Of course, it is possible to trace the emergence of cryptocurrencies, including all transactions with them, but by the word "trace" we mean precisely to find a kind of “cryptotrace”, and not the real owner of the cryptocurrency. It is quite difficult to associate crypto traces with a specific person

without his initiative, but in practice it is almost impossible. This phenomenon is called “pseudonymity”.

In this case, Bitcoin is a lot like cash, which is anonymous and, in fact, created for any kind of anonymous transactions. Cryptocurrencies open up completely new possibilities for anonymizing payments, which, unlike cash, can be made remotely. If we look at such prospects from the point of view of the possibility of money laundering or the financing of terrorism, then this is a huge unregulated sphere of activity, opportunities and prospects, we admit, are not entirely pleasant for any legal country and the international community.

But also the anonymity of cryptocurrencies can be viewed from the side of their opportunity. Of course, this is not a benefit for governments, but for people who want to remain anonymous in monetary transactions. Especially if the funds were obtained illegally or from illegal activities. Therefore, cryptocurrencies are currently heavily regulated by the AML law, including companies that operate with cryptocurrencies must verify the source of funds of a person who invests in cryptocurrencies.

Risk 3: Tougher regulation on cryptocurrencies, which can cancel all opportunities

Cryptocurrencies are a complex instrument in the context of regulation and legal support. At the moment, European states do not have a single mechanism for regulating and maintaining the cryptocurrency market. There is also no technical base that would recognize the crypto traces of users and the blockchain protocol. There are just few specialists who would understand this area at the professional level and would be able to create a unified legal base together with a technical background.

Indeed, having seen some of the risks of cryptocurrency participation in operations to finance unauthorized areas or launder money obtained through illegal activities, any state will take the first, but weighty step – prohibiting all initiatives related to cryptocurrencies or the blockchain protocol. Thus and in this case, cryptocurrencies and any transactions with them will become illegal in an instant. If such a regulation arises at the level of the European state and applies to all states of the SEPA, the damage in the field of cryptocurrencies will become catastrophic, as this will devalue all bitcoin savings and will not allow cryptocurrency owners to exchange bitcoins for currency or other assets, at

least in the European Union. Another question is whether a state or a community of states will be able to take such a step? Most likely, given the volume of the cryptocurrency market at the present time, it will be very difficult to establish a categorical ban on this instrument, since this would entail a violation of the alternative market system that was formed from cryptocurrencies.

These risks of cryptocurrencies are pointing on the necessity to regulate this currency in order to cover most of the risks and to allow people to operate with this digital unit. Otherwise, this market of crypto currencies will be unregulated and thus become a threat to World economy.

4.4 Regulation of bitcoin and cryptocurrencies in the World

In 2015-2017, when different countries were just developing their attitudes towards blockchain and cryptocurrencies, the range of ideas and reactions that came in ranged from prohibition and criminalization to the transfer of central banks to blockchain and the emission of national cryptocurrencies. Such an amplitude of opinions was rather worrying for crypto enthusiasts in those years. However, it only revealed the dual nature of the crypto phenomenon. It has always been difficult to combine with one concept, because it is composed of two conflicting areas: technological - blockchain technology, and financial – cryptocurrency. And although they are linked, their meaning is very different and the attitude towards them is also very different: to a financial irritant – cryptocurrency – the politicians triggered prohibitive reflexes; and the technological phenomenon – blockchain – sparked curiosity. Many governments simultaneously viewed cryptocurrency as a potential threat and explored the possibilities of blockchain for their own political needs. The blockchain, as a result, went out of the way - there was no application for it, no legislative interest in its regulation either (Lacity, 2020).

It is cryptocurrency that has become the main subject of regulation in the relevant legislation of different countries that has appeared over the past three years. When one says, "*government regulation of crypto technologies and blockchain*", it is meant "*government regulation of cryptocurrencies*."

In addition to interest in the regulation of the cryptosphere, in the legislative decisions of different countries over the past five years, common motives and trends can also be traced. Particularly, the matter of interest is intentions of regulation of

cryptocurrencies in the USA, China, Russia, Venezuela, Germany, Estonia and other countries of the European Union and the world.

4.4.1 The United States

Among the developed countries, the United States has shown perhaps the least interest in regulating the cryptosphere. However, due to its size and federal structure, at different levels - federal, departmental and state level – several current legislative trends and variations were expressed there at once.

At the US federal level, cryptocurrency regulation is discussed only within the framework struggle against financial crimes and money laundering; there is no separate cryptocurrency legislation and was not planned by now (Stabile, 2020).

At the state level, there is a variety of approaches from different countries: crypto-liberalism, when the state allows operations with cryptocurrency, crypto-etatism, when the state licenses operations with crypto-currency, and crypto-enthusiasm, when the state relies on the development of the crypto-sector.

The activities of American regulators are mainly related to the protection of American crypto investors from fraudulent projects and projects that do not meet requirements, for example, during the ICO1 boom in 2017 (Stabile, 2020).

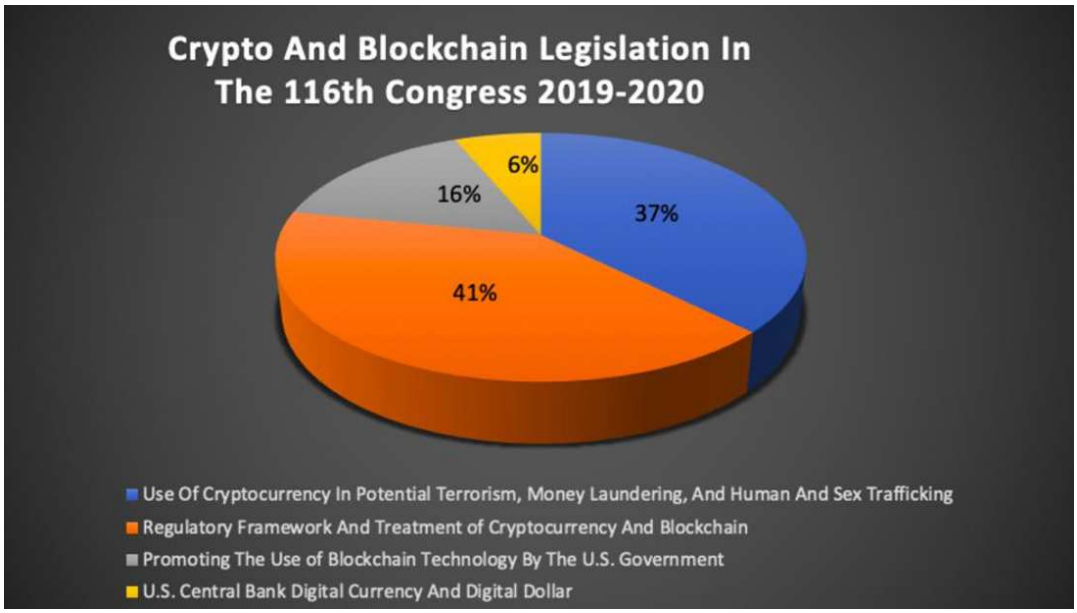
While the ICO did not go beyond the boundaries of the cryptoeconomy, exchanging tokens for cryptocurrency, they could still be qualified as phenomenon of the close eco-system of crypto-world. But the success of the first ICOs led to the emergence of the following ones, aimed directly at the sale of tokens-promises of investment value for fiat and cryptocurrency, with which many ICOs got attention of financial regulators, and seemed to seek to take a place in the historical series of financial speculations beyond regulations. However, after a meeting with the US Securities and Exchange Commission (SEC), most ICO projects not only changed their minds about dreaming about American investors, but also banned the purchase of tokens for US citizens (Anson, 2018).

The American administration demonstrated its suspicious attitude towards cryptoeconomics. But in the last years, there is a noticeable desire in the United States to

1 Initial Coin Offering - initial placement of tokens) - the release by any project or company of its own money - tokens (cryptocurrencies) in order to attract investment (Anson, 2018).

give cryptocurrency a clear legal status. Nowadays there are more and more various proposals for regulation. As part of the 116th convocation of Congress, which began its work in January 2019, members of the lower house and US senators presented a total of 32 bills to regulate the crypto industry (Stabile, 2020). Most of the measures concern cryptocurrency indirectly, as part of measures against money laundering, human trafficking, prostitution and terrorist financing:

Figure 2 Crypto and Blockchain Legislation in the 116th Congress 2019-2020



Source: Own processing

Legislative and executive activity in relation to crypto business is manifested not only at the federal level of the Congress and the SEC, but also at the state level – and, moreover, not only prohibitive. On the one hand, the Texas Securities Board issued 16 restraining orders in 2018. The main reason was called fraud – misleading investors and providing false documents (The Law Reviews, 2020).

The state of California back in 2015 passed a law allowing any corporation, association or individual in California to participate in the circulation of money other than legal tender in the United States, becoming the first American state to legally recognize and allow cryptocurrency (Global insights, 2020).

During 2019, the state of Wyoming passed a number of blockchain and cryptocurrency laws that provide opportunities rather than impose restrictions:

cryptocurrencies are allowed to be treated as money, tokens can be recognized as property, and some restrictions for ICOs held in the state were even pulled off.

In Wyoming, cryptocurrency is considered money, but in Pennsylvania it is not. And since cryptocurrency is not money, it was decided that in Pennsylvania, a money transfer license was not required for operations with cryptocurrency. This was officially stated on January 23, 2019, in a guide for state-owned virtual currency companies published by the Pennsylvania Department of Banking and Securities (DoBS) (Global insights, 2020).

In the 2019 operations with cryptocurrency were licensed in the states of Alabama, Alaska, Connecticut, Georgia, Hawaii, Idaho, New York, North Carolina, Oregon, Vermont, Virginia, Washington, Wisconsin.

In Arizona, on March 9, 2020 was represented the draft Cryptocurrency Act to the US legislature. The document indicates 3 types of digital assets: “goods”, “cryptocurrencies” and “securities”, and to control each type of assets, it is planned to create an appropriate supervisory authority that will register digital assets and keep their register (The Law Reviews, 2020).

4.4.2 Canada

Regulation in Canada appeared on June 19, 2014, when the General Governor of Canada approved Bill C-31, which included amendments to the Canadian Proceeds of Crime (Money Laundering) Act) and the Terrorist Financing Act concerning and including regulation on cryptocurrency. The latest amendments were adopted already in 2020. Canada is gradually tightening regulation: from June, 1, 2020, all cryptocurrency exchanges in Canada must register with the Canadian Financial Transaction Analysis and Reporting Center (FinTRAC). New guidance has also been released defining when current securities legislation should apply to transactions on cryptocurrency exchanges (Fintrac – canafe.gc.ca, 2021).

Canada currently allows cryptocurrencies, but they are not considered as legal currency in Canada. The only legal currency in Canady is Canadian dollar. That is, private transactions with cryptocurrency are not prohibited, but one cannot pay taxes with bitcoins. The Canadian Tax Agency defines cryptocurrency as a commodity, announcing that using

cryptocurrency to pay for goods or services should be treated as a barter transaction. That is, crypto coins are a commodity that is used to exchange for other goods. Otherwise, transactions with cryptocurrency are subject to Canadian tax laws and regulations, including the Income Tax Act (Library of Congress, 2021).

Despite regulation, Canada is an active supporter of cryptocurrencies. It ranks second in the world after the United States in terms of the number of installed bitcoin ATMs, and since 2016 the blockchain has been actively studied in the country; at the same time, the Central Bank of Canada tried to develop its own cryptocurrency called CADcoin (Library of Congress, 2021).

4.4.3 Great Britain

In the UK, the status of cryptocurrencies is still not clearly defined. Until 2014, cryptocurrencies were classified as "single-purpose vouchers", transactions with which were subject to VAT. In 2014, the Office of Taxes and Customs stated that bitcoin is neither currency nor money, therefore cryptocurrency was not regulated by UK financial legislation and was not subject to the UK Law on Legalization (Laundering) of Proceeds from Crime. But since January 2020, the situation has changed: now the FCA (Financial Conduct Authority, the financial regulator in the United Kingdom) is engaged in the fight against money laundering and terrorist financing, including controlling crypto assets in the UK (OECD.org, 2020).

FCA continues to work with the government and the Bank of England to analyze and eliminate potential risks associated with cryptocurrency, and to encourage and develop consumer-benefit innovation in this area. And research is also being carried out: on June 30, 2020, a report was released on the results of the cryptocurrency market research – "Cryptoasset consumer research 2020". It notes that 89 % of cryptocurrency holders (individuals) are aware that their transactions are not subject to sufficient regulation and are not secure (FCA, 2020).

4.4.4 European Union

Generally, it can be assumed that the EU demonstrates a conservative attitude towards digital assets. In particular, the EU reacted with alarm to the idea of Facebook

launching the Libra cryptocurrency, banning its circulation on its territory due to the unpredictability of the risks that could entail the emergence of a new means of payment (Dw.com, 2020). In 2016, the European Commission proposed to establish additional regulation for cryptocurrency exchanges and companies that provide cryptocurrency wallets to users: to provide for mandatory registration or licensing of the activities of cryptocurrency exchanges that exchange cryptocurrency for fiat money and vice versa, and companies that provide cryptocurrency wallets to users (Library of Congress, 2021). On December 15, 2017, the EU authorities approved a decision on the mandatory identification of users of cryptocurrency exchanges. Anti-money laundering measures have recently been strengthened. They are aimed at the transparency of the cryptocurrency market: since January 2020, the Fifth Anti-Money Laundering Directive (AML5) has been in effect, which will eliminate anonymity (Cointelegraph, 2021). According to the Directive, companies are required to store information about how their customers which use cryptocurrency. Formally, this measure is intended to stop the use of tokens for illegal activities. Cryptocurrency-related organizations must register and submit customer information to the appropriate authorities. For example, a crypto exchange based in Spain must be officially registered with that country's regulator.

In November 2015, the European Court of Justice ruled that bitcoin should be considered a currency (means of payment) and not a commodity (in terms of taxation). Thus, transactions for the purchase and sale of bitcoins for traditional fiat currencies should not be subject to value added tax. Prior to that, national regulators had different attitudes towards the imposition of this tax on cryptocurrencies. In the European Union, cryptocurrencies are not subject to the MiFID II Directive on Markets in Financial Instruments (MiFID II) and EMD2 in relation to electronic money and are not subject to financial regulation of the European Union. On the territory of the European Union, there is also no officially accepted classification of digital assets. Recently, the Vice President of the European Commission Valdis Dombrovskis promised to present new rules for regulating the cryptocurrency industry. Therefore, one should focus on their status in a particular country (Global Legal Research Center, 2021).

Based on the above analysis of the regulation of cryptocurrencies in different countries, we can come to the following conclusion:

1. Despite the fact that the cryptocurrency and bitcoin for a long time remained a tool that was used in very narrow circles, and there was no need for states to

regulate it, it soon became clear that the popularity of cryptocurrencies and blockchain was growing. Transactions in cryptocurrency appeared, as well as pyramid schemes to raise funds for certain cryptocurrency businesses. This made governments think about regulating this currency.

2. The main issue in regulation was primarily transactions that were not taxed. Governments were afraid of mutual settlements using cryptocurrencies, which were barter from a legal point of view, and therefore business units did not account for them, that is, did not pay taxes. Therefore, there was an urgent need to regulate cryptocurrencies and turnover with them.

3. When blockchain technologies began to penetrate ordinary people who invested in cryptocurrency because of its volatility and the ability to make money, governments saw the need to regulate the circulation of cryptocurrencies and crypto exchanges so that they meet all the requirements to combat financial risks connected with anonymity and money laundering.

4. It is also necessary to understand the risks associated with money laundering and terrorist financing through cryptocurrency. Since cryptocurrencies remained anonymous all this time, huge amounts of money could circulate in the field of cryptocurrencies, financing illegal operations, including terrorist actions and illegal business.

5 Case study of cryptocurrencies regulation in different countries

5.1 Regulation of cryptocurrencies in Germany

Germany became one of the first states that launched the legal regulation of cryptocurrency in order to ensure it at least some kind of legitimacy. There is no general ban on issuing, mining, owning or trading cryptocurrencies in Germany, moreover, this country and its government was always adapting to the changing scenario in the Worlds' economy and tried to correspond to these changes by regulation. It's the same with securities, assets and utility tokens. Germany has introduced regulatory requirements for licensing and emissions of cryptocurrencies in order to have information and control over all economic units operating with cryptocurrencies.

From a technical and legal point of view, cryptocurrencies were classified by the Federal Financial Supervisory Authority of Germany back in 2011 as financial instruments in accordance with sect. 1 of the German Banking Act (Kreditwesengesetz) (Federal Financial Supervisory Authority, 2020). In Germany cryptocurrencies became a new "accounting unit" (Rechnungseinheiten), which are a special category of financial instruments not covered EU legislation.

Back in 2013, Federal Financial Supervisory Authority released additional cryptocurrency guidance, because cryptocurrencies and particularly bitcoin was getting more public importance and interest. It is applicable for the general classification of cryptocurrencies. The key issue is that the corresponding tokens qualify as a substitute for legal currency, as they are accepted for payment on the basis of private law agreements, that is, in contrast to the regulation of public law, which is the main feature of official currencies (Federal Financial Supervisory Authority, 2020).

The Ministry of Finance of the Federal Republic of Germany also issued a corresponding decree. According to him, Bitcoin became the unit of account for the use of trade transactions between individuals (Library of Congress, 2021).

Bitcoin in Germany has a status of alternative accounting unit. It has never become foreign currency, because there is no foreign entity that regulates it. It was not recognized

as electronic money, because electronic money is de facto, traditional money, which is a part of money aggregators. It can be just called private money or accounting unit.

In 2017, the Federal Republic of Germany updated the national regulatory framework. After that, the Federal government recognized cryptocurrency as a financial instrument (Library of Congress, 2021). However, this classification was argued by Berlin Court, which insisted that bitcoin is not a financial instrument, but accounting unit.

Federal Financial Supervisory Authority also states in its guidance that cryptocurrency does not qualify as a regulated electronic money as there is no central issuer. Under the German Payment Services Supervision Act (Zahlungsdiens-teaufsichtsgesetz), electronic money is defined as any monetary value that is stored electronically, including on a magnetic medium, and takes the form of a claim against the issuer. It is issued in exchange for cash to carry out payment transactions (Federal Financial Supervisory Authority, 2020).

At the same time, tokens that have functions that go beyond a simple substitute for payment, that is, in particular, securities, must be classified on an individual basis. They can be classified as securities or even units or shares of investment funds.

In its February 2018 ICO guide, Federal Financial Supervisory Authority explains that *"tokens can be classified as securities, so-called capital investments, or even shares or stakes in investment funds"* (Federal Financial Supervisory Authority, 2020).

5.1.1 Tax regulation of cryptocurrencies in Germany

Of course, the regulation of cryptocurrency in terms of taxation is one of the main issues for every country. In Germany, the regulation of cryptocurrency in the field of taxation came in 2015. By law, taxes were levied on all transactions exceeding 600 euros. Not taxed on transactions with cryptocurrencies that have been in possession for more than 1 year.

Cryptocurrency mining is not subject to value added tax. This tax is applied to such instruments as stocks, bonds and other securities purchased for the purpose of resale in the future and receiving income from this. While mining is using of energy sources in order to achieve some crypto-unit. Until this unit is sold or exchanged on the market, this is not a tax operation. However, Bitcoin mining is considered to be the process of creating value

for a currency. Accordingly, it is subject to income tax. This was ruled basing on the court precedent of the European Court of Justice decision of 22 October 2015 (C-264/14 – Hedqvisf). It stated that:

- Exchange of cryptocurrency for fiat money is not included to VAT regime.
- Use of cryptocurrencies as means of payment is not included to VAT regime.
- Mining is excluded from VAT regime.
- Taxable (VAT) is the e-wallet service if it is provided in Germany.
- Cryptocurrency exchange is VAT applicable, but it depends on the type of exchange.

In addition, transactions with cryptocurrencies may be subject to German income tax, when the seller of cryptocurrency is a German tax resident.

5.1.2 Licensing of crypto-business in Germany

Germany was one of the first countries to consider licensing cryptocurrency companies or cryptocurrency-related businesses.

Most of commercial operations with all kind of cryptocurrencies and tokens require licensing in accordance with the Financial Supervision Act of the Federal Republic of Germany. It states that all kind of business connected or somehow related to financial services can be provided only with written permission from Federal Financial Supervisory Authority. This permission is an obligation not only for business units based in Germany, but for all entities that offer their services on German market. Thus, every entity that wants to operate with cryptocurrencies, has to have permission from the Financial Authority.

The main platforms for trading virtual money are crypto exchanges. They can be registered as a company in Germany, and it will be much easier than in other European countries. In this country, such legal entities fall under the classification of financial companies. To conduct their activities, they must obtain a license. You also need to meet the following requirements. The size of the authorized capital of the crypto exchange must be at least 730 thousand Euros, and paid not in cryptocurrency, but in fiat money. This already imposes certain obligations on the company, since the amount of the authorized capital shows the seriousness of the company. The next requirement is the need to submit

company reports within a clearly specified time frame. Reports must be submitted to the Financial Supervisory Authority (Library of Congress, 2021).

Among other things, crypto exchanges and platforms - multilateral trading platforms - fell under the obligation of licensing. Further, companies that somehow participate in organizing transactions involving cryptocurrencies must undergo authorization from the financial supervision in Germany. For example, we are talking about data centers that store tokens and cryptocurrency, but do not operate with it as a means of payment. Also, the aforementioned ICO is directly related to attracting and operating with cryptocurrency, therefore, it is also necessary to go through the authorization process on the part of Federal Financial Supervisory Authority (Federal Financial Supervisory Authority, 2020).

Below there are listed operation that are directly or indirectly connected with cryptocurrencies or crypto-business and thus have to be authorized by the Financial Authority of Germany (Gurkan, 2018):

- *"Brokerage services: buying and selling financial instruments as cryptocurrencies.*
- *Safely storage and manage accounting units as cryptocurrencies.*
- *Underwriting (hard underwriting): the purchase of financial instruments at the credit institution's own risk for placement on the market or the acceptance of equivalent guarantees, including cryptocurrecies.*
- *Investment mediation in business related to the purchase and sale of financial instruments as well as cryptocurrencies.*
- *Investment consulting and providing personal advice to clients or their representatives regarding transactions involving certain financial instruments including cryptocurrencies when the recommendation is a professional advice, which can lead to decision – making process of the entity.*
- *Multilateral Trading System Operations (MTF): working with a multilateral trading platform that brings together the interests of a large number of individuals in buying and selling financial instruments including cryptocurrencies.*

- *Placement of financial instruments and accounting units (soft underwriting): placement of financial instruments and accounting units without firm commitments.*
- *Management of individual portfolios of financial instruments or cryptocurrencies on a discretionary basis.*
- *Own trading: buying and selling financial instruments including cryptocurrencies."*

5.2 Regulation of cryptocurrencies in China

China is a very interesting market in terms of cryptocurrency regulation. First of all, it's worth mentioning that the price of bitcoin on crypto exchanges has been heavily influenced several times by China's decision to regulate cryptocurrencies. There were several reports in the media that China is about to introduce its own cryptocurrency, which will be an alternative currency to Chinese Juan. Such news stimulated speculation in bitcoins and other cryptocurrencies and affected the price of cryptocurrencies. But China is a very closed country in terms of announcements of its economic development strategy. Therefore, China's strategy for cryptocurrencies is not entirely clear. In this chapter, we will try to find out what is the legal regulation of cryptocurrency in China today, and what development can be in this area.

Since October 2017, a law has come into force in China that establishes the legal regulation of cryptocurrency in the country. This act becomes the first legal document that describes the principle of cryptocurrency regulation in China. In accordance with this Chinese law "General Principles of Civil Law of the People's Republic of China", cryptocurrencies will be considered "virtual property". Earlier, in December 2013, China's regulators banned banks from performing transactions with cryptocurrency, in particular with bitcoin (Bloomberg, 2018). And already in 2014, the People's Bank of China issued a circular on the closure of accounts and the prohibition of cryptocurrency exchanges. Cryptocurrency, in particular bitcoin, was defined not as a currency, but as a virtual commodity. These actions were due to the fact that the Chinese government considered the overwhelming majority of ICO projects to be risky for the consumer, since it could have a connection with illegal activities and the withdrawal of large cash flows from the country (Li, 2017).

The adopted regulation mentions that the recent wave of bans on cryptocurrency transactions are not a complete ban on the use or possession of virtual currency. Also, it mentions about the likely resumption of the work of some large Chinese crypto exchanges, after the final inspection of the People's Bank of China.

However, since 2016, the People's Bank of China has reported the news that it is about the founding of its own cryptocurrency. In October 2019, the president of the People's Republic of China Xi Jinping said that "*the development of blockchain technology is one of the priority tasks of the state and called for accelerating the development of this area in the country"* (CNBC, 2019). By that time, it was already known that China had been developing its own cryptocurrency since 2014. News about this periodically surfaced in professional and public sources, although for most crypto enthusiasts the country was more associated with strict regulatory actions – strict restrictions on cryptocurrencies, entering mining into the preliminary stop list of industries that should be banned, closing blockchain conferences by the police, and so on.

Much has changed with the release of the Libra news (DW.com, 2020). The prospect of issuing its own currency by a private company with 2.3 billion users around the world could potentially turn the project into the world's main cryptocurrency.

China took this as an incentive. First of all, it is an incentive to oust the dollar from the electronic payments market, and in the long term, to change the entire global financial system. Looking at the example of China, and realizing what opportunities could be missed, many other countries announced the development of their CBDC (Central Bank Digital Currency). For example, the European Central Bank, the Central Bank of South Korea, Russia, Sweden and a number of other countries are talking about their own developments in the field of state cryptocurrencies (Ward, 2019).

Crypto companies are massively created in China, and the blockchain is being tested in real sectors of the economy. It is used by dozens of the largest state-owned banks, courts, tax authorities, telecommunications and Internet giants. Industrial and Commercial Bank of China (ICBC), Ping An Bank, UnionPay, Baidu, Alibaba Group, Tencent, Huawei, Midea, iQIYI, BGI, Jingde Porcelain are developing their blockchain projects.

Over 10,000 blockchain companies have been created in the country in the first 6 months of 2020. Most of them were small businesses. The main regions in which the

sector is developing are: Beijing, Hebei, Guizhou, Hunan and Hainan. In them, government services are actively transferred to the blockchain (Thatsmags.com, 2020).

In June 2020, the authorities published the Beijing Blockchain Innovation Development Plan 2020-2022, which calls for the transformation of Beijing into a blockchain hub (Chinabankingnews, 2020). Over the next two years, it is planned to integrate dozens of blockchain innovations into the city's economy and infrastructure. Already, 140 state and municipal services are using blockchain in the capital of China. This is expected to eliminate paper documents and cut administration costs by 40 %. In the future, blockchain will be used for real estate registration, taxation, medical data processing, social benefits, asset securitization, cross-border payments, etc. A fund to support blockchain startups, a training system and special blockchain centers throughout the city will be created. In addition to Beijing, more than 10 cities in China have released their own strategies for integrating blockchain into everyday life. Two projects stand out for their scale and potential impact on the crypto market - the digital yuan (DCEP) and the blockchain infrastructure platform (BSN) (Chinabankingnews, 2020).

All this indicates that in China it was necessary to regulate operations with cryptocurrency, since the market was out of government regulation, and it was necessary to regulate all processes.

5.2.1 Tax regulation of cryptocurrency in China

As in the case of Germany, the regulation of taxation in the field of transactions related to cryptocurrencies came in China as a first necessity. As soon as more companies appeared that carried out their operations in digital currency, the Chinese government immediately recognized cryptocurrency as a virtual currency and obliged all market participants to show reports on transactions that were made in cryptocurrency.

China has taken a lot of initiative in regulation of cryptocurrencies in the field of taxation. Since China has defined cryptocurrency as virtual currency with some value, it is a matter of taxes, namely (Li, 2017):

- VAT – value added tax, which is implied on all operations with cryptocurrencies.

- Corporate Tax – income tax (income and profits in cryptocurrency are subject to taxation.
- Individual Income Tax – income tax of physical entities and individual entrepreneurs, which have profit from any operations with cryptocurrencies.
- Capital Gains Tax – capital gains tax. Since cryptocurrencies are a matter of speculation on crypto-exchanges.

An additional incentive for the regulation of cryptocurrencies in China in terms of taxation is that the field of financial technology in China has been developing at a rapid pace. Many fintech companies have concentrated their activities either in China, because the market has not been regulated for a long time, or in other countries, but in close cooperation with China. Therefore, the Chinese government had to make a number of amendments to tax laws in order not to simply lose money that Chinese companies operating with cryptocurrency had to pay in the form of tax (Reuters, 2017).

5.2.2 Licencing of crypto business in China

Currently, there is no regulation of cryptocurrency exchanges or mining in China, as in Germany. This area is regulated exclusively in terms of AML and taxation. Therefore, all companies that deal with cryptocurrency are obliged to notify about their activities, first of all, the tax authorities and the financial authority to combat AML and FT. As such, a license to conduct transactions with cryptocurrencies or for mining is not implied.

Registration of a crypto exchange in China is getting more complicated at this stage. Some experts believe that the main reason for concern on the part of China's regulators about ICOs is the outflow of capital from the country. Therefore, the methods of resistance with such innovations in society are not yet complete. And, of course, the unregulated ICO, which, according to the authorities, may entail certain risks.

A cryptocurrency license in China may refer in the future to services of a financial nature. Depending on the type of activity, a license will be issued. However, due to the current circumstances in the country on the topic of cryptocurrency, regulators are warning

about the possible revocation of licenses on commercial activities from companies that may be associated with the ICO.

5.3 Regulation of cryptocurrencies in Japan

Japan can be called an advanced country that started regulating cryptocurrency even before it became widespread in the country. Already in 2017, this country began to register operators that exchange cryptocurrencies for real money. Cryptocurrency exchange service providers should verify transactions (including customer data) and report suspicious ones, keep verification protocols (AML and FT policy). This was supposed to protect against the use of cryptocurrencies to AML. Second, Japan has protected the rights of buyers and sellers of cryptocurrencies. It divided the management of monetary assets and cryptocurrencies and obliged to conduct an audit for this. Japan has also implemented complaints procedures.

On May 1, updated laws on cryptocurrencies came into effect in Japan, which are designed to bring more clarity to the regulations regarding the crypto industry in this country.

In 2019, the Japanese House of Representatives passed amendments to the Payment Services Act (PSA) and the Financial Instruments and Exchanges Act (FIEA) aimed at strengthening control over crypto exchanges (Mofo.com, 2020).

Japan, which recognized bitcoin as a means of payment back in 2017, did not introduce new laws and only introduced significant amendments aimed at improving the regulation of the digital assets industry.

5.3.1 Tax regulation of crypto business in Japan

As in the other countries, regulation of cryptocurrencies in Japan implied VAT regulation. Japan exempted from it the operations of exchanging virtual currencies for money, and when using it as a means of payment, VAT should be charged. In transactions with regular currency, the tax base is calculated based on the amount paid, and for virtual currencies, it should depend on the market price of the asset or service.

Along with the emergence of new types of financial licenses in Japan, which were associated with crypto business, these companies, as well as all transactions with

cryptocurrencies, were subject to tax liability, like other types of financial assets. As of 2020, companies in Japan have had to register all cryptocurrency transactions on their ledgers and log them like other assets.

Thus, operations with cryptocurrencies in Japan were no longer profitable from a tax point of view, as they were subject to all types of taxes like other financial instruments (Mofo.com, 2020).

5.3.2 Licensing of crypto business in Japan

Bitcoin and similar cryptocurrencies were legally introduced as "crypto assets" instead of "virtual currencies". From May 1, ICOs and STOs[2] must be regulated in accordance with Financial Instruments and Exchange Act (FIEA), which also governs the availability and use of "electronically recorded and transferable rights" (ERTR).

In addition, from May 1, the updated FIEA law will also begin to regulate the cryptocurrency derivatives market, which, despite significant trading volumes, has not yet been regulated in Japan.

The updated laws in Japan also oblige all cryptocurrency firms to separate user deposits from their own funds, using third-party custody services with cold wallets. Hot wallet services must store the same assets and in the same amount as users in order to recover funds in the event of theft.

It should be noted that the Japanese authorities have stepped up their efforts to keep crypto exchanges safe after the $ 535 million Coincheck hack in January 2018. The Japanese Financial Services Agency (FSA) has obliged all cryptocurrency exchanges to obtain an appropriate license to operate in the country (Mofo.com, 2020).

5.4 Comparison of the chosen countries in regulation of bitcoin

Above, an analysis was carried out of three countries, which in different resources are called the most progressive countries in terms of regulation and use of cryptocurrencies – Germany, China and Japan. If one compares these three countries, one can see the different approaches of the governments of the countries when regulating and accepting

[2] Security coin offering

bitcoin, cryptocurrencies, tokens and blockchain technology. The table below shows a comparison of the three countries. The table was compiled based on the analysis performed.

Table 1 Comparison of the chosen countries in terms of regulation of cryptocurrencies

Comparison criteria	**Germany**	**China**	**Japan**
First reaction on cryptocurrencies	Adoption and regulation (2015-2017)	Ban on operations connected to cryptocurrencies (2013-2017), then adoption	Adoption and regulation (2017-2020)
Regulation of tax on crypto operations	VAT and income taxes on crypto business	VAT and income taxes on crypto business	All types of taxes: VAT, income tax and taxes on financial assets
Status of cryptocurrencies	Financial instruments / accounting unit	Virtual property	First as "virtual currency", then as "crypto asset"
Licensing of crypto business	Yes, by laws on crypto business. Licenses on all types of crypto business.	No, just in terms of AML	Yes, legal regulation as amendments to the laws on financial companies

Source: Own processing

Comparing the three countries, we can say that each of them reacted differently to the development of the cryptocurrency market. In Japan, the government immediately reacted to the development trends of this market and introduced legislation to regulate this market. This was done primarily to prevent the negative development of the market from the point of view of the legality of transactions and taxes. Japan was also afraid of the development of an underground financial market, so it immediately established rules for crypto exchanges and companies that operated with cryptocurrencies.

In China, first came a sharp ban on all operations with cryptocurrencies. It was only when the Chinese government saw that blockchain technology was spreading around the world, and the volumes of cryptocurrencies were becoming huge, that the Chinese government began to develop its own initiatives in the regulation and development of the cryptocurrency market. It is also worth noting that for China, the development of the

cryptocurrency market could mean a weakening of the dollar's influence. This was one of the reasons why China thought about it and began to implement its own national cryptocurrency project.

Germany also began to respond to market development trends after several years of global cryptocurrency turnover. Licensing of companies related to blockchain technology has been introduced. Also, in Germany, regulation was introduced for the tax area and the activities of companies that speculated with bitcoin, even if they were not registered on the German market but operated on it.

5.5 Estimation on the future of cryptocurrencies in terms of alternative means of payment

Since one part of my goal is to analyze the current regulation of cryptocurrencies and to estimate its future regulation in terms of the current integration of this alternative currency in different countries, it is necessary to represent main ideas that appeared after analysis of regulation of cryptocurrencies in different countries.

Having identified the difference in the regulation of cryptocurrency in the world and its different position in various countries that recognize and regulate this asset, we can say that at the moment there is no common understanding in the world whether a cryptocurrency is an asset, a unit of account or a virtual currency. Cryptocurrency is not based on any known asset, nor on the capitalization of companies, but simply on market speculation and energy / power. This is not enough for this currency to become a full-fledged alternative currency in the world. There are still many risks associated with it, including anonymity, high volatility, and the relative insecurity of the system. However, in some areas of business, cryptocurrency has already completely replaced traditional payment methods. We are talking, for example, about IT freelancers, who often settle in cryptocurrency. Also, in some cities there are cryptocurrency ATMs or companies that accept bitcoins. As an example, we can cite the largest online store in the Czech Republic – Alza.cz, in which there is a device for accepting cryptocurrency on account of the purchase of electrical equipment. This means that countries cannot ignore the existence and circulation of cryptocurrencies.

Therefore, countries are taking the initiative into their own hands and trying to adapt their laws and internal rules for the circulation of cryptocurrency, taking into account

the risks associated with it, as well as the volume of the market, which currently involves the blockchain.

For cryptocurrency to become an alternative means of payment, countries need to start regulating it. Based on the results of the analysis carried out in the work, it can be concluded that in the very near future the following laws will appear that will regulate cryptocurrency in different areas. The regulatory initiative should first of all come from global organizations, and then be introduced into the internal legislature of different countries:

1. Regulation in the field of AML. At the moment, there is regulation of cryptocurrencies as a risky instrument in the AML5 directive. In the following versions of the law, cryptocurrencies should be considered in detail in a separate paragraph, including a description of all the risks and responsibilities of financial institutions and individuals when dealing with cryptocurrencies.
2. Regulation in the field of accounting and taxation, including VAT. This is a very complex topic, especially when it comes to international payments using cryptocurrencies. It is necessary to make the rules for the unified accounting of cryptocurrencies, valuation and depositing on the balance sheet of the enterprise.
3. Regulation in terms of total turnover. It is necessary that all countries agree on the inclusion of cryptocurrencies in their legislation so that this payment method becomes legal and transparent and is not associated with risky transactions.

Also, during the writing of the work, the following conclusions were made:

1. For the cryptocurrency to become an alternative means of payment, which will be recognized throughout the world, there must be a unified regulation. Countries must agree among themselves how they will perceive the cryptocurrency in terms of calculation and taxation.
2. It is necessary to establish clear rules for speculation with cryptocurrency in order to protect inexperienced investors from risky investments. So, for

example, how the securities market or chest of drawers is regulated in the world.

3. Citizens should be provided with proper training and methodological materials on the risks associated with cryptocurrencies and their turnover. In particular, banking organizations and financial institutions must accept this means of payment and be able to handle it. In the meanwhile, no banks in Europe recognize cryptocurrencies, which make them completely unavailable for common bank customers.
4. Another disadvantage of cryptocurrencies is speed of transactions. According to Strelenko (2017), transaction time can take 15 seconds (in case of Etherium) to 10 minutes (in case of Bitcoin). It is slower compared to Visa or PayPal service, which is electronic money.
5. Mining of the cryptocurrencies is conditioned with power and electricity and its capacities. The main advantage of cryptocurency is that the qualtity of it is limited. Which means that when everything will get mined, there will be no new mining necessary.

In accordance with the development of cryptocurrency over the past five years, it can be assumed that all three of the above points will be achieved in the very near future. Perhaps at the moment there has been a slight delay in the regulation of cryptocurrency, due to the Covid-19 pandemic, which is still a worldwide problem.

It is also worth noting that as soon as China launches its own cryptocurrency circulation, or as soon as Facebook launches crypto-Libra, states will be forced to recognize cryptocurrency not only as an investment asset, but also as a full-fledged means of payment.

In the context of comparing the two types of currencies - traditional currencies and cryptocurrencies, it must be said that cryptocurrencies cannot yet compete with traditional currencies because there is no uniform regulation and use of cryptocurrencies worldwide. It is not a currency that is recognized by all the world's states, and there are many problems associated with cryptocurrencies in the area of taxation and proof of origin in the context of AML policy.

6 Conclusion

In this work, the problem of cryptocurrencies as an alternative currency was analyzed. The thesis deals with how the traditional currency has evolved, how monetary policy is implemented to help regulate the amount of money in the economy. Unlike traditional money, which is issued by central banks and then multiplied electronically by commercial banks, cryptocurrencies have no specific issuer. In addition, unlike traditional investment instruments, they are not secured by company capital or banking instruments or precious metal. It is a digital currency, which arises as a result of mining, ie the generation of large energy capacity and the transformation of this energy into a certain digital unit.

However, despite these properties, cryptocurrency and specifically bitcoin is a highly debatable topic and an alternative unit that is quoted on cryptobourses and that is measured against the dollar.

In recent months, the price of bitcoin has climbed to $ 58,000 per Bitcoin. Compared to 2013, when the price per fighter was only $ 6, this is a huge increase. This growth is explained only by speculation with the battlefield and the growth in demand for this digital asset.

There are many risks associated with cryptocurrencies, as discussed in Chapter 4. However, where there is a risk for the state, there is an opportunity for users, so it cannot be said unequivocally that these properties of cryptocurrencies are purely negative. This is a risk of volatility, which is also an opportunity for investors. There is also the risk of anonymity, which is also an opportunity for people who do not want to be seen in circulation as owners of funds. Furthermore, there is a risk that any regulation or prohibition of cryptocurrencies may have a negative impact on their price and mean a loss for many investors.

Furthermore, the work presented an analysis of China, Germany and Japan in the issue of cryptocurrency regulation. It was found that each country has a different approach to cryptocurrencies. For example, China initially issued an absolute ban on any cryptocurrency operations, but subsequently began working to create its own cryptocurrency. Initially, Japan changed the laws that implied the regulation of cryptocurrencies. Germany has enacted laws to regulate cryptography, primarily in terms of tax and AML.

It should be noted that for the existence of cryptocurrency as a truly accepted currency, it is necessary for states to unify their access to this currency and create an effective framework for regulating the price of cryptocurrencies and their turnover. I think it's a question of the next few years.

The hypothesis stated in the introduction of this thesis was the following: cryptocurrency and blockchain system is not yet sufficiently developed to become an alternative to the monetary system in its current form. For this reason, it can be assumed that the cryptocurrency system does not yet fulfill all the functions it would perform if cryptocurrencies were accepted as a standard means of payment. This hypothesis has been fully confirmed.

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