



THE STUDY OF THE RISK OF CRYPTOCURRENCIES VOLATILITY UNDER GLOBAL UNCERTAINTY

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Abstract

The entire international economic space is affected by the aftermaths of both the global pandemic and sanctions shocks, which directly influence the cryptocurrency market. Therefore, the volatility risks of fiat currencies, as well as of bitcoins and altcoins, are increasing. The study focuses on analyzing the risk of cryptocurrencies vitality under global uncertainty. To that end, To meet the study's aim, a range of general methods, including descriptive, comparison, analysis and observational methods are utilize. According to the results, the exchange rate fluctuations of bitcoin to the US dollar and bitcoin to the euro are synchronous, which to a greater extent indicates the actual absence of the impact of bitcoin on the world's fiat money. At the same time, the cross-rates of fiat currencies are in direct interaction, which confirms the actual absence of the impact of bitcoin on the stability of the euro or dollar monetary currencies. The conducted research made it possible to identify the main risks and threats associated with the regulation of crypto markets at the level of individual jurisdictions. It implies the improvement of the current digital legislation to regulate the activities of crypto exchanges in order to forestall the growth of the shadow economy.

Keywords: Cryptocurrency, Risk, Cybersecurity, Reliable innovative technologies, blockchain



O ESTUDO DO RISCO DE VOLATILIDADE DAS CRIPTOMOEDAS SOB INCERTEZA GLOBAL

Resumo

Todo o espaço econômico internacional é afetado pelas consequências da pandemia global e dos choques de sanções, que influenciam diretamente o mercado de criptomoedas. Portanto, os riscos de volatilidade das moedas fiduciárias, bem como de bitcoins e altcoins, estão aumentando. O estudo se concentra em analisar o risco da vitalidade das criptomoedas sob incerteza global. Para esse fim, para atender ao objetivo do estudo, uma variedade de métodos gerais, incluindo métodos descritivos, comparativos, de análise e observacionais, são utilizados. De acordo com os resultados, as flutuações da taxa de câmbio do bitcoin para o dólar americano e do bitcoin para o euro são síncronas, o que indica em maior medida a real ausência do impacto do bitcoin na moeda fiduciária do mundo. Ao mesmo tempo, as taxas cruzadas das moedas fiduciárias estão em interação direta, o que confirma a real ausência do impacto do bitcoin na estabilidade das moedas monetárias euro ou dólar. A pesquisa realizada permitiu identificar os principais riscos e ameaças associados à regulação dos mercados de criptomoedas ao nível das jurisdições individuais. Implica o aprimoramento da atual legislação digital para regular as atividades das exchanges de criptomoedas, a fim de impedir o crescimento da economia paralela.

Palavras-chave: criptomoeda, risco, cibersegurança, tecnologias inovadoras confiáveis, blockchain

1. INTRODUCTION

The European Union is an integration association. Though the countries that are members of the EU are independent, they are subject to uniform rules covering many significant areas, such as training programs, medical care, the judiciary and other standards that are related to the legal system of the European Union. The basis of the European Union is laid by the principles, the observance of which is obligatory for each member state (Dudukalov et al., 2021; Ramón Fernández, 2020). The European Union is characterized by a common economic space, free movement of labor, goods, services, capital and by uniform customs rules. Moreover, since 1999 it has had a single European currency, the euro, which is circulated within the European Monetary Union. A single currency under integration processes in the economic environment has many advantages against the circulation of a national currency in each EU state (Anderson, 2018). Replacing the national accounting currency with a single one, eliminates the risks of fluctuations in national currencies, levels out the costs of foreign exchange transactions. It should be noted that fluctuations in the euro exchange rate are influenced by many factors, both internal processes in the EU perimeter and external global influences (Ciaian, 2018).

These are inflationary processes, the impact of the growth of world trade, which affects economic activity in different ways for each EU member. As the study shows, the significant

impact is made also by a confrontation between world powers, for example, the United States and China, and, as a result, a decrease in economic growth in the commodity markets, which provide world markets with cheap raw materials (Kalašová et al., 2022). Moreover, protective duties introduced by the United States exercise a significant influence not only on the EU market, but also on the international economic community. In addition to the already well-known factors affecting the volatility of the euro, new challenges have emerged as a consequence of the digital economy development (Boreiko, 2019). The rapid development of innovative technologies has ensured the rapid growth of digital analogs, which can be regarded as the emergence of a special segment, which is the digital economy (Nikitin and Safonov, 2021). The digital economy spurred not only the technologies of the Internet, e-mail, big data and cloud information storage, etc., which in general led to the possibility of developing digital business, but also to improving the methods and maneuverability of communications (Lubozheva, 2021). In turn, this has given rise to many information leakage problems as a lot of parties have an access to transactions (Cong, 2019; Livson et al., 2021).

The idea of excluding a third party in making transactions prompted scientists to develop a new technology called blockchain, which in turn became the basis for the development of bitcoin and altcoin as its analogues. The study has shown that most countries tend to believe that bitcoin and other altcoins should not be considered as e-currency or digital money. This has the rationale that bitcoin and other altcoins do not meet the criteria for recognizing fiat money, foreign currency, and are not part of the currency system of any jurisdiction (Dremova, 2019; Deryagin et al., 2019).

In the international environment, there is no single term for the designation of bitcoin and other altcoins at the legislative level and in legislative acts, comments of government officials, they can be referred to as intangible goods, digital objects, cryptocurrency, etc. At the same time, the entire international economic community is influenced by the consequences of the COVID-19 pandemic, which can affect both the volatility of fiat currencies and the bitcoin and altcoins, which have not currently acquired an unambiguous status, but can no longer be ignored by national jurisdictions due to their growing volume and turnover (Santos, 2021; Flores, & Cruz; 2021). The ambiguity of their classification, the perception of the bitcoin and altcoins by the national jurisdictions of the EU countries, the taxation of transactions involving bitcoins and altcoins, as well as the impact of bitcoins and altcoins on the euro exchange rate, the impact of the consequences of the COVID-19 pandemic on their volatility are relevant to solving many economic issues and economic security issues, both for the EU countries and in the world.

2. LITERATURE REVIEW

The history of the creation and development of digital technologies arouses much interest in contemporary researchers (Korableva et al., 2020; Maia et al., 2020). Their impact on the global economic environment can be both positive and negative, but we cannot deny the fact of their presence, development, and implementation in a variety of production and communication processes. Blockchain technology according to Jun (2017) is the most important innovative solution based on modern digital technologies. The variability in the use of blockchain technology is already multifaceted. To be more exact, blockchain technology can be applied in the banking and financial sector, in the insurance services markets, in business communications, in the public sphere as a regulator of markets, business and authorized regulatory bodies. Bitcoins and altcoins created on the blockchain technology raise many controversial issues which were considered in the studies, such as issues of a legal nature and the prospects for their recognition in national jurisdictions (Cong, 2019).

Basically, the authors' works are devoted to the bitcoin, as it represents the most capitalized digital currency from the entire palette of similar coins.

Meanwhile, the authors conclude that the bitcoin is sufficiently reliable for investing in comparison with other coins (Paule, 2020) as most jurisdictions inform business processes participants about the unreliability and unpredictable volatility of the bitcoin. Simultaneously, numerous related studies rely on evidence-based factors, the indicators of the dynamics of behavioral changes and responses to challenges from fiat currencies, the bitcoin and altcoin, as well as gold, which ensures the value of fiat money. The dilemma for both private and business investors is whether the bitcoin can be considered as a speculative asset that is suitable for long-term investments. Some researchers (Vigliotti, 2020; Movchan et al., 2021) come to the conclusion that the volatility of the bitcoin demonstrates a trend that is not typical for speculative assets, which gives reason to consider the bitcoin as a vehicle for making investments in times of uncertainty and portfolio diversification (Hacker, 2018; Dudukalov et al., 2021).

One of the underlying factors of uncertainty is the current economic situation, caused by the COVID-19 pandemic, the consequences of which will still be the subject of both scientific research and fighting its negative influences in practice. Despite the difficult economic situation provoked by the COVID-19 pandemic, the process of finding the best options for recognizing and classifying the bitcoin and altcoin has been studied in field and desk research. The ongoing discussion about the classification of digital currencies in the company's financial statements as well as the search for acceptable alternatives, makes it difficult to stick to either the position of the IFRS Interpretations Committee or to opposing opinions at a compromising edge between accounting policies and tax legislation (Voronkova et al., 2020).

Despite the dominating global problem associated with the COVID-19 pandemic, the expert reviews highlight the possible threats which may come from cybercriminals and terrorist organizations using modern digital technologies for money laundering, as well as issues related to the impact of bitcoin on financial structure of Al-Tawil (2020). A review of scientific research proves the diversity and multidimensionality of interests of researchers and business regarding digital technologies in the face of uncertainty and the need to solve many problems that have arisen because of the COVID-19 pandemic (Glotko et al., 2020).

3. METHODS

To meet the study's aim, a range of general methods, including descriptive, comparison, analysis and observational methods are utilized.

The digital economy contributes to the development of many systems that have practice in many areas of economics, finance, and law. One of the new solutions for business is the issue of working with the bitcoin and its analogues. At the same time, for some companies the solution to this problem was predetermined by the emergence of bitcoin and its analogues as an inevitable fact of the digitalization of the economy.

Blockchain technology, which is the base of bitcoin mining, is already being considered by businesses as an alternative to many existing products in logistics, creating databases for a file cabinet, accounting and auditing and other areas of business. Meanwhile, the technology has been developed and enhanced so that it can include a system of "smart contracts", which allows you to process a virtually unlimited number of transactions, as well as to support decentralized applications. It is known that the creation of bitcoin has initiated blockchain technology as an alternative to carrying out account settlement transactions between stakeholders. The change in the bitcoin code and the inclusion of new functions in the blockchain technology makes it possible to expand the line of altcoins. Considering hands-on experience of working with digital assets, it should be noted that there are a lot of digital assets that are listed on stock exchanges. Figure 1 shows research data on the activity of digital assets on exchanges.

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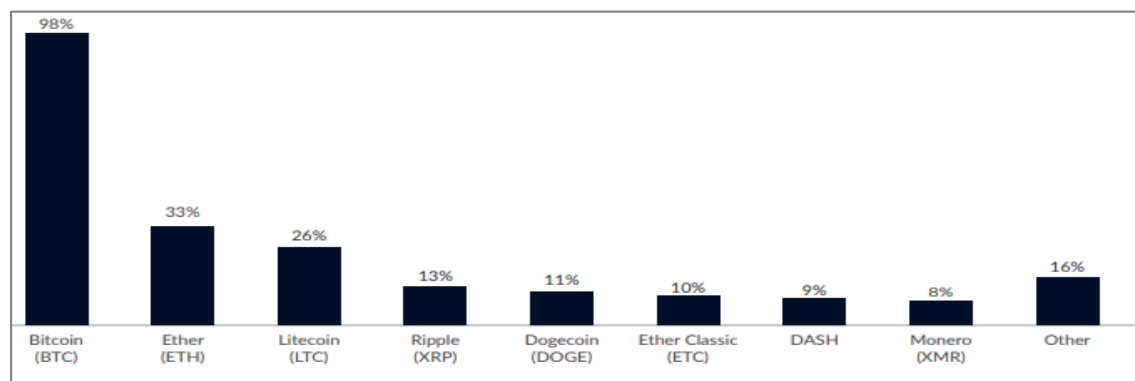


Figure 1. Transactions of digital assets on stock exchanges, in % for the exchanges under study
Compiled basing on https://www.jbs.cam.ac.uk/fileadmin/user_upload/research/centres/alternative-finance/downloads/2017-global-cryptocurrency-benchmarking-study.pdf

Commenting on the data in Figure 1, it should be noted that the most popular digital asset is the bitcoin, which is traded on virtually all trading platforms. Apart from the bitcoin, the most popular alternatives include ethereum, DASH, Monero, Ripple, Litecoin, Kitecoin, Dogecoin, and many other altcoins. Now on the market you can observe more than 300 platforms where the bitcoin and its analogues are traded. In fact, all trading platforms are an Internet resource. Whereas reliable and stable platforms provide access for trading bitcoin as well as the most popular and well-known altcoins, many new platforms are ready to provide a platform for more risky operations. Fig. 2 shows research data on the bitcoin and its analogues trading platforms by sales volume.

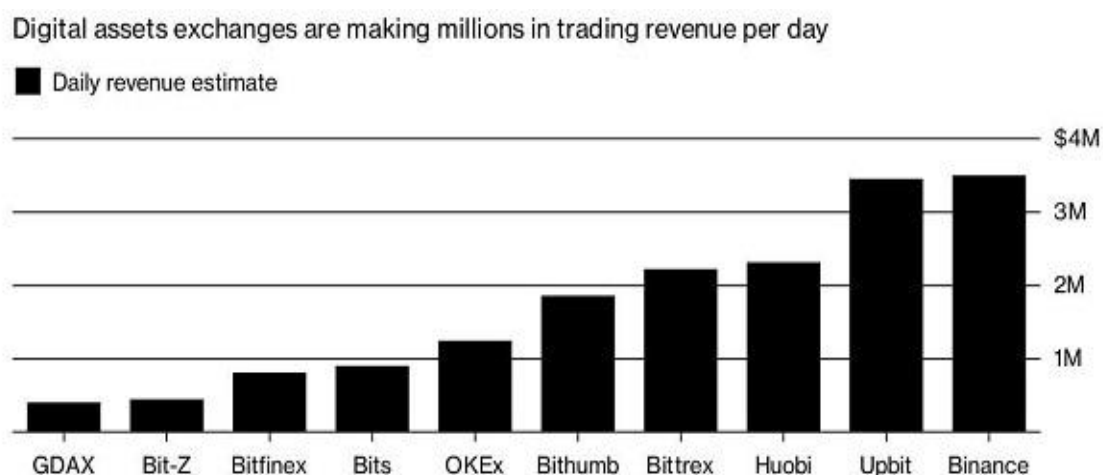


Figure 2. Bitcoin and altcoins trading platforms by sales volume, \$ USA

Compiled basing on <http://partnerskie-programmy.org/rating/rejting-birzh-kriptoalyut>

Commenting on the data in Figure 2, it can be noted that the most active trading platforms are Binance and Upbit. The capabilities of each digital trading platform are individual,

but in general, their comprehensive characteristics include the ability to choose trading pairs, the level of commission fees and, thirdly and most importantly, the accounts security system. Bidders can choose the trading platform that best suits their interests and requests. As a rule, traders are attracted by low or zero commissions. Moreover, in exchange operations they are lured by a line of digital products and capital storage services. Additional services can be represented by exchange operations with fiat money, multilingualism, and marginal trading (Westerman, 2019). Besides, users of digital trading platforms appreciate the ability to process large amounts of information and a high speed of transactions, even at peak loads. It is important that all digital trading platforms represent decentralized stock exchanges where the verification of a participant's identity in trading is usually not mandatory (Stoianova and Vasilyeva, 2022). That, in turn, should be considered a priority factor by exchange trading participants. On the other hand, the same factor arouses much controversy, both from legal and taxation points of view.

However, it is even more topical from the point of view of state counter-terrorism structures fighting against terrorist organizations, as well as criminal acts. This requires jurisdictions to form a stable position regarding the status and legitimacy of transactions with the bitcoin and its analogues (Rahman and Novikova Freyre Shavier, 2018). Jurisdictions of various countries ambiguously perceive the ability of a business to work with the bitcoin and its analogues, which are mainly viewed as an opportunity to carry out settlement transactions for goods, works, services. In fact, the bitcoin and its analogs put jurisdictions at peril of bypassing settlements in the national accounting currency or other foreign currency funds recognized in the international environment (Smirnova and Rudenko, 2017). In general, transactions beyond the state control are most risky, since consequently assets transfers may be streamed to support illegal actions both between individuals and persons belonging to terrorist groups, prohibited on the territory of almost all states. Another risk provoked by settlements with digital assets is tax evasion, which in turn creates conditions for the shortfall in budget (regional, territorial) funds in the operation of the entire mechanism for the functioning of public services, social policy, environmental policy and other significant areas (Movchan et al., 2019; Nikulin et al., 2021). However, some governments have reported millions in tax revenues from the sale of bitcoins (Dudukalov et al., 2020; Villas Bôas Filho, 2021).

Since the participants in the transactions cannot be identified, the calculations of the bitcoin and its analogs are used in corruption crimes, such as the trade in drugs and psychotropic substances, as well as pornography. Some volumes of turnover can be judged by the court decisions that have taken place. For example, according to the Finnish customs, confiscated bitcoins for drug crimes in the amount of 19 million euros may be put up for auction. The statistics of such studies is extremely difficult and when some shadow trading platforms are closed, others with similar properties and characteristics appear. Therefore, according to

the author's study, from the moment of the emergence and circulation of bitcoin, the emergence of a legal vacuum in relation to the status of bitcoins and the regulation of legal actions with them is noted (Vasilyeva et al., 2021). In general, the status of the bitcoin and its analogues varies from a means of payment to a property mass. However, regardless of the status established by the jurisdiction, the confirmation of ownership of the digital asset is required, which is complicated by its initial functionality as an object, transactions with which may be of an incognito character.

The volatility of the bitcoin is noted by virtually all jurisdictions and representatives of the financial and economic sector. Particular attention to the potential of digital assets comes at a time of economic uncertainty and volatility that is a consequence of the COVID-19 pandemic (Machado, 2021). It is obvious that the period of isolation has led to a restriction of business activity and, therefore, a slowdown in the global GDP growth. This situation has engulfed virtually all geopolitical conglomerates, and we can say that COVID-19 is spread not only from person to person, but also from market to market. High volatility in financial markets has brought back investors' interest in virtual currencies. In our opinion, the impact of the COVID-19 epidemic on the bitcoin exchange rate should be considered from at least two positions. These are tracking the dynamics of the bitcoin rate relative to exchange-traded assets and the complexity of mining in conditions of limited resources. The research done in this area shows that in conditions of uncertainty as well as during crisis times, investor interest in the bitcoin is growing (CEO of Bitcoin Lab Tetsuyuki Oishi). Meanwhile, it is not a proven fact that an increase in the number of market players and in the volume of transactions inevitably lead to a significant increase in the bitcoin rate, as well as a significant impact of bitcoin volatility on fiat currency rates. However, this area of research should not be ignored, since the creation of favorable or, on the contrary, prohibitive legal and legislative niches can lead to a change in focus on the financial market.

4. RESULTS AND DISCUSSION

Even though operations with the bitcoin and its analogues do not occupy leading positions in transactions, it is no longer possible for jurisdictions to ignore the fact of their existence. Table 1 shows the data for the EU countries on the recognition of the bitcoin and its analogues by jurisdictions.



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Table 1. Recognition of bitcoin and its analogues by EU countries.

Country	Not recognized as an official payment instrument	Qualified as a payment instrument, transactions with which are subject to or exempt from taxation	Officially announced release of the national digital asset
Austria	v	v	
Belgium	v	v	
Bulgaria	v	v	
Croatia	v	v	
The Republic of Cyprus	v	v	
The Czech Republic	v	v	
Denmark	v	v	
Estonia	v	v	
Finland	v	v	
Germany	v	v	
Hungary	v	v	
Ireland	v	v	v
Italy	v	v	
Latvia	v	v	
Lithuania	v	v	v
Luxembourg	v	v	
Malta	v	v	v
The Netherlands	v	v	
Poland	v	v	
Portugal	v	v	
Romania	v	v	
Slovakia	v	v	
Slovenia	v	v	
Spain	v	v	
Sweden	v	v	v
Greece	v	v	
France	v	v	

Commenting on the data in Table 1, we can note the relative uniformity of approaches to the recognition of the bitcoin and its analogues. Digital assets are not legally recognized as a means of payment. However, regarding terminology in European countries, a single term for designation and classification has not been developed both at the level of legislative acts and

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in the comments and reports of representatives of the banking and financial sector. For example, such terms as digital currency, virtual goods, virtual assets, electronic currency, etc. are commonly used. Most countries tend to believe that the bitcoin and other altcoins should not be considered as e-currency or digital money, since the bitcoin and other altcoins do not meet the criteria used for the recognition of fiat money, foreign currency, national currency and are not integrated in the monetary system of any jurisdiction.

In this regard, the German Bundesbank proposes to designate the bitcoin and other altcoins as "crypto-token". The Finnish Financial Supervisory Authority designates digital assets as investment alternatives. Bundesministerium der Finanzen, classifies it as a type of goods without physical form, i.e. intangible goods. Such a variety of terms is a consequence of the rather general definition of digital assets by the EU Commission, which refers to them as "a digital representation of the value of objects not controlled by state bodies and central banks of jurisdictions, which can be accepted by active market participants as a means of payment, stored or sold electronically". In our opinion, it is advisable for the jurisdictions of countries to develop a uniform approach to terminology to turn to stable terms used by global businesses for the classification, recognition, and reflection of digital assets in financial statements. It should be emphasized that while digital assets can be used for payments, none of the companies recognize the bitcoin and its analogues as cash.

As an exception can be considered the financial statements of First Bitcoin Capital Corp (Canada) for the period from January 1 to June 30, 2017, where digital assets were included in Cash and cash equivalents article of the Statement of Financial Position (without disclosure). In support of the business position, the IFRIC release completely rejects the possibility of classifying digital assets as cash or cash equivalents. From the point of view of IFRS, digital assets do not have the features of cash since they are characterized by high volatility. Moreover, regarding their value, no valuation is determined for settlements in trading operations.

However, the IFRIC uses a "cryptocurrencies" term referring to the common name of digital assets. At the same time, the business community uses the term "cryptoassets" when preparing financial statements. We believe that the "cryptoassets" term should be used as a basis for the international language of business and jurisdictions for digital assets. "Crypto" is short for cryptography as a process of encrypting and decrypting information. "Assets" is a term used by transnational business that denotes objects that can bring economic benefits to the holder from various types of transactions. Such operations may refer to producing and extracting objects, acquiring property in order to resell or to increase value, etc. All possibilities are united by a single concept, which implies control, i.e. the right to use. Meanwhile, the right does not necessarily secure the right of ownership. For example, assets include items received on lease without the right of subsequent purchase and transfer of title to the lessee. The

legislation, stipulating a control function, is considered as the ability to control an object and to carry out certain economic actions. At the same time, assets must have a reliable valuation. Despite the instability and a high risk of loss of value, these objects have a certain value at a definite period of time. Thus, the bitcoin and altcoins can be referred to as "cryptoassets" (Movchan et al., 2019).

The comments and reports of regulatory authorities' representatives as well as representatives of banking and financial sectors of the EU countries unanimously note the high risks of transactions with the bitcoin and its analogues for both individuals and businesses. Thus, the European Supervisory Authorities for Securities (ESMA), Banking (EBA) and Insurance and Pensions (EIOPA) issued a joint warning about the high risks of transactions with the bitcoin and its analogues, as they are not regulated by the current legislation and the degree of their suitability for investments, value gains, savings for retirement investments are highly questionable. National jurisdictions of countries, national banks, as well as key figures in the financial and economic sector of the economy, are actively warning all market participants about the high risks of transactions in bitcoin and its analogues. Thus, the National Bank of Bulgaria has noted that the bitcoin and its analogues not only demonstrate high price volatility, but also has some features of a price bubble. The National Bank of Denmark has emphasized that the value of the bitcoin cannot be tied to the value of quoted metals such as gold or silver and compared the bitcoin to glass beads. Moreover, the National Bank of France calls Bitcoin a speculation and money laundering tool. Representatives of EU countries' governmental structures have unanimously recognized the high risks of using the bitcoin and its analogues for business (Dudukalov et al., 2020).

Representatives of the financial sector of government agencies have emphasized that businesses that invest in the bitcoin and its analogues are at risk, since the responsibility for the losses incurred lies solely with the management of the companies. At the same time, the risks are also connected with a possible theft of digital wallets, fraud, and other crimes. For example, the Financial Stability Board of Croatia has clarified that regulators are not responsible for supervising the process of issuing and trading the bitcoin and its analogues. This situation is typical for almost all EU countries. Thus, the Financial Supervision Authority of Denmark has explicitly stated that transactions with bitcoins are not secured by the current financial legislation. Moreover, such transactions are not stipulated by law in terms of issuing funds, their exchange, payment, and other operations. However, entering the ICO may be regulated by the legislation on alternative investment funds, prospects, and money laundering. A similar statement was made by the Finnish Financial Supervision Authority, announcing that access to the ICO can be regulated by EU rules for alternative investment funds. Whereas in Italy it is determined that providers of the bitcoin and its analogues must comply with the laws

regulating money exchange operators. There exist similar rules in Germany and other EU countries.

As an overall result can be considered the position of the Central Bank of Ireland, which raised the issue of transactions with the bitcoin and its analogues. It has proposed to treat them either as new examples of old types of activity with the current legislation applicable to them with some amendments, or as a new type of activity that requires the development of a new legislation. It should be mentioned that an important aspect in the legislation of the EU countries is the development of common approaches in the legislation to prevent terrorist activities and illegal actions using blockchain technologies and operations with the bitcoin and its analogues. In this regard, there is a solid initiative of the European Commission to amend the Fourth Anti-Money Laundering Directive (AMLD) to include providers-custodians of digital wallets, as well as digital platforms for exchanging bitcoins and altcoins in the AMLD scope.

This approach stipulates the obligation of providers-custodians of digital wallets and digital platforms for the turnover of bitcoins and its analogs to provide for the necessary actions to prevent and detect terrorism financing and money laundering activities, as well as the obligation to inform law enforcement agencies (Boreiko, 2019). Based on this principle, in the legislation of virtually all EU countries, amendments have been made to the anti-money laundering legislation, which also applies to persons who provide services for transactions with the bitcoin and its analogues, such as buying and selling, exchange and storage, and also to those who provide other services related to operations with bitcoin and its analogues. At the same time, service providers must have an appropriate permit to operate.

Nevertheless, not all representatives of the EU countries see a significant threat in the activities of operations with bitcoin and its analogues. For example, a representative of the Belgian Ministry of Finance has noted that the volumes of transactions in the bitcoin and its analogues are not significant and do not represent a real threat to the country's economy, consequently, they cannot be considered a tool for money laundering and illegal activities. However, according to cryptanalysts' reports for the year of 2019, Visa processed \$ 8.8 trillion in bitcoin payments, which corresponds to 10% of global GDP (Chinchaladze, 2020). Thus, despite all the power of fiat money, high volatility, hacking attempts and the likelihood of crypto wallets being stolen, the potential of the bitcoin and its analogues looks quite confident. In addition, restrictions on their distribution, as well as interference with the infrastructure and the mining system can have a significant impact on the spread of the bitcoin and its analogues. Such impacts are possible at the level of regulatory and legislative measures. However, it should be recognized that the blockchain system and digital assets represent an innovative type of technology and business. Since the system is improving, adapting to new challenges, its development is significantly ahead of legislative initiatives.

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One of the key factors influencing the volatility of the bitcoin is determined by possible interventions in the transaction system, i.e. the so-called cyber-attacks. They mainly consist in an increased flow of applications from participants that digital platforms are not technically capable to process. At the same time, digital platforms are also improving, and cyber-attacks are quite costly and resource-intensive actions. Also, the expected impact on the volatility of the bitcoin is defined as the influence of manufacturers of mining equipment and deliberate interference with the processor and operating system. However, a range of threats to the promotion of the bitcoin and altcoin narrows down to the same regulatory and legislative initiatives of jurisdictions. Not only business, but also government financial structures do highly appreciate the potential of blockchain technology and digital assets, which can be used in various government areas as to complete transactions and attract investments in the innovative sector of the economy. The possibilities of applying favorable regulatory conditions for digital assets at the state level lead to a quite feasible idea of issuing a state digital currency. For example, in Ireland, Irladcoin is intended to be used for the development of the tourism industry. The Malta Gambling Authority is also considering the use of the bitcoin by licensees.

The Swedish Central bank is also considering launching its own digital currency. The Bank of Lithuania has announced its intention to issue the first collectible digital coin using blockchain technology. Such government digital currencies are likely to be decentralized. Nevertheless, it is precisely the nationalization of digital coins that can lead to the ousting of altcoins and even bitcoin from the crypto market. As noted earlier, the regulatory and legislative restrictions on transactions with bitcoin and its analogues can significantly affect the development of the crypto market (Dudukalov et al., 2021). One of these impacts is the recognition of turnover and mining, as well as other services with digital assets, as subject to taxation. Common to all EU countries is the approach of levying VAT on transactions with the bitcoin and its analogues. So, back in 2015, the European Court of Justice (ECJ) ruled that exchange operations of bitcoin, its counterparts and fiat currency are not subject to VAT taxation, as well as the purchase and sale of the bitcoin and altcoin.

Regarding other taxes, such as income tax, no completely identical approaches can be seen in the EU countries. For example, in Austria, mining of the bitcoin and its analogues is considered as the production of goods and their selling is subject to income tax, as well as the operation of digital platforms and crypto ATMs. The Italian Imposta Regionale sulle Attività Produttive is levied on corporate income from operations with the bitcoin and its analogues. In Denmark, losses from the sale of the bitcoin and its analogues are not taxed, whereas profits are taxed, including capital gains from currency exchange or their usage as a means of payment (Slepov, 2019).

In Ireland, the Capital Gains Tax Act regulates transactions in the bitcoin and its analogues. Moreover, individuals who must pay income tax from sales, for example, in

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Bulgaria and Ireland, are subject to taxation. Thus, the EU countries have not developed a unified approach to the taxation of transactions with the bitcoin and its analogues. Most laws are under development or consideration, which affects adversely the global economic environment, creating both more and less attractive economic zones. The impact of bitcoins and altcoins on fiat money, including the euro, is in focus of interest for both national financial and research institutions. During the Covid 19 period, this interest has increased. The issues of “ousting” fiat money by their digital counterparts in business transactions can be a subject for discussion. Fig. 3 shows the dynamics of changes in the bitcoin rate against the US dollar and euro.

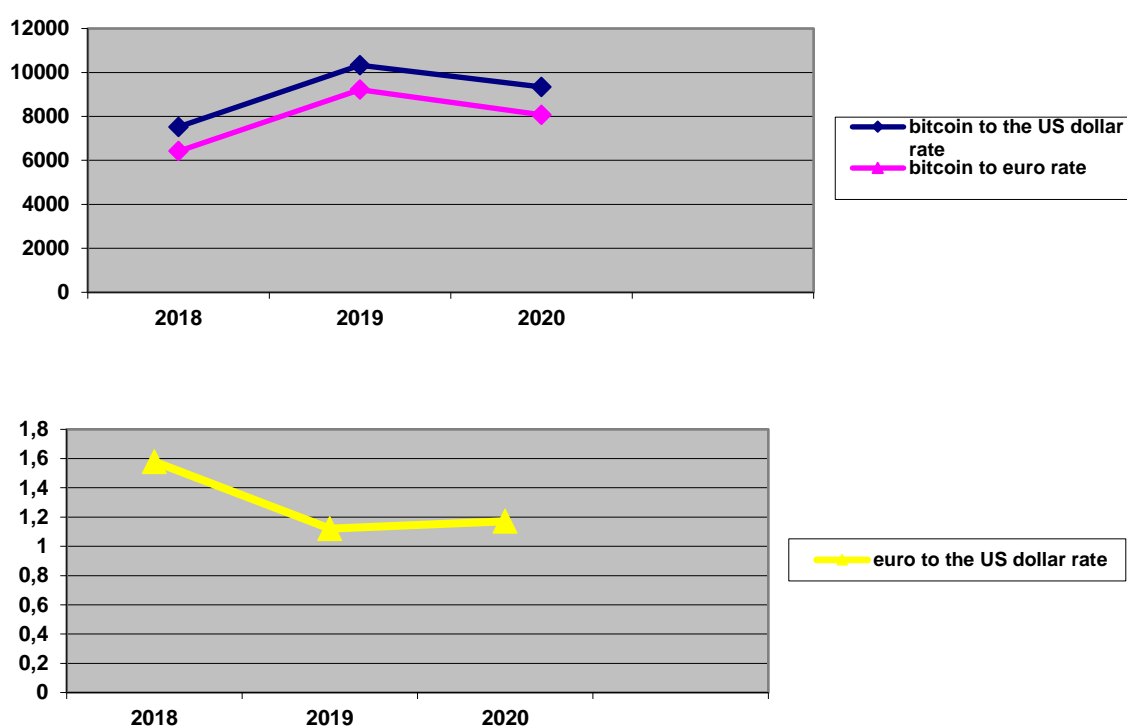


Figure 3. The rate of the bitcoin to the US dollar and the euro, and the euro to the US dollar.

As can be seen from Figure 2, the dynamics of changes in the exchange rate of bitcoin to the US dollar and the bitcoin to the euro are synchronous, which indicates the actual absence of the impact of bitcoin on the world's fiat money. At the same time, the cross-rates of fiat currencies interact in a different way, which also confirms the actual absence of the effect of the bitcoin on the stability of the euro. Regarding the euro, it can be noted that it is a fairly stable fiat currency and consumer price inflation in the eurozone is not significant, having been for many years in the range of 1.5% - 1.7%. The inflationary processes of the euro are influenced more significantly by internal and external economic challenges. These should include the dynamics of growth or decrease in growth of the world trade in general (Nikulin et

al., 2021). Another important factor is the "trade wars" between the world powers, and changes in the dynamics of the commodity markets growth. The impact is also exerted by the introduction of US restrictions and protective duties, environmental problems, such as lower water levels, which can paralyze shipping and steaming in some countries of the eurozone.

Thus, inflationary factors in the eurozone are influenced by internal and external economic challenges, which the society is aware of, but not by the bitcoin and altcoins. Regarding multiplier intermarket relationships, it is worth noting that fiat currency depends on many factors, so does the bitcoin. The key drivers of the bitcoin are obviously the price of gold and the exchange rate of the Chinese yuan. However, a significant decrease in gold production in China may occur during the introduction of isolation and the extension of quarantine under the Covid 19 pandemic, which in turn will facilitate an increase in the price of this mineral in the market and simultaneously in bitcoin value. However, even in this case, we are not inclined to predict the significant impact of the bitcoin on the volatility of the euro or the US dollar.

5. CONCLUSION

The European Union is a unique integral association of independent states with a single economic space and a single European currency, which is the euro. Based on the results of the study, it was determined that the fluctuations in the euro exchange rate are influenced by many factors both internal processes in the EU perimeter, and external global influences. The rapid development of innovative digital technologies has led to the development of a new blockchain technology, which in turn has become the basis for the development of the bitcoin and its altcoin analogues. It is obvious that to solve many economic and economic security issues, both for EU countries and in the international economic environment, it is necessary to take into account the perception of the bitcoin and altcoins by the national jurisdictions of the EU countries, the ambiguity of their classification, the taxation of bitcoin and altcoin transactions, as well as the impact of bitcoins and altcoins on the euro and the fiat currencies rate.

Relying on the results of our research, it was concluded that most countries are inclined to believe that the bitcoin and other altcoins should not be considered as electronic currency or digital money. Digital assets are not legally recognized as a means of payment. However, regarding the terminology in European countries, a single term for definition and classification of the bitcoin and other altcoins has not been developed, both at the level of legislative acts and in the comments and reports of representatives of the banking and financial sector. Such a variety of terms is a consequence of the fairly general definition of digital assets by the EU Commission, which refers to them as "a digital representation of the value of objects not controlled by state bodies and central banks of jurisdictions, which can be accepted by

participants in an active market as a means of payment, stored or sold in the electronic format" (Boreiko, 2019). In our opinion, it is advisable for jurisdictions of countries to develop a uniform approach to terminology to refer to stable terms used by transnational businesses for the classification, recognition and reflection of digital assets in financial statements, such as "cryptoassets".

Regarding the development of unified approaches to legislation on transactions with the bitcoin and altcoins, the EU countries need more solidarity in resolving the issue. They should consider transactions with the bitcoin and its analogs either to be new examples of old types of activity and thus apply the current legislation to them with some amendments, or they should treat them as a new type of activity, requiring the development of new legislation. Also, the EU countries have not developed a unified approach to the taxation of transactions with the bitcoin and its analogs, most laws have been under development or consideration, which negatively affects the global economic environment, creating both more attractive and less attractive economic territories.

We believe that the unification of the legislation of the EU countries to prevent terrorist activities and illegal actions using blockchain technologies and transactions with the bitcoin and its analogues is of importance. In this regard, there is a solid initiative of the European Commission to amend the Fourth Anti-Money Laundering Directive (AMLD) to include digital wallet custodian providers, as well as digital platforms for exchanging bitcoins and altcoins in the AMLD scope. Regarding the impact of bitcoins and altcoins on fiat currencies, including the euro, the study has shown that the dynamics of changes in the exchange rate of the bitcoin to the US dollar and the bitcoin to the euro are synchronous, which indicates the actual absence of the impact of the bitcoin on the world's fiat money. Nevertheless, the cross-rates of fiat currencies interact in a different way, which also proves the fact that the bitcoin has no effect on the stability of the euro. Thus, inflationary factors in the eurozone are influenced by well-known internal and external economic challenges, but not by the bitcoin and altcoins (Dudukalov et al., 2021).

It should be noted that the potential of digital assets has come in focus at a time of economic uncertainty and volatility that is a consequence of the COVID-19 pandemic. Undoubtedly, the period of isolation has led to a restriction of business activity and, therefore, a slowdown in global GDP growth. This situation has engulfed virtually all geopolitical conglomerates, and we can say that COVID-19 is transmitted not only from person to person, but also from market to market. Due to a high volatility in financial markets, investors' interest in virtual currencies has resumed. In our opinion, the impact of the COVID-19 pandemic on the bitcoin exchange rate must be considered, since in conditions of uncertainty as well as in crises, the interest of investors in the bitcoin is growing. However, it is not proven that an

increase in the number of market players and in the volume of transactions lead to a significant rise in the bitcoin rate, as well as an impact of the bitcoin volatility on fiat currency rates.

Therefore, this research direction should not be ignored, since the creation of favorable or, on the contrary, prohibitive legal and legislative niches can lead to a change in focus on the financial market. Regarding multiplier intermarket relationships, it should be noted that the bitcoin depends on many factors to the same extent that the fiat currency does. Nevertheless, the major drivers of the bitcoin are the price of gold and the exchange rate of the Chinese yuan. During the introduction of isolation and the extension of quarantine during the Covid 19 pandemic, there may be a significant decrease in gold production in China, which in turn will lead to an increase in the price of this mineral in the market thus raising the cost of the bitcoin. However, we believe that even in this case, it is not possible to predict the significant impact of the bitcoin on the volatility of the euro or the US dollar.

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REFERENCES

Al-Tawil, T. N. E., & Younies, H. (2021). The implications of the Brexit from EU and bitcoin. *Journal of Money Laundering Control*, 24(1), 137-149.

Anderson, B. (2018). Regulating the future of finance and money: a rational U.S. regulatory approach to maximizing the value of crypto-assets and blockchain systems. *Bocconi Legal Papers*. 11, 1–71.

Boreiko, D., & Vidusso, G. (2019). New blockchain intermediaries: do ICO rating websites do their job well? *Journal of Alternative Investments*, v21(4), 67–79.

Chinchaladze, N. (2020). The impact of various currency regimes on economic development facets: case of Georgia. *Journal of Security and Sustainability Issues*, 9 (4), 1445-1457.

Ciaian P., & Rajcaniova, M. (2018). Virtual relationships: Short-and long-run evidence from bitcoin and altcoin markets. *Journal of International Financial Markets, Institutions and Money*, 52, 173 – 195.

Cong L. W., & Hem Z. (2019). Blockchain disruption and smart contracts. *Review of Financial Studies*, 32(5)m 1754-1797.

Deryagin, A. V., Krasnova, L. A., Sahabiev, I. A., Samedov, M. N., & Shurygin, V. Y. (2019). Scientific and educational experiment in the engineering training of students in the bachelor's degree program in energy production. *International Journal of Innovative Technology and Exploring Engineering*, 8(8), 572-577.

Dremova, E.V. (2019). Economic aspects for ensuring justice in the context of the industrial development system formation. *Journal of Advanced Research in Law and Economics*, 10 (5), 1408-1414.2019.

Dudukalov, E. V., Geroeva, Y. A., Shtepa, M. A., & Ushakov, D. (2021). The crypto currency as money of digital economy. Paper presented at the E3S Web of Conferences, 244. <https://doi:10.1051/e3sconf/202124410021>

Dudukalov, E. V., Spabekov, G. O., Kashirskaya, L. V., Sevbitov, A. V., Voronkova, O. Y., & Vasyutkina, L. V. (2020). Fiscal goals of regulating the activities of the institute of controlled foreign companies in the digital economy. *Entrepreneurship and Sustainability Issues*, 8(2), 972-983. [https://doi:10.9770/jesi.2020.8.2\(59\)](https://doi:10.9770/jesi.2020.8.2(59))

Flores, G. N., & Cruz, P. M. da. (2021). Sustainability as an Inducting Element for an Environmental State of Law. *Journal of Law and Sustainable Development*, 9(2), e0735. <https://doi.org/10.37497/sdgs.v9i2.33>

Glotko, A., Karabasheva, M., Prodanova, N., Sychanina, S., Vysotskaya, O., & Barmuta, K. (2020). Directions of effective use of biopharmaceutical resources as a factor of sustainable development of mountain territories. *International Journal of Pharmaceutical Research*, 12, 2037-2049. doi:10.31838/ijpr/2020.SP1.301

Hacker, P., & Thomale, C. (2018). Crypto-securities regulation: ICOs, token sales and cryptocurrencies under EU financial law. *European Company and Financial Law Review*, 15(4), 645-696.

Kalašová, A., Hájnik, A., Kubařák, S., Beňuš, J., & Harantová, V. (2022). The impact of actuated control on the environment and the traffic flow. *Journal of Applied Engineering Science*, 20(2), 305-314.

Korableva, O. N., Mityakova, V. N., & Kalimullina, O. V. (2020). Designing a decision support system for predicting innovation activity. Paper presented at the ICEIS 2020 - Proceedings of the 22nd International Conference on Enterprise Information Systems, 1 619-625.

Livson, M., Eshtokin, S., Vasyukov, V., Yudina, E., Baybarin, A., & Pivneva, S. (2021). Impact of Digitalization on Legal Regulation: formation of new legal practices. *Journal of Law and Sustainable Development*, 9(2), e0749. <https://doi.org/10.37497/sdgs.v9i2.28>

Lubozheva, L. (2021). Despecialization of Economic Terminology. *Modern Studies of Social Issues*, 13(2), 102-110. <https://doi.org/10.12731/2077-1770-2021-13-2-102-110>

Machado, F. V., Meys, R., Delbressine, J. M., Vaes, A. W., Goërtz, Y. M., van Herck, M., ... & Spruit, M. A. (2021). Construct validity of the Post-COVID-19 Functional Status Scale in adult subjects with COVID-19. *Health and quality of life outcomes*, 19(1), 1-10. <https://doi.org/10.1186/s12955-021-01691-2>

Maia, A. V. F., Silva, T. H. C., & Jordão, L. R. (2020). MINERALBUSINESS AND RISKS IN BRAZIL: THE IRRATIONALITY OF ENVIRONMENTAL LICENSING AND RESPONSIBILITY FOR DISASTERS. *Journal of Law and Sustainable Development*, 8(2), 190–209. <https://doi.org/10.37497/sdgs.v8i2.38>

Movchan, I. B., Shaygallyamova, Z. I., Yakovleva, A. A., & Movchan, A. B. (2021). Increasing resolution of seismic hazard mapping on the example of the north of middle russian highland. *Applied Sciences (Switzerland)*, 11(11) <https://doi:10.3390/app11115298>

Movchan, I. B., & Yakovleva, A. A. (2019). Refined assessment of seismic microzonation with a priori data optimisation. *Journal of Mining Institute*, 236, 133-141. <https://doi:10.31897/PMI.2019.2.133>

Nikitin, Y., & Safonov, D. (2021). Determination of the Cost of Logistic Operational and Warehouse Works When Forming The Initial Price Of The Contract. *Krasnoyarsk Science*, 10(2), 7-24. <https://doi.org/10.12731/2070-7568-2021-10-2-7-24>

Nikulin, A. N., Dolzhikov, I. S., Klimova, I. V., & Smirnov, Y. G. (2021). Assessment of the effectiveness and efficiency of the occupational health and safety management system at a mining enterprise. *Bezopasnost' Truda v Promyshlennosti*, 2021(1), 66-72. doi: <https://10.24000/0409-2961-2021-1-66-72>

Paule, V.J., Prado-Román C., & Gomez, M.R. (2019). Economic policy uncertainty and Bitcoin. Is Bitcoin a safe-haven asset? *European Journal of Management and Business Economics*. 2020. [Online]. Available: <https://10.1108/EJMBE-07-2019-0116>.

Rahman, P. A., & Shaviev, G. D. K. N. F. (2018, March). Reliability model of disk arrays RAID-5 with data striping. In *IOP Conference Series: Materials Science and Engineering* (Vol. 327, No. 2, p. 022087). IOP Publishing. <https://doi.org/10.1088/1757-899X/327/2/022087>

Ramón Fernández, F. (2020). Artificial Intelligence and Agriculture: New Challenges in the Agricultural Sector. *Journal of Law and Sustainable Development*, 8(2), 123–139. <https://doi.org/10.37497/sdgs.v8i2.35>

Santos, M. L., Zacharias, L. R., & Cota, V. R. (2022). Open-source hardware to face COVID-19 pandemic: the need to do more and better. *Research on Biomedical Engineering*, 38(1), 127-138. <https://doi.org/10.1007/s42600-020-00123-2>

Slepov, V. A., Kosov, M. E., Burlachkov, V. K., Grishina, O. A., & Sakharov, D. M. (2019). Shadow banking: Reasons of emergence and directions of development. *International Journal of Civil Engineering and Technology*, 10(2), 1747-1754..

Stoianova, A., & Vasilyeva, N. (2022). Production Process Data as a Tool for Digital Transformation of Metallurgical Companies. In *XIV International Scientific Conference "INTERAGROMASH 2021"* (pp. 780-787). Springer, Cham. doi: https://10.1007/978-3-030-81619-3_87

Smirnova, N. V., & Rudenko, G. V. (2017). Tendencies, problems and prospects of innovative technologies implementation by russian oil companies. *Journal of Industrial Pollution Control*, 33(1), 937-943.

Vasilyeva, N., Fedorova, E., & Kolesnikov, A. (2021). Big data as a tool for building a predictive model of mill roll wear. *Symmetry*, 13(5) doi: <https://10.3390/sym13050859>

Vigliotti, M. G., & Jones, H. (2020). Bitcoin and Blockchain: The Fundamentals. In *The Executive Guide to Blockchain* (pp. 41-70). Palgrave Macmillan, Cham.10.1007/978-3-030-21107-3_4.

Villas Bôas Filho, O. (2021). Judicialization As a Form of "Immunization" of Democracy Against Populist Contamination. *Journal of Law and Sustainable Development*, 9(2), e0744. <https://doi.org/10.37497/sdgs.v9i2.3>

Voronkova, O. Y., Klochko, E. N., Vakhrushev, I. B., Sergin, A. A., Karpenko, E. Z., & Tavbulatova, Z. K. (2020). Land resource management in the agro-industrial sector of russia.

International Journal of Pharmaceutical Research, 12, 2087-2093. doi:
<https://10.31838/ijpr/2020.SP1.306>

Westerman, G. (2019). The First Law of Digital Innovation. *MIT Sloan Management Review*, 52(3), 326–349.

