


“Tax control of cryptocurrency transactions in Ukraine”

AUTHORS

Svitlana Volosovych  <https://orcid.org/0000-0003-3143-7582>
 <https://publons.com/researcher/2218914/svetlana-volosovich/>
Yurii Baraniuk  <https://orcid.org/0000-0003-1289-2248>
 <http://www.researcherid.com/rid/J-5726-2018>

ARTICLE INFO

Svitlana Volosovych and Yurii Baraniuk (2018). Tax control of cryptocurrency transactions in Ukraine. *Banks and Bank Systems*, 13(2), 89-106.
doi:[10.21511/bbs.13\(2\).2018.08](https://doi.org/10.21511/bbs.13(2).2018.08)

DOI

[http://dx.doi.org/10.21511/bbs.13\(2\).2018.08](http://dx.doi.org/10.21511/bbs.13(2).2018.08)

RELEASED ON

Saturday, 23 June 2018

RECEIVED ON

Thursday, 17 May 2018

ACCEPTED ON

Wednesday, 13 June 2018

LICENSE



This work is licensed under a [Creative Commons Attribution 4.0 International License](https://creativecommons.org/licenses/by/4.0/)

JOURNAL

"Banks and Bank Systems"

ISSN PRINT

1816-7403

ISSN ONLINE

1991-7074

PUBLISHER

LLC “Consulting Publishing Company “Business Perspectives”

FOUNDER

LLC “Consulting Publishing Company “Business Perspectives”



NUMBER OF REFERENCES

50



NUMBER OF FIGURES

6



NUMBER OF TABLES

1

© The author(s) 2025. This publication is an open access article.



BUSINESS PERSPECTIVES



LLC "CPC "Business Perspectives"
Hryhorii Skovoroda lane, 10, Sumy,
40022, Ukraine

www.businessperspectives.org

Received on: 17th of May, 2018

Accepted on: 13th of June, 2018

© Svitlana Volosovych,
Yurii Baraniuk, 2018

Svitlana Volosovych, Doctor of
Economics, Professor, Department
of Finance, Kyiv National University
of Trade and Economics, Ukraine.

Yurii Baraniuk, Doctoral Student,
Department of Finance, Kyiv
National University of Trade and
Economics, Ukraine.



This is an Open Access article,
distributed under the terms of the
[Creative Commons Attribution 4.0
International license](https://creativecommons.org/licenses/by/4.0/), which permits
unrestricted re-use, distribution,
and reproduction in any medium,
provided the original work is properly
cited.

Svitlana Volosovych (Ukraine), Yurii Baraniuk (Ukraine)

TAX CONTROL OF CRYPTOCURRENCY TRANSACTIONS IN UKRAINE

Abstract

The current global financial market is witnessing the activation of cryptocurrency as a payment instrument and a means of accumulation. However, the risks of money laundering, terrorism financing and tax evasion that cryptocurrency transactions imply lead to the need to implement their state regulation, an important component of which is tax control.

Therefore, the purpose of the article is to substantiate the value orientations when forming the system of cryptocurrency transactions tax control in Ukraine taking the positive experience of developed countries into account. The scientific results of the study consist in the emphasizing structural, functional, systemic and institutional approaches to understanding tax control, which became the basis for identifying the features of cryptocurrency transactions as a tax control object.

It was revealed that the lack of personalization of the agreement parties, the relatively high level of information security, free international turnover and a decentralized payment system are the factors of the cryptocurrency market further development. On the other hand, this leads to the loss of tax revenues for Ukrainian budgetary system, taking into account the forecasted trends in the development of the cryptocurrency market by 2022 through methods of sums, least squares and expert estimates. Given the institutional approach to the understanding of tax control, an institutional structure of the cryptocurrency transactions tax control in Ukraine is proposed.

It is established that domestic state institutions are able to carry out tax control over these transactions. It is also determined that introducing fiscal control will result in the receipt of additional revenues by budgets, reduction of shadow economy, counteraction to cybercrime and terrorism financing.

The practical importance of the results is in the need to form an effective system of cryptocurrency transactions tax control as a function of public administration.

It has been determined that transactions on cryptocurrency supply, on the determining exchange rates and transactions on cryptocurrency disposal should be an object of tax control in Ukraine. Mining transactions, receipt of income (profits) in the cryptocurrency are subject to general taxes, depending on the taxpayer's legal status, in particular, personal income tax, corporate income tax and a unified social tax (UST). Taking into account the EU recommendations on the non-application of value added tax in the cryptocurrency transactions taxation, it is not appropriate to implement it in this area. Establishing tax control over cryptocurrency transactions will expand the powers of state authorities that are empowered to control observing financial discipline by economic agents in Ukraine and the financial capabilities of state and local budgets.

Keywords

tax control, cryptocurrency, tax control object, tax control subject, cryptocurrency transactions, mining

JEL Classification

E44, E62, G18

INTRODUCTION

Under the international trade intensification, cross-border capital movements and the information technology development, a gradual transformation of financial systems towards the use of electronic money is taking place. Currently, the world financial market is witnessing the circulation of cryptocurrency as a payment instrument and accumulation means, which is due to the benefits for financial services consumers and a decrease in confidence to state institutions and, in particular, to

traditional financial intermediaries. The cryptocurrency development makes an innovative foundation for the transforming financial services market, creating new opportunities for investment, lending, insurance, payments and money transfer. At the same time, the mechanism for the cryptocurrency transactions includes the risks of money laundering, terrorist financing and tax evasion. This necessitates their state regulation, an important component of which is tax control, which has recently been intensified in developed countries. Shaping the system of cryptocurrency transactions tax control and defining its objects and subjects will provide institutional modernization of the domestic tax system, increase the possibilities of the state and local self-government bodies to finance social and economic programs through additional tax revenues and working against negative phenomena such as shadow economy and cybercrime.

1. THEORETICAL BASIS

The analysis of Ukrainian scientific literature indicates the lack of attention to cryptocurrency transactions as a tax control object. At the same time, it allows for the emphasizing structural, functional, systemic and institutional approaches to the general idea of tax control. Within the first approach (structural), tax control is considered as a kind of state financial control aimed at ensuring compliance with tax and other legislation by taxpayers, identifying, eliminating and preventing tax offenses (Melnyk & Leshchukh, 2015, p. 21) at the controlled object (Lopatovskyi & Demchuk, 2016, p. 115). As a result, the country's economic security is maintained (Baranovskyi, 2017).

Vasiuk (2015), Maryniv (2016) and Proskura (2014) are the functional approach representatives. With that, attention is drawn to the fact that filling the budget through full and timely payment of taxes and fees (Vasiuk, 2015, p. 89), as well as observance of the legislation on cash flow regulation, settlement and cash operations, patenting, licensing and other legislation, the control of which is entrusted to supervisory authorities (Proskura, 2014, p. 265) are the main objectives of tax control.

Tax control within the system approach is understood as the multidimensional inter-sectoral system of supervision of state controlling bodies on the financial and economic activity of taxpayers to provide the specified level of budget and set it in accordance with the current legislation requirements (Koretskyi, 2010). As an element of the tax administration system, tax control contributes to the development of measures to counteract tax evasion, the system of fines for violating tax laws (Shuba & Khymych, 2016, p. 137). Shevchuk (2012), Nasypaiko and Samsonova (2012), Ihnatyshyn

and Troshchak (2014) support the institutional approach. According to this approach, tax control is the activity of the tax service officials to oversee the compliance of accounting of taxation objects, methods of calculating and paying taxes and tax payments with the current normative and legal documents, detecting tax offenses and defining their impact on tax liabilities. Given that, tax control includes organizational, methodological, analytical and effective measures for the controlling bodies (Ihnatyshyn & Troshchak, 2014, p. 161). On the one hand, this is the basis for meeting fiscal obligations to the budgets of all levels. On the other hand, the institutional approach to understanding tax control ensures:

- harmonization of interests of tax relation subjects;
- minimization of tax risks for all national economy subjects; and
- raising the tax culture of society.

Achieving these goals results in the modernization of both the activities of the State Fiscal Service of Ukraine and the actualization of taxation objects in accordance with changes caused by the financial technology development and the intensification of globalization processes triggering the cryptocurrency market development. The inclusion of cryptocurrency transactions in the tax control objects depends on domestic approaches to state regulation of the cryptographic market. Lansky (2018, p. 22) outlines six approaches to the regulation of cryptocurrency markets in individual countries:

- level 0 – ignoring;
- level 1 – monitoring;

- level 2 – recommendation;
- level 3 – management;
- level 4 – regulation;
- level 5 – interdiction or integration.

However, there is an opinion on the existence of a liberal, conservative, and repressive models of regulating virtual currency schemes and an expectation model (Volosovych, 2016, pp. 72-73). Within the liberal and conservative regulatory models, the law provides for the presence of taxation objects, which stipulates:

- increase in state budget income; and
- avoiding financial flows in the cybercrime world that promote money laundering from cybercrime.

The preliminary determination of the cryptocurrency legal status, which belongs to virtual currencies is the basis for the taxation of cryptocurrency transactions. In February 2015, the European Central Bank proposed to consider the cryptocurrency as a digital representation of a value not issued by a central bank, a lending institution or an e-money institution, which in some cases could be used as an alternative to money (European Central Bank, 2015). It has following features: fictitious currency without the official offer status; lack of proper regulation; issued by non-financial private companies; recognition, as a rule, only by specific virtual companies; lack of fixed offer and guarantee of money return; insufficient control of operations (European Central Bank, 2012). Financial Action Task Force (FATF) has a similar approach to understanding the cryptocurrency. Features of the virtual currency as a means of turnover were emphasized: means of payment; means of accumulation, though without the legal payment means status (FATF Report, 2014).

The first attempts to determine the legal status of cryptography in Ukraine were made in November 2014 by the National Bank of Ukraine, which determined the cryptocurrency as a money surrogate without the possibility to use it as a payment means on the territory of Ukraine. In October 2015,

this approach was changed when the National Bank of Ukraine has expressed interest in new cryptocurrency payment services, which have prospects of entering the domestic market subject to their safety. In October 2017, the Verkhovna Rada of Ukraine considered the bills “On the Cryptocurrency Turnover in Ukraine” (2017) and “On Stimulating the Market of Cryptocurrency and Their Derivatives in Ukraine” (2017). According to Article 1 of the draft Law (On Stimulating the Market of Cryptocurrency and Their Derivatives in Ukraine, 2017), cryptocurrency should be considered a financial asset for the purposes of legal regulation. Proposals come to imposing a tax on buy and sell transactions in the amount of 2% to the Pension Fund. At the same time, cryptocurrency mining transactions will also be subject to taxation, the size of which will depend on the entity’s organizational form, which can be both individual entrepreneur and legal entity.

The authors of the bills (On the cryptocurrency turnover in Ukraine, 2017; On stimulation of the market for cryptocurrency and their derivatives in Ukraine, 2017) propose to implement tax control of cryptocurrency transactions at the level of financial institutions that provide services on the cryptocurrency market. It is proposed to oblige such institutions to simultaneously execute the client’s request for the purchase/sale (exchange) of cryptocurrency, to charge and retain the fee for compulsory state pension insurance against the transaction amount, to keep a tax record of such transactions and to report to the Pension Fund bodies. However, most likely, this will lead to virtual money market participants looking for other ways to convert the hryvnia into a cryptocurrency, or vice versa, possibly through European financial markets, where such transaction fees are not collected.

For example, in the United Kingdom, since 2014, cryptocurrency is recognized as a means of payment, and special tax regulations are not applicable to transactions with their use. In 2013, The Danish Financial Supervision Authority stated that cryptocurrencies are not recognized as a means of payment, so there is no need to regulate them at all. In France, the taxation of cryptocurrency transactions begins with a margin of 5,000 euros, which is justified by the need to

allow citizens first to try to invest and develop a business with this type of assets before taxing (Kuznetsov & Yakubov, 2016). However, in some countries, the taxation of cryptocurrency operations is being introduced, and mechanisms for tax control of the above-mentioned objects are being developed. These countries include Sweden, the USA, Australia, Hong Kong, Singapore, Norway, Canada and others (Volosovych, 2016, p. 72).

Developing a tax control mechanism for cryptocurrency transactions will facilitate the identification of entities, objects and a subject of transaction in a digital currency. As a result, this will allow determining what tax rate to apply to a particular cryptocurrency transaction and establishing compliance or violation of the law on the cryptocurrency market by economic actors.

An analysis of the foreign experience of using tax audit tools shows that in France, tax control is carried out as tax declarations and documentary checks. While in the United Kingdom, the USA, Japan, Canada, and Germany, tax assessments are differentiated to check tax returns, audit, and tax/criminal investigations (Shevchuk, 2013). In Ukraine, tax control is carried out in terms of checks, revisions, investigations, supervision and inspections (Law of Ukraine "On the Basic Principles of State Supervision (Control) in the Sphere of Economic Activity", 2007), but still the list of tax control objects remains unclear to a full degree, which becomes the reason for nondisclosure of some uncontrolled cash flows associated with public administration (Bardash & Baraniuk, 2016). This necessitates the harmonization of the interests and objectives of tax control participants.

Therefore, the purpose of the article is to substantiate the value orientations when forming the system of cryptocurrency transactions tax control in Ukraine taking the positive experience of developed countries into account.

To achieve this goal, the methodical techniques of quantitative and qualitative system analysis of the financial and economic development of the cryptocurrency market, which consist in the study of state tax control in this market in the system of relations arising between state and private economic entities; retrospective and comparative analysis of

the capitalization of the most common cryptocurrencies; and methods of comparison and generalization were used. Also, forecasting methods were used to substantiate the expediency of tax control on the cryptocurrency market. Forecasts of the cryptocurrency market development are based on the methods of sums, least squares and expert estimates.

The forecast by the sum method was calculated according to the algorithm below:

$$\begin{cases} a \cdot \sum_{i=1}^k x_i + k \cdot b = \sum_{i=1}^k y_i \\ a \cdot \sum_{i=k+1}^n x_i + (n-k) \cdot b = \sum_{i=k+1}^n y_i \end{cases}, \quad (1.1)$$

Linear forecast model parameters were determined as follows:

$$a = \frac{n \cdot \sum_{i=1}^n x_i \cdot y_i - (\sum_{i=1}^n x_i) \cdot (\sum_{i=1}^n y_i)}{n \cdot \sum_{i=1}^n x_i^2 - \left(\sum_{i=1}^n x_i \right)^2}, \quad (1.2)$$

$$b = \frac{1}{n} \cdot \sum_{i=1}^n y_i - a \cdot \frac{1}{n} \cdot \sum_{i=1}^n x_i. \quad (1.3)$$

To calculate the forecast values, information for the 2012–2017 period was used, where y is the volume of the cryptocurrency market capitalization, and x is the period (in particular, the year 2012 corresponds to the value of "1", 2013 – "2", ... 2022 – "11"). Therefore, a and b are the predictive function variables; n and k are the corresponding number of periods. The equalities obtained by the methods of sums and the least squares allowed to determine the value of the forecasted market capitalization for the years 2018–2022 and their share in the GDP.

Forecast of the cryptocurrency market through the expert estimation method is based on the Michael Novogratz's (ForkLog, 2017) statement that the cryptocurrency market will reach USD 5 trillion by the year 2022. Accordingly, the difference between forecasted capitalization and the situation on the market at the end of 2017 is divided into five equal parts, which are added annually to the aggregate sum.

2. RESULTS

2.1. The development of cryptocurrency transactions as a prerequisite for their taxation system

The formation of the cryptocurrency market took place in 2008. This was caused by the 2008–2009 global financial crisis, one of the factors of which was the crisis of centralization (Dyba et al., 2014, p. 316). Nakamoto (2008) is the founder of the cryptocurrency. He considered Bitcoin as a decentralized digital currency payment system, consisting of the blockchain, open to general use account ledger. It remains the most widespread cryptocurrency, and its blockchain technology has begun to be used in many industries (Yli-Huumo et al., 2016), in public administration, in the financial market services, in trade, which is influenced by its technological structure. Since the Bitcoin appearance, the number of types of cryptocurrency has increased and reached approximately 1.2 thousand types (RBC-UKRAINE, 2018). As of January 30, 2018, the market capitalization of cryptocurrency in the world amounted to USD 538.4 billion, with 80% of this amount accounted for the top 10 leaders in the rating of digital currencies (RBC-UKRAINE, 2018) (Table 1).

As Table 1 demonstrates, four out of top 10 cryptocurrencies in the world by the size of capitalization appeared in 2017, which confirms the strong development of the cryptocurrency market.

For financial institutions, blockchain technology is the most secure way to store information about anonymity and confidentiality-based transactions. At the same time, its ongoing modernization takes place. Thus, the Blockchain 1.0 technology, which was incorporated in Bitcoin, was upgraded to 2.0 version, resulting in the emergence of a new digital currency, Ethereum, whose principle of operation lies in the functioning of “smart contracts”, excluding the impact of the human factor on the transaction and the information preservation. Such contracts are concluded between two participants (signatories), and a numeric key serves as a signature. At the same time, blockchain is the guarantor of the agreement implementation, that is, if the terms of the contract are observed, both parties receive the proper benefits (Ethereum Foundation, 2018).

In 2014, the Blockchain 3.0 was announced, which became the basis for cryptocurrencies such as EOS, Dfinity, Cosmos, Dashta, etc. The advantage, for example, of Dash currency compared to Bitcoin, is that it has lower energy costs during the mining, and absolute anonymity. If bitcoin transactions are identified when the wallet owner is detected, it is not possible to monitor transactions in the Dash system, since their data is not published in blocks.

Most modern types of cryptocurrencies are derived from Bitcoin by modifying its code. However, there are cryptocurrencies, for example, Ripple, which principles are different from Bitcoin. The purpose of this cryptocurrency is to carry out safe and fast global financial transactions of any size

Table 1. Top 10 cryptocurrencies in the world by size of capitalization as of January 30, 2018

Source: Compiled based on RBC-UKRAINE data (2018).

Name	Year of creation	Founder	Capitalization, USD bln
Bitcoin	2009	Satoshi Nakamoto	137.5
Ethereum	2015	Vitaliy Buterin	81.9
Ripple	2012	Arthur Britto, David Schwartz, Ryan Fugger	31.6
BitcoinCash	2017	Amaury Sechet	18.9
EOS	2017	Daniel Larimer	9.0
Litecoin	2011	Charlie Lee	8.2
Stellar	2014	Jed McCaleb, Joyce Kim	7.2
Neo	2017	Da Hong Fei	6.8
Dash (previously known as DarkCoin, iXCoin)	2014	Evan Duffield	4.3
TRON	2017	Justin Soon	3.8
Total	–	–	309.5



Note: Compiled using CoinMarketCap data (2018).

Figure 1. Top-5 cryptocurrencies capitalization for 2014–2018

without refunds. The main function of Ripple is to increase the speed of transactions between banking operations. Ripple technology is already being used by large banks such as Bank of America, Hongkong & Shanghai Banking Corporation, and Western Union. The latter is testing the Ripple protocols (ESPRESO.TV, 2017).

Currently, Bitcoin, Ethereum, Ripple, BitcoinSash, Litecoin are the most common cryptocurrencies. As of March 2018, the capitalization of each aforementioned cryptocurrency, according to CoinMarketCap, exceeds USD 10 billion (Figure 1).

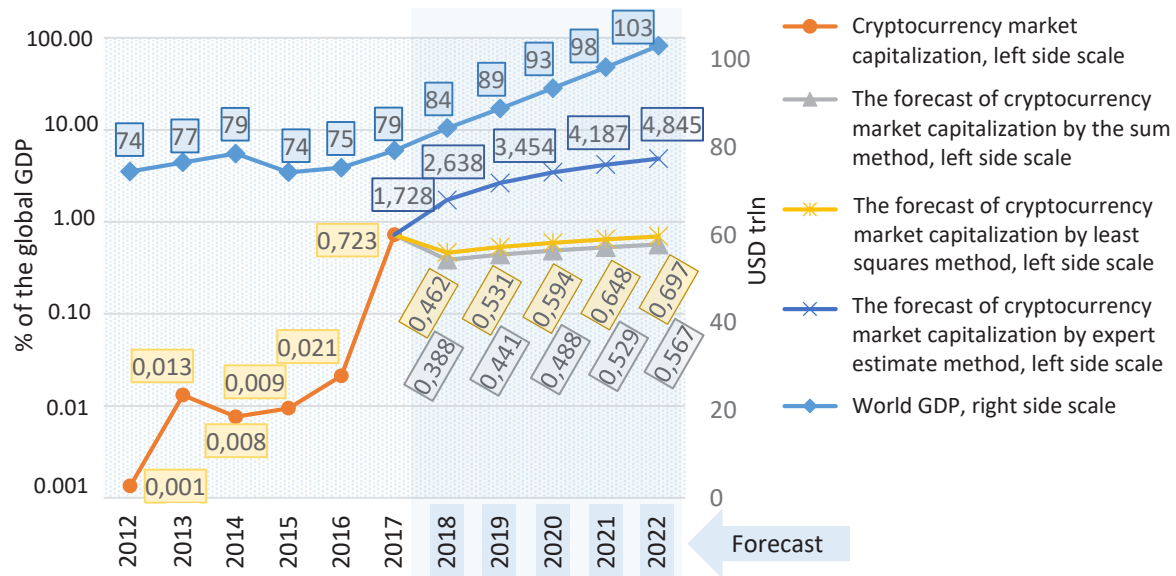
Figure 1 shows that the capitalization of Ethereum and Ripple grows faster than that of Bitcoin. In particular, in the first quarter of 2016, the capitalization of Ethereum grew more than 12 times, in the first and second quarters of 2017 it increased by more than 47 times. At the same time, in the third and fourth quarters of 2014, the capitalization of Ripple increased more than 24 times, and in the second quarter of 2017 – by 33 times. Litecoin demonstrated the rapid growth in the second quarter of 2017. Taking this into account, it can be assumed that in the future, cryptocurrencies such as Ethereum, Ripple and Litecoin will have a larger market share than Bitcoin.

The change in the level of cryptocurrency capitalization is an expression of public confidence in this financial instrument. According to Citigate Dewe Rogerson (The Paypers, “One in five British tempted to invest in cryptocurrencies, study reveals”, 2018), every fifth adult resident in the UK who never owned a cryptocurrency would like to buy it by 2021. It should be noted that the intensive development of the cryptocurrency market is more likely to occur in developing countries where there is a low level of trust in financial institutions and the state (The Paypers, “Barclays: crypto, blockchain need to be trusted to become truly mainstream”, 2018).

Now the share of cryptocurrency market capitalization reaches 0.7% of the world’s GDP and increases annually (Figure 2).

Currently, a number of factors contribute to the cryptocurrency market development, including the lack of personalization of the parties to the agreement, information security, free international circulation and a decentralized payment system. According to Merkle Tree Limited (2018), more than 60 countries now intend to completely legalize the cryptocurrency turnover.

Geopolitics, that is, the lack of a formal statement on the prohibition of using such assets is the cat-



Note: The statement by Michael Novogratz (ForkLog, 2017) regarding the forecasted volume of cryptocurrency market capitalization by 2022, CoinMarketCap (2018) data and Statista (2018) data made the basis for the graph.

Figure 2. Dynamics and forecast of the global GDP and the proportion of cryptocurrency in the global GDP, 2012–2022

alyst for the cryptocurrency popularity growth. When assessing the real effects of the growing popularity of cryptocurrency, one can state about its dollar-replacing role in the global financial system. The economy dollarization embracing the modern world is a consequence of the dominant role of financiers of one country over others, while cryptocurrency is an alternative asset that can freely serve the economic actors: producers, traders and consumers.

In the last century, the US Congress set a course for transferring its role of the world manufacturer of goods to China, while for itself, confirmed the role of a financial regulator. However, the debt of the Federal Reserve System of the USA permanently grows. Since 2003, it has exceeded 60% of the GDP, and 100% as from 2012 (Trading Economics, 2018). This debt refers only to debt securities of the US Federal Reserve System and does not include foreign currency liabilities. It should be noted that over the time elapsed since the Jamaican Currency Conference, the US dollar devalued for more than 37 times in relation to gold, the prime cause of this is its uncontrolled emission. This allows the US government to pursue a speculative policy, buying up products and raw materials, and pay such purchases through almost unsecured money. On the other hand,

producers of goods and service providers had no other way but to sell products for unsecured US dollars and subsequently buy unsecured bonds from the Federal Reserve System. They did not have an alternative mechanism and a real financial instrument that would be a world-class standard of value. Cryptocurrency provides these opportunities.

Currently, cryptocurrencies have integrated into the world economy and their popularity is only increasing. The calculations using Bitcoin only daily for 2017 range at 1-5 million units, which at the rate of May 1, 2018, ranges from 8.97 to USD 44.85 bln per day (Trade Block, 2018), which already allows for a hypothesis about the possibility of serving at least 11.4% of the global GDP.

Under these circumstances, the domestic financial system requires institutional transformation, in particular, it concerns the expansion of the objects and powers of tax control entities. The need for tax control on the cryptocurrency market is that the economy cryptocurrency predominance can occur in an environment free from regulation, resulting in the national currency depreciation and the financial system becoming uncontrolled.

2.2. Types of cryptocurrency transactions for tax control in Ukraine

Blokchain, which is the basis of the majority of cryptocurrencies functioning, complicates the market participant identification, which helps to avoid taxation by business entities and individuals. At the same time, Qatar University and Hamad Bin Khalifa University researchers denied the statement of low retroactive operational security for cryptocurrency. They were able to link 100 bitcoin transactions with buyer public accounts, while in 20 cases, their real names and location were found. At the same time, based on the social networks analysis, the researchers found that 46 transactions were WikiLeaks donations and 22– Silk Road payments for drug supply (ANO “Innopolis Media”, 2018). On the one hand, this can be interpreted as non-compliance with the cryptocurrency transactions anonymity, and on the other hand, it indicates the possibility of controlling cryptocurrency transactions. In 2015, British researchers found that the risk of money laundering and terrorist financing associated with digital currencies is low, although it may grow in the future (HMTreasury, 2015). However, already in 2017, they emphasized that cybercurrencies are closely linked to cybercrime in obtaining a pay-

ment for kidnapping, cyberattacks, acquisition of illicit tools and services, money laundering of cybercrime, etc. (HM Treasury, 2017).

On the other hand, the introduction of cryptocurrency transactions taxation may complicate the legitimizing cryptocurrency operations in the economy. However, the liberal model of cryptocurrency market regulation, as well as the repressive model, are found not so often in the world. The Isle of Man, the Island of Jersey, Belarus, and Denmark are examples of the liberal model, while Algeria, Bangladesh, Bolivia, Vietnam, Ecuador, Indonesia, Kyrgyzstan, Morocco, and Nepal are the repressive model representatives. At the same time, some countries abolished the cryptocurrencies interdiction and began developing legislation on their regulation. This applies to countries such as Malaysia, Nigeria and Thailand. Other countries use either a wide range of administrative and financial methods, or use only certain regulatory elements. At the same time, a number of developed countries use or develop the cryptocurrency transactions taxation, in particular, Australia, Brazil, the United Kingdom, Israel, Canada, the Netherlands, Germany, Norway, Singapore, the USA, Finland, and Japan.

From the standpoint of accounting and control, cryptocurrency transactions can be divided into

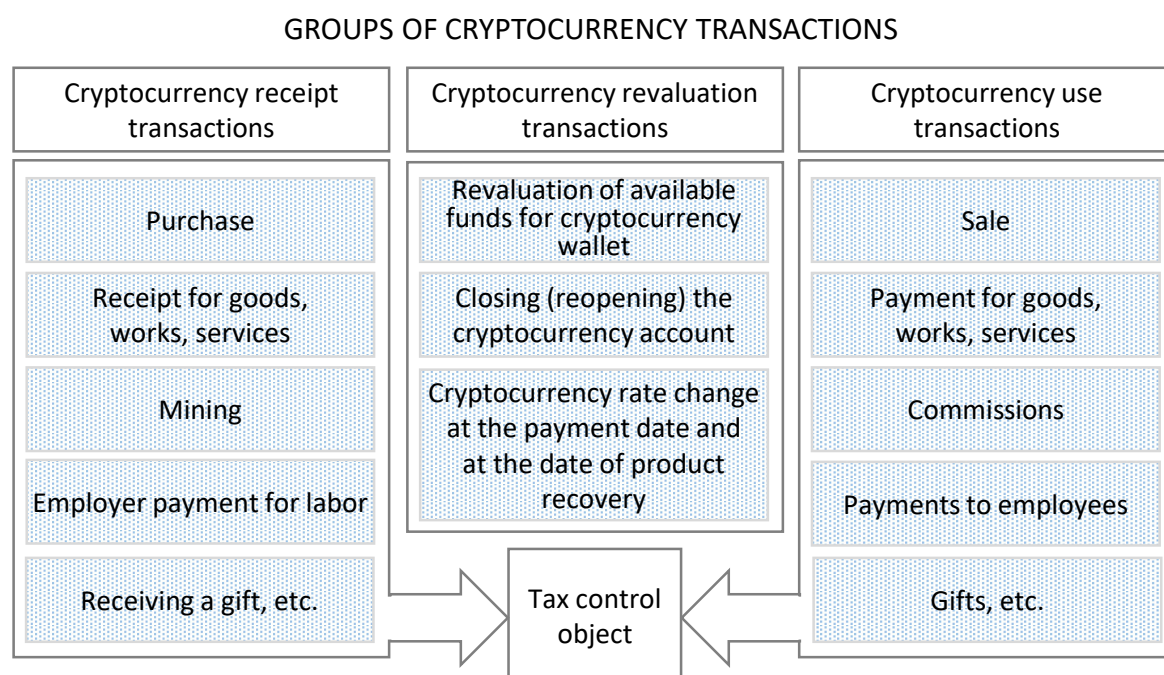


Figure 3. Cryptocurrency transactions as a tax control object

transactions related to the cryptocurrency receipt, revaluation and use (Figure 3). This distribution is important for crisis management and risk management in the cryptocurrency portfolio of the entity's balance sheet (Mazaraki & Kasianova, 2015). Accordingly, tax control should be specific to each of these groups of transactions.

It should be noted that the greatest attention in the implementation of tax control should be given to the cryptocurrency receipt operations. Since, once they are fixed, it is possible to further track the movement of cryptocurrency assets in the economy. This can be done on the basis of creating a database of electronic wallets' numbers of cryptocurrency owners. As a result, this will give the possibility for tax authorities to monitor further transactions using such assets. However, there is a risk that an entrepreneur may register yet another wallet. Therefore, states should be interested in creating additional favorable conditions for the digital assets circulation, but with increasing control activities.

From the list of cryptocurrency transactions that may be tax control objects, it is clear that the tax control subject is not the only body, but acts as their system. At the same time, depending on the specific cryptocurrency transaction, the system of tax control bodies may change, the competence of which will include the need for appropriate control measures. It should be noted that the control measures will also be different, their composition and content will be determined by a specific transaction using cryptocurrency. Therefore, in order to determine the possibilities of cryptocurrency transactions tax control, it is necessary to disclose their institutional and methodological features in terms of revenues, revaluations, and the disposal of cryptocurrency assets.

2.3. Determining the possibilities for the state tax control over transactions with the cryptocurrencies receipt and disposal

Cryptocurrency transactions on the receipt and disposal are characterized by their economic nature similarity. That is, such transactions cause a certain movement of cryptocurrencies. In this

case, it is necessary to distinguish between operations on the receipt or disposal of cryptocurrencies in a content that will affect the taxation terms.

Transactions on the cryptocurrency receipt through creating an additional unit of its physical volume, that is, operations such as mining or service, could be an object of the value added tax. This is due to the fact that the economic content is creating an added value. However, this value-added tax should be recognized as a liability and payable simultaneously with the creation of a cryptocurrency unit, without obtaining a tax credit. However, taking into account the European integration vector of Ukraine, it is worthwhile to abide by the EU tax regulations, where in 2015, according to the European Court decision, cryptocurrency transactions were exempted from paying value added tax, which had an impact on the formation of national legislation in this area. However, the legal uncertainty about the need for cryptocurrency transactions taxation in Ukraine creates barriers to legalizing incomes thus obtained by a country's population that is an active participant in the cryptocurrency mining and servicing transactions related to its use. Therefore, nowadays there is a need for organizational and legal and methodological principles for the implementation of tax control over the cryptocurrency production.

The methodology of hypotheses and violations at the organizational-preparatory and technological stages of tax audit will ensure compliance with the entrepreneurs' obligation to pay taxes on cryptocurrency extracted. The basis of this should be the formation of an integrated system of financial and legal norms, which will, on the one hand, facilitate the opportunities for deviations from them and types of deviations, and, on the other hand, will allow the development of mechanisms for their prevention. It optimizes the implementation of the preventive function of tax control and will ensure the recovery of unpaid taxes to the state and prevent tax offenses in the future.

A different approach to the cryptocurrency taxation should be applied to transactions on its purchase and receipt as payments for goods, works, and services. The main interest of the tax control subjects for these operations should be the possi-

bility of a tax levy on the result of such transactions, that is, on the proceeds from the products sale.

It may be affirmed that the state should create conditions for the formation of a domestic cryptocurrency market, which would provide a legitimate way to carry out cryptocurrency transactions. This opportunity can be provided by cryptocurrency brokers, which actually exist in Ukraine, and commercial banks. At present, it is necessary to expand the list of transactions that may be carried out by commercial banks, through the permission to trade in cryptocurrencies. Bobyl and Dron (2017, p. 87) point up this necessity. In their opinion, modern banks should use cryptocurrency together with traditional money. Although operations using cryptocurrency will be characterized by a high level of investment risk, the use of traditional money is also a high financial risk (credit, liquidity, and market).

Tax control of cryptocurrency buying/selling in Ukraine can be institutionally arranged as in Figure 4.

Control of the Accounting Chamber and the State Fiscal Service of Ukraine is possible subject to the preliminary and current financial control exercised by the National Bank of Ukraine, the National Commission for State Regulation of Financial Services Markets and the National Securities and Stock Market Commission. This makes it possible to assert that tax control is preceded by the introduction of administrative regulatory instruments in the financial control.

Tax control for cryptocurrency transactions should be carried out as with other traditional currencies. However, according to Article 99 of the Constitution of Ukraine (The Law of Ukraine No. 254k/96-vr, 1996), the domestic currency should be the only legal means to conduct transfers and settlements to be accepted by all individuals and legal entities without any restrictions on the territory of Ukraine.

The use of cryptocurrency by business entities should not be limited, as in the international trade, cryptocurrency is increasingly used to make payments. Therefore, cryptocurrency

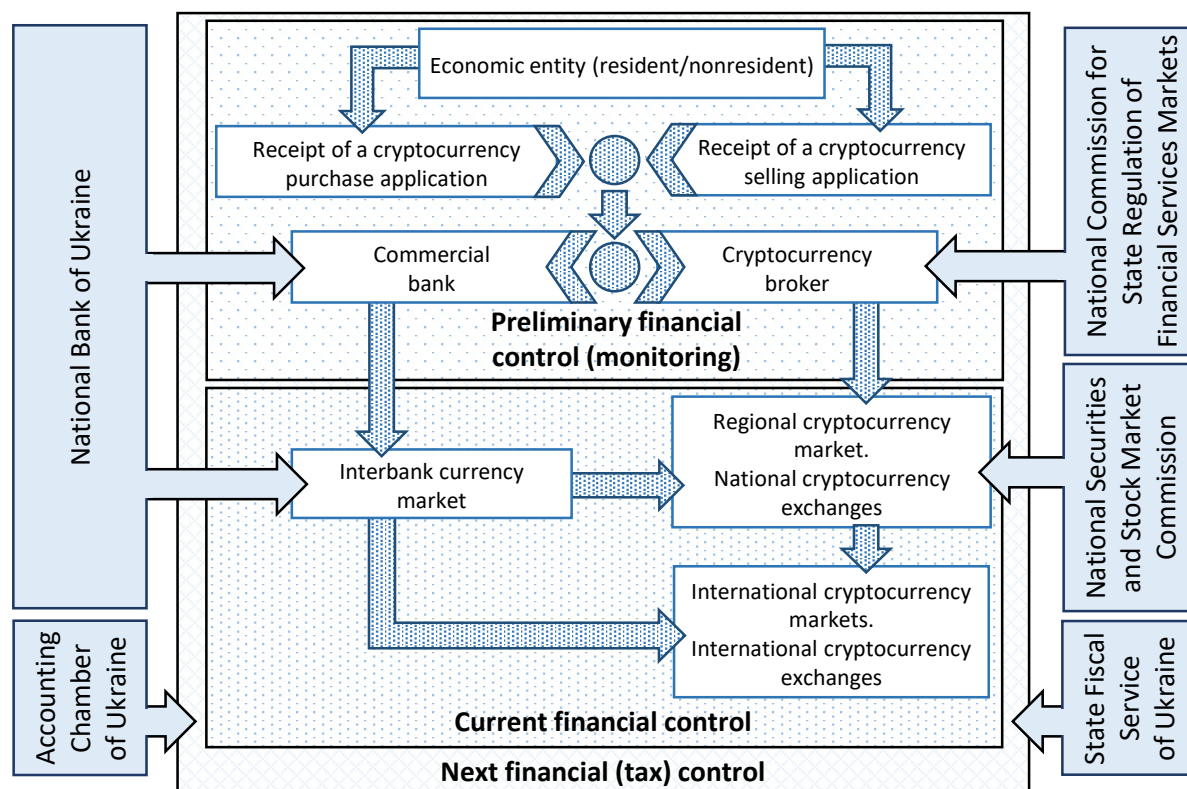


Figure 4. Institutional model of financial and tax control of cryptocurrency purchase/sale transactions

agreements should be signed as those in foreign currency, that is, with the definition of their monetary equivalent in hryvnia, as Article 533 of the Civil Code of Ukraine (The Law of Ukraine No. 435-XV, 2003) specifies. Then, the amount to be paid will be determined at the official rate of the corresponding cryptocurrency to the hryvnia on the day of payment, unless another procedure for its determination is established by the agreement. In this case, between economic entities within the economic territory of Ukraine, the circulation of foreign monetary units and monetary surrogates is prohibited in accordance with the Law of Ukraine on the National Bank (1999). The only condition for the possibility of a cryptocurrency turnover, as well as other currencies, should remain the right to use them subject to calculations in UAH equivalent.

Concerning the purchase/sale of cryptocurrency, these operations must be carried out on an organized financial market, through the provision of banks and cryptocurrency brokers with the right to perform cryptocurrency transactions. This will allow expanding the range of banking services, will lead to obtaining additional revenues from banks, receive additional revenues from local and state budgets of Ukraine, and reduce the level of shadow economy. In particular, Article 6 of the Decree of the Cabinet of Ministers of Ukraine "On the System of Currency Regulation and Currency Control" (1993) stipulates that foreign currency trade by legal entities on the territory of Ukraine is carried out through authorized banks exclusively on the interbank currency market of Ukraine. While individuals have the right to sell/buy foreign currency in banks and other financial institutions or, through their intermediation, to other individuals. Accordingly, if cryptocurrency is recognized as a foreign currency, its conversion will be possible in financial institutions, which will increase the demand for such transactions, based on the trust and security principles.

To do this, it is necessary to recognize the cryptocurrency transactions as being carried out using foreign currency, which will lead to economic benefits for both the state and other economic actors in the long run. First of all, such a decision

will expand the trading opportunities for business entities, because they will be able to freely account for cryptocurrency, not hiding separate transactions from fiscal authorities. Consequently, it is not possible to determine the amount of income or expenses in cryptocurrency, as the National Bank of Ukraine does not establish a cryptocurrency rate and their average commercial rate on the Ukrainian market is not set.

For tax control of cryptocurrency transactions, it is necessary that the National Bank of Ukraine determine the official rate of cryptocurrency in terms of the hryvnia on a daily basis, as well as its rate on the interbank and inter-exchange cryptocurrency markets. This will allow accounting and tax accounting of cryptocurrencies, their revaluation, reflecting exchange differences, and, respectively, exercising tax control.

2.4. Tax control of cryptocurrency revaluation transactions

The lack of cryptocurrency market regulation in Ukraine does not contribute to the legitimization of cryptocurrency transactions in the business environment. Business is ready to use it, management accounting tools are capable of performing accounting, analytical and controlling functions for the management of cryptocurrency and liabilities (Mazaraki & Fomina, 2016, p. 50), but there is no regulatory document that would allow accounting and tax records. As a result, it is not possible to exercise tax control over cryptocurrency transactions and regulate this market.

The introduction of cryptocurrency legal regulation will necessitate assets revaluation. Such revaluation for different dates will result in the exchange differences that, in accordance with the Regulation (standard) of accounting "21" (Decree of the Ministry of Finance of Ukraine No. 193, 2000), will be displayed between dates:

- reflecting the transaction in the accounting (tax) and the actual calculations;
- reflecting the transaction in the accounting (tax) and doing accounting (tax) reporting for the reporting period;

- preparation of accounting (tax) reporting for the previous reporting period and the actual calculation;
- preparation of accounting (tax) reporting for the previous reporting period and preparation of the accounting (tax) report for the reporting period.

A significant cryptocurrency market volatility will be the cause of the exchange differences. At the International Economic Forum in Davos, George Soros said that cryptocurrency cannot be considered a means of preserving value. It is impossible, for example, to pay wages to employees if currency fluctuations reach 25% per day (Bloomberg, 2018). Therefore, the presence of cryptocurrency on the balance sheet of an enterprise will lead to significant changes in the balance sheet at the reporting date, at the date of delivery of products or at the date of settlement. Comparing quarterly changes in the rate of the most capitalized cryptocurrencies (see Figure 1), it should be noted that there is a tendency of a simultaneous growth of all currencies rate or, vice versa, decline (Figure 5).

The analysis results presented in Figure 5 show that Ripple is the most volatile to time changes. This is due to the fact that its emission is controlled

by the same founders of the project and there are no decentralized miners. Bitcoin Cash is also more prone to change rate. That is, among the five most popular cryptocurrencies (Bitcoin, Litecoin, Ripple, Bitcoin Cash, and Ethereum) there is no one that would be able to maintain exchange rate stability.

Cryptocurrency exchanges are now functioning in Ukraine, the largest of which are BTC-trade (<https://btc-trade.com.ua>), BTCZoo (<https://www.btczoo.com>) and Kuna (<https://kuna.io>). Moreover, the Ukrainian Exchange (www.ux.ua) has become the world's first venue for tradable cryptocurrency derivatives (ForkLog, 2016). This creates the basis for the capabilities of the National Bank of Ukraine, the National Commission for State Regulation of Financial Services Markets and the National Securities and Stock Market Commission to control cryptocurrency transactions.

Consequently, the growth of the cryptocurrency in Ukraine is facilitated by both the external factors of the cryptocurrencies entry and the internal structure of the financial market. Tax control of cryptocurrency transactions in the calculation of exchange differences is necessary and is possible taking into account the number of cryptocurrency exchanges on the Ukrainian market.

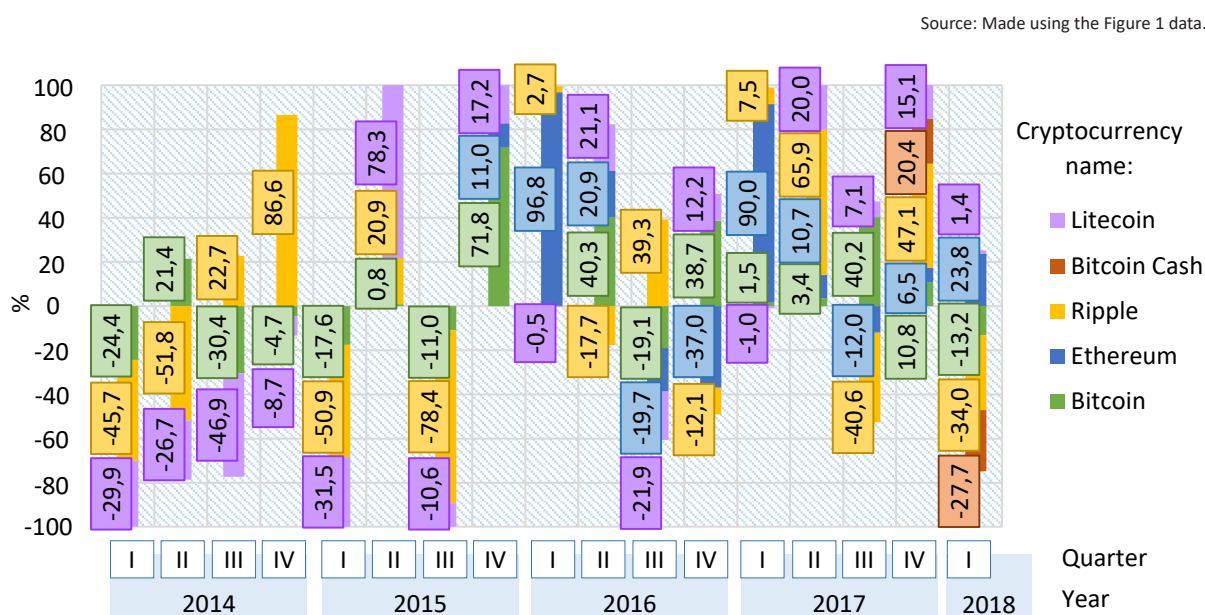


Figure 5. Quarterly analysis of changes in the rates of individual cryptocurrencies in the world, 2014–2017 and Q1 2018

2.5. Consequences of cryptocurrency transactions tax control for Ukraine

The introduction of mining taxation, purchase/sale or other cryptocurrency transactions will lead to a change in the cryptocurrency rate, since at the present price of a given unit of digital assets, there is a cost of their creation and maintenance (investment in computing power, risks associated with wear and tear, costs for electricity) and the desired profit of the computer technology owner. At the same time, as a result of taxation, there will be three consecutive stages that will significantly reduce its rate.

In the first stage, which will start from the date of taxation on the cryptocurrency market, its rate will increase as the tax will be added to the value of the unit, that is, the equilibrium point will shift from A_0 to A_1 , due to the increase of the direct offer upward in parallel. It means that the physical volume of the cryptocurrency market will not expand, but only the cost per unit of the digital asset (from P_0 to $P_0 + T$, where T is a tax) will increase, and, as a result, the money supply will decrease by the amount of the withdrawn taxes (P_0 to P_2), which will remain at the state's disposal (Figure 6).

In the second stage, the weakening of its rate will actually take place at the point on the direct initial

offer of the cryptocurrency (from A_1 to A_2) within the newly established volume Q_1 . This is due to the fact that under such conditions, the transfer of part of the cryptocurrency assets value will take place to the state through taxes, the outflow of both miners and consumers will be observed, due to lower demand for this type of assets. As a result, there will be a decline in the rate and physical volume of the cryptocurrency market.

In the third stage, there will be a need for the state to convert the withdrawn part of the cryptocurrency through tax, that is, the complete restoration of the physical volume of the cryptocurrency market (from Q_1 to Q_0). The new equilibrium point will move along the direct demand from A_2 to A_3 . At this point, it should be noted that its rate will finally decrease, accordingly, its capitalization will fall and crises will be expected on this market.

In order to prevent crisis phenomena on the cryptocurrency market, countries whose governments decide to introduce cryptocurrency transactions taxation, should keep the accumulated portion of taxes from this market in cryptocurrency.

In determining the market equilibrium subject to synergistic effect of tax and administrative control (in the part of financial control), rapid decrease

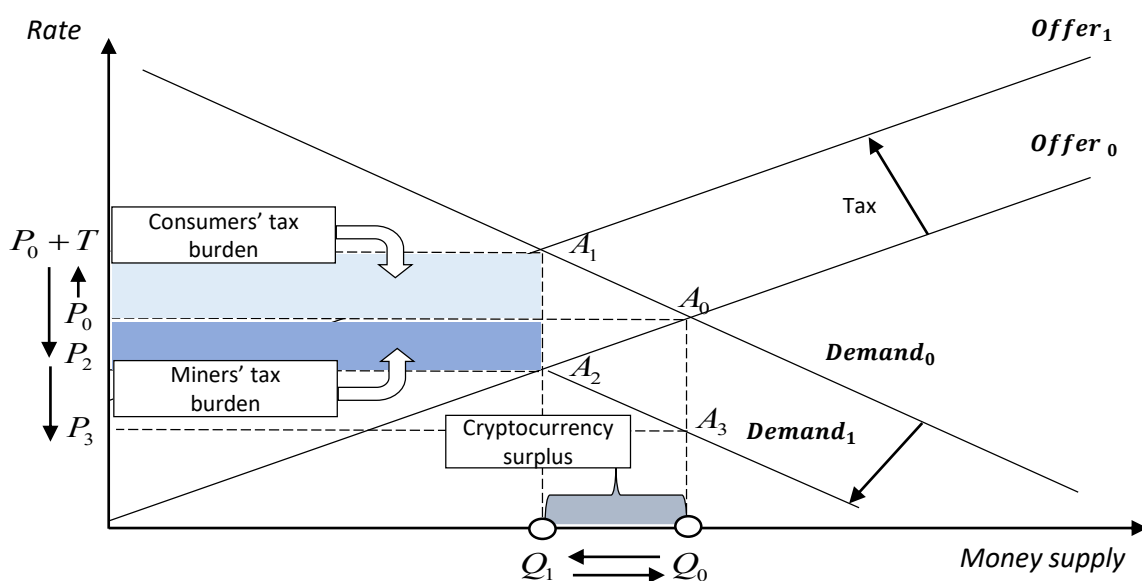


Figure 6. Market equilibrium subject to of cryptocurrency transactions state regulation

in its price should be noted. Due to the introduction of the tax, the cryptocurrency market can be maintained if the state does not convert accumulated funds from this market to other currencies, as this will lead to a significant drop in the cryptocurrency rate.

The aforementioned may also cause miners to change their placement, with their computer equipment, to other countries where there are no such taxes. However, nowadays in Ukraine the most favorable conditions for cryptocurrency mining among all European countries are created. Ukraine occupies the 4th place in the world at cost of creating a unit of digital assets (TV Channel "24", 2018). Cost of electricity made the basis for calculating the cryptocurrency profitability.

If Ukraine does not regulate the cryptocurrency market now, the current favorable conditions will quickly become transformed into the miners' outflow and transferring their capacities to other countries. This will not only bring the loss of potential tax revenues in the budgets, but also the loss of solvent consumers in the domestic market of goods and services. And this, in turn, will result in a surplus of goods in the economy, the economic downturn and the shadow economy growth.

3. DISCUSSION

The proposed approach to the tax control is based on the fact that cryptocurrency transactions serve as its object. In this case, state tax control of cryptocurrency transactions should be considered as a control over its individual object, the widespread introduction of which in Ukraine will provide cer-

tain guarantees to society and business environment as to the safety and legality of such financial transactions with their strengths and weaknesses, threats and capabilities.

The strong points of the approach proposed are as follows: its compliance with the basic model of control in management, which will provide systematic scientific knowledge of control; identification of new facilities and control measures, which will ensure the coverage of cryptocurrency transactions; compliance with international requirements for resisting terrorism financing, cybercrime and tax evasion.

The weaknesses of the study include: fragmentary consideration of the research of the tax control object and subject, which may have an impact on its organization and methodology.

Opportunities include the adoption of normative legal acts on the cryptocurrency market regulation in Ukraine (On Cryptocurrency Turnover in Ukraine, 2017; On Encouraging the Market of Cryptocurrencies and Their Derivatives in Ukraine, 2017), taking into account the distinction between cryptocurrency transactions and those that cause their physical volume growth and those aiming at using cryptocurrency; further development of the theory and practice of tax control over cryptocurrency transactions.

The threat is due to underestimation of the importance of tax control for the cryptocurrency market development in Ukraine, which will result in a shadow economy growth and will not ensure the state and local budgets execution by revenues.

CONCLUSION

As a result of the research conducted, it was found necessary and expedient to implement tax control of cryptocurrency transactions on the basis of the preliminary determination of the cryptocurrency legal status, which would help prevent the use of cryptocurrency in terrorist financing, money laundering, tax evasion and ensure the filling of the revenues of the state and local budgets of Ukraine and other countries.

Cryptocurrency transactions, which should be the object of tax control in Ukraine, are determined. Among them: transactions on the cryptocurrency receipt, transactions on determining exchange rate differences, and transactions on the cryptocurrency disposal. As a result, it has been established that:

- mining transactions and cryptocurrency income generation should be taxed with general taxes depending on a taxpayer's legal status. These taxes include personal income tax, corporate income tax and a unified social tax. At the same time, given the EU recommendations on the non-application of value added tax in the cryptocurrency transactions taxation, its implementation is not appropriate in this area;
- all other transactions, which do not result in an increase in the physical volume of cryptocurrency assets, should not be taxed by special fees, they should be subject to the same taxation conditions as for foreign currency.

It is determined that there is an opportunity to carry out tax control of transactions on cryptocurrency receipt and disposal. To do this at the macro level, it is necessary:

- to ensure normative legal documents regulating the cryptocurrency market. These normative documents should determine the cryptocurrency as a foreign currency, supported by the representatives of the Department of Cyberpolice of the National Police of Ukraine;
- to recognize the National Bank of Ukraine the main body of tax control on this market. The National Commission for State Regulation of Financial Services Markets and the National Securities and Stock Market Commission State Commission should provide financial control at the level of cryptocurrency brokers and exchanges. Tax control over cryptocurrency transactions of economic entities must be secured by the State Fiscal Service of Ukraine, and the Accounting Chamber of Ukraine should become the supreme body of tax control;
- to legalize cryptocurrency exchanges in Ukraine, which will allow receiving additional tax revenues in the budgets and contribute to the development of the domestic cryptocurrency market;
- to take into account the volume of cryptocurrency assets when cutting tax rates or subsidies (in order to stimulate business entities to disclose information about cryptocurrency transactions).

At the micro level, it is necessary:

- to provide conditions for identification of electronic wallet owners; and
- through the mass media, to ensure the popularization of the conditions for cryptocurrency transactions taxation.

The introduction of tax control on the cryptocurrency market will lead to the need for accounting of cryptocurrency assets by business entities. This in turn will necessitate their revaluation, based on the high volatility on the market under study. As a result, in order to create opportunities for cryptocurrency tax control, the National Bank of Ukraine should determine the official rate of major cryptocurrencies on a daily basis, as well as their exchange rate on the interbank and inter-exchange cryptocurrency markets. These measures will form the basis for tax control of transactions in terms of determining exchange differences.

The consequences of taxation on the cryptocurrency market are established. It is proved that the state needs to keep revenues derived from cryptocurrency transactions in the same cryptocurrency, rather than immediately convert it, which will ensure sustainable development of the cryptocurrency market.

These results create new preconditions for the development of the state tax control theory, as well as procedures for its conduct, in particular, extend its object to cryptocurrency transactions, as well as supplement the list of functions and responsibilities of the tax control system.

REFERENCES

1. Baranovskyi, O. I. (2017). Податкова безпека: сутнісний вимір [Podatkova bezpeka: sutnisnyi vymir]. *Zbirnyk naukovykh prats Universytetu derzhavnoi fiskalnoi sluzhby Ukrainy*, 1, 7-24. Retrieved from http://nbuv.gov.ua/UJRN/znpndps_2017_1_3
2. Bardash, S. V., & Baraniuk, Yu. R. (2016). Financial audit as a part of state administration in Ukraine: condition and public need. *Baltic Journal of Economic Studies*, 2(2), 5-14. <https://doi.org/10.30525/2256-0742/2016-2-2-5-13>
3. Bloomberg (2018). *George Soros on Trump, Social Media and Cryptocurrencies*. Retrieved from <https://www.bloomberg.com/news/videos/2018-01-26/george-soros-on-trump-social-media-and-cryptocurrencies-video>
4. Bobyl, V. V., & Dron, M. A. (2017). Вплив криптовалют на розвиток альтернативного банкінгу в Україні [Vplyv kryptovalyut na rozvytok alternatyvnoho bankinhu v Ukraini]. *Bankivska sprava*, 4, 85-91. Retrieved from http://elibrary.nuft.edu.ua/library/DocDescription?doc_id=363141
5. Cabinet of Ministers of Ukraine (2014). Про систему валютного регулювання і валютного контролю. Декрет Кабінету Міністрів України від 19 лютого 1993, № 15-93 [Pro systemu valiutnoho rehuliuвання i valiutnoho kontroliu. Dekret Kabinetu Ministriv Ukrainy vid 19 liutoho 1993, No. 15-93]. Retrieved from <http://zakon5.rada.gov.ua/laws/show/15-93>
6. CoinMarketCap (2018). *Cryptocurrency Market Capitalizations*. Retrieved from <https://coinmarketcap.com/historical>
7. Dyba, M. I., Moroz, A. M., Ostapishyn, T. P. et al. (2014). Генеза банківських криз [Heneza bankivskykh kryz] (578). Kyiv: KNEU. Retrieved from http://kneu.edu.ua/ua/science_kneu/scientific_schools/gkv/gkv_praci/gkv_prazi/genbcr/
8. ESPRESO.TV (2017). *Top five cryptocurrency world. In addition to bitcoin*. Retrieved from <https://espresso.tv/article/2017/08/30/alternatyvni-kryptovalyuta>
9. Ethereum Foundation (2018). *Stiftung Ethereum*. Retrieved from <https://www.ethereum.org>
10. European Central Bank (2012). *Virtual currency schemes*. Retrieved from <https://www.ecb.europa.eu/pub/pdf/other/virtual-currencyschemes201210en.pdf>
11. European Central Bank (2015). *Virtual currency schemes – a further analysis*. Retrieved from <https://www.ecb.europa.eu/pub/pdf/other/virtualcurrencyschemesen.pdf>
12. FATF Report (2014). *Virtual Currencies: Key Definitions and Potential AML/CFT Risks*. Retrieved from <http://www.fatf-gafi.org/media/fatf/documents/reports/virtual-currency-key-definitions-and-potential-aml-cft-risks.pdf>
13. ForkLog (2016). *On the Ukrainian Stock Exchange started trading futures bitcoin*. Retrieved from <https://forklog.com/na-ukrainskoj-birzhe-startovali-torgi-fyuchersami-na-bitkoin>
14. ForkLog (2017). *After 5 years, the market capitalization cryptocurrency reach 5 trillion dollars USA: Michael Novograz's forecast*. Retrieved from <https://forklog.com/milliarder-majkl-novograds-cherez-5-let-kapitalizatsiya-kryptovalyut-dostignet-5-trln/>
15. HM Treasury (2015). *UK national risk assessment of money laundering and terrorist financing*. Retrieved from https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/468210/UK_NRA_October_2015_final_web.pdf
16. HM Treasury (2017). *UK national risk assessment of money laundering and terrorist financing*. Retrieved from https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/655198/National_risk_assessment_of_money_laundering_and_terrorist_financing_2017_pdf_web.pdf
17. Ihnatyshyn, M. V., & Troshchak, V. I. (2014). Податковий контроль як елемент державного регулювання в системі податкових платежів [Podatkovy kontrol yak element derzhavnoho rehuliuвання v systemi podatkovykh platezhiv]. *Naukovyi visnyk Uzhhorodskoho universytetu*, 2(43), 158-161. Retrieved from http://www.visnyk-ekon.uzhnu.edu.ua/images/pubs/43/43_33.pdf
18. Koretskyi, O. M. (2010). Податковий контроль як складова державного фінансового контролю [Podatkovy kontrol yak skladova derzhavnoho finansovoho kontroliu]. *Derzhavne upravlinnia: udoskonalennia ta rozvytok*, 12. Retrieved from <http://www.m.nayka.com.ua/?op=1&j=derzhavne-upravlinnia-udoskonalennia-ta-rozvytok&s=ua&z=403>
19. Kuznetsov, V. A., & Yakubov, A. V. (2016). О подходах в международном регулировании криптовалют (Bitcoin) в отдельных иностранных юрисдикциях [О podkhodakh v mezhdunarodnom regulirivani i kryptovaliut (Bitcoin) v otdelnykh inostrannykh yurisdiksiyakh]. *Dengi i kredit*, 3, 20-29. Retrieved from https://www.cbr.ru/publ/MoneyAndCredit/kuznetcov_03_16.pdf
20. Lansky, J. (2018). Possible State Approaches to Cryptocurrencies. *Journal of system integration*. <http://dx.doi.org/10.20470/jsi.v9i1.335>
21. LigaZakon (2017). Про обіг криптовалют в Україні. Проект Закону України від жовтня 2017, № 7183 [Pro obih kryptovalyuty v Ukraini. Proekt Zakonu Ukrainy vid 6 zhovtnia 2017, No. 7183]. Retrieved from http://search.ligazakon.ua/l_doc2.nsf/link1/JH5JJ00A.html
22. Lopatovskyi, V. H., Demchuk, Yu. A. (2016). Особливості сучасної системи податкового контролю

- [Osoblyvosti suchasnoi systemy podatkovoho kontroliu. *Visnyk Khmelnytskoho natsionalnoho universytetu*, 5(1), 115-118. Retrieved from <http://elar.khnu.km.ua/jspui/handle/123456789/5389>
23. Maryniv, N. A. (2016). Податковий контроль як складник фінансового контролю: публічно-правовий аспект [Podatkovyi kontrol yak skladnyk finansovoho kontroliu: publichno-pravovyi aspekt]. *Visegrad journal on human rights*, 5/2, 86-90. Retrieved from <http://dspace.nlu.edu.ua/handle/123456789/13054>
 24. Mazaraki, A. A., & Fomina, O. V. (2016). Інструментарій управлінського обліку [Instrumentarii upravlinskoho obliku]. *Ekonomichnyi chasopys-XXI*, 159, 48-52. <http://dx.doi.org/10.21003/ea.V159-10>
 25. Mazaraki, A. A., & Kasianova, A. O. (2015). Overview of proactive and reactive activities in corporate crisis management. *Economic Annals-XXI*, 3-4(1), 42-45. Retrieved from http://soskin.info/userfiles/file/2015/3-4_1_2015/Mazaraki,%20Kasianova.pdf
 26. Melnyk, M. I., & Leshchuk, I. V. (2015). Податковий контроль в Україні: проблеми та пріоритети підвищення ефективності [Podatkovyi kontrol v Ukraini: problemy ta priorytety pidvyshchennia efektyvnosti] (330 p.). Lviv: Instytut rehionalnykh doslidzen im. M. I. Dolishnoho NAN Ukrainy. Retrieved from <http://ird.gov.ua/irdp/p20150301.pdf>
 27. Merkle Tree Limited (2018). *Bit-legal world*. Retrieved from <http://map.bitlegal.io>
 28. Ministry of Finance of Ukraine (2014, August 19). Про затвердження положення (стандарту) бухгалтерського обліку 21 "Вплив змін валютних курсів". Наказ Міністерства фінансів України від 10.08.2000, № 193 [Pro zatverdzhennia polozhennia (standartu) bukhhalterskohoobliku 21 "Vplyvzminvaliutnykhkursiv. Nakaz Ministerstva Finansiv Ukrainy vid 10.08.2000, No. 193]. Retrieved from <http://zakon2.rada.gov.ua/laws/show/z0515-00>
 29. Nakamoto, S. (2008). *Bitcoin: A Peer-to-Peer Electronic Cash System*. Retrieved from <https://bitcoin.org/bitcoin.pdf>
 30. Nasypaiko, D. S., & Samsonova, K. V. (2012). Податковий контроль в Україні: особливості та шляхи вдосконалення [Podatkovyi kontrol v Ukraini: osoblyvosti ta shliakhy vdoskonalennia]. *Naukovi zapysky KNTU*, 12(1), 80-83. Retrieved from <https://core.ac.uk/download/pdf/84825035.pdf>
 31. News channel «24» (2018). *Where in Europe it is most profitable to mining bitcoins: Ukraine is among the leaders*. Retrieved from https://24tv.ua/de_v_yevropi_nayvididnishe_mayniti_bitkoyni_ukrayina_sered_lideriv_n921276
 32. Nikitin, A. (2018). Блокчейн не гарантирует анонимности биткойн-платежей [Blokcheyn ne garantiruyet anonimnosti bitkoyn-platyezhey]. Retrieved from <https://hightech.fm/2018/02/01/bitcoin-drug-deals>
 33. Proskura, K. P. (2014). Податкове адміністрування в Україні в посткризовий період: ефективність та напрями модернізації [Podatkove administruvannia v Ukraini v postkryzovyi period: efektyvnist ta napriamy modernizatsii] (376 p.). Kyiv: Emkon. Retrieved from <http://ir.kneu.edu.ua/handle/2010/5035>
 34. RBC-Ukraine (2018). *Not only Bitcoin: In the network have been named the most popular cryptocurrencies in the world*. Retrieved from <https://styler.rbc.ua/rus/zhizn/bitcoin-seti-nazvali-samyepopulyarnyekriptovalyuty-1517849648.html>
 35. Shevchuk, O. A. (2012). Теоретичні засади розвитку податкового контролю [Teoretychni zasady rozvytku podatkovoho kontroliu]. *Visnyk KNTEU*, 2, 74-83. Retrieved from <http://visnik.knteu.kiev.ua/files/2012/02/7.pdf>
 36. Shevchuk, O. A. (2013). Форми та методи податкового контролю: світовий досвід та українська практика [Formy ta metody podatkovoho kontroliu: svitovyi dosvid ta ukrainska praktyka]. *Ekonomichnyi chasopys-XXI*, 1-2(1), 73-76. Retrieved from http://nbuv.gov.ua/UJRN/ecchado_2013_1-2%281%29__23
 37. Shuba, I. M., & Khymych, R. V. (2016). Механізм податкового адміністрування: проблеми та шляхи удосконалення [Mekhanizm podatkovoho administruvannia: problemy ta shliakhy udoskonalennia]. *Materialy siomoi mizhnarodnoi naukovo-praktychnoi Internet-konferentsii "Problemy rynku ta rozvytku rehioniv Ukrainy v XXI stolitti"*, 137-139. Retrieved from <https://economics.opu.ua/files/science/ipreed/2016/137.pdf>
 38. Statista (2018). *Global GDP at current prices from 2010 to 2022 (in billion U.S. dollars)*. Retrieved from <https://www.statista.com/statistics/268750/global-gross-domestic-product-gdp>
 39. The Paypers (2018). *Barclays: crypto, blockchain need to be trusted to become truly mainstream*. Retrieved from <https://www.thepappers.com/cryptocurrencies-bitcoin-virtual-currencies/barclays-crypto-blockchain-need-to-be-trusted-to-become-truly-mainstream/772750-39>
 40. The Paypers (2018, June 15). *One in five British tempted to invest in cryptocurrencies, study reveals*. Retrieved from: <https://www.thepappers.com/cryptocurrencies-bitcoin-virtual-currencies/one-in-five-british-tempted-to-invest-in-cryptocurrencies-study-reveals/772747-39>
 41. Trade Block (2018). *Transaction value (BTX)*. Retrieved from https://tradeblock.com/bitcoin/historical/1d-f-txval_per_tot-01071-blksize_per_avg-01071
 42. Trading Economics (2018). *United States Gross Federal Debt to GDP (1940-2018)*. Retrieved from <https://tradingeconomics.com/united-states/government-debt-to-gdp>
 43. Vasiuk, Yu. M. (2015). Податковий контроль в умовах реформ в Україні [Podatkovyi kontrol v umovakh reform v Ukraini]. *Aspekty publichnoho upravlinnia*, 3,

- 27-36. Retrieved from http://nbuv.gov.ua/UJRN/aplup_2015_3_6
44. Verkhovna Rada of Ukraine (2016, September 30). Конституція України. Закон України від 28 червня 1996, № 254к/96-вр [Konstytutsiia Ukrainy. Zakon Ukrainy vid 28 chervnia 1996, No. 254k/96-вр]. Retrieved from <http://zakon0.rada.gov.ua/laws/show/254%D0%BA/96-%D0%B2%D1%80>
45. Verkhovna Rada of Ukraine (2018, April 4). Про основні засади державного нагляду (контролю) у сфері господарської діяльності. Закон України від 05.04.2007, №877-16 [Pro osnovni zasady derzhavnoho nahladu (kontroliu) u sferi hospodarskoi diialnosti. Zakon Ukrainy vid 05.04.2007, No. 877-16]. Retrieved from <http://zakon2.rada.gov.ua/laws/show/877-16/page>
46. Verkhovna Rada of Ukraine (2018, June 10). Цивільний Кодекс України. Закон України від 16 січня 2003, № 435-XV [Tsyvilnyi Kodeks Ukrainy. Zakon Ukrainy vid 16 sichnia 2003, No. 435-XV]. Retrieved from <http://zakon2.rada.gov.ua/laws/show/435-15>
47. Verkhovna Rada of Ukraine (2018, March 20). Проект Закону про стимулювання ринку криптовалют та їх похідних в Україні від 10.10.2017, № 7183-1 [Proekt Zakonu pro stymulivannia rynku kryptovaliut ta yikh pokhidnykh v ukraini vad 10.10.2017, No. 7183-1]. Retrieved from http://w1.c1.rada.gov.ua/pls/zweb2/webproc4_1?pf3511=62710
48. Verkhovna Rada of Ukraine (2018, May 9). Про Національний Банк України. Закон України від 20 травня, 1999, № 679-XIV [Pro Natsionalnyi Bank Ukrainy. Zakon Ukrainy vid 20 travnia 1999, No. 679-XIV]. Retrieved from <http://zakon2.rada.gov.ua/laws/show/679-14>
49. Volosovych, S. V. (2016). Біп-гуальна валюта: глобалізаційні виклики та перспективи розвитку [Virtualna valiuta: hlobalizatsiini vyklyky ta perspektyvy rozvytku]. *Ekonomika Ukrainy*, 4(653),68-78. Retrieved from http://nbuv.gov.ua/UJRN/EkUk_2016_4_8
50. Yli-Huumo, J., Ko, D., Choi, S., Park, S., & Smolander, K. (2016). Where is Current Research on Blockchain Technology? A Systematic Review. *PLOS ONE*, 11(10). <https://doi.org/10.1371/journal.pone.0163477>