

**A.E. SHMATKO**, research associate,  
Financial and Economic Research  
Department  
e-mail: shmatko.a.e@econri.org

SI «Economic research institute»,  
Donetsk, Donetsk People's Republic

## **CONCEPTUAL BOUNDARIES FOR MONETARY POLICY THEORY IN XXI CENTURY: FROM BLOCKCHAIN TO MODERN MONETARY THEORY**

After mortgage crisis in 2007–2009 the world economies faced the lack of money problem that is depicted in lowering of broad money growth and increasing of general level of prices. This problem made monetary authorities to look for new solutions. The paper concerns theoretical analysis of two issues: blockchain as a concept for monetary policy development and modern monetary theory (MMT) postulates as systemic shift in theoretical and practical implementations of monetary policy in XXI century. These concepts are considered in comparison with macroeconomic mainstream. As an information technology blockchain can offer wide advantages for monetary policy to improve its functioning. Cryptocurrency as the main form of blockchain realization cannot be true rival for fiat money nowadays. MMT offers to print more money as an answer to economic problems. It does not concern issues of market discipline for financial intermediaries. For the blockchain system there exists no state with its budget, taxes, social responsibilities, inflation regulation and so on. Therefore, the conclusion of the research is that the future monetary policy will have combined characteristics of these concepts.

*Keywords:* monetary policy, mainstream, blockchain, modern monetary theory.

**Шматько А.Е.** Концептуальные границы теории денежно-кредитной политики в XXI веке: от блокчейна к современной денежной теории.

После ипотечного кризиса 2007–2009 годов мировая экономика столкнулась с проблемой нехватки денег, что выражается в снижении темпов роста широкой денежной массы и повышении общего уровня цен. Эта проблема заставила монетарные власти искать новые решения. Статья посвящена теоретическому анализу двух вопросов: блокчейна как концепции развития денежно-кредитной политики и постулатов современной денежной теории (Modern monetary theory, ММТ) как системного сдвига в теоретических и практических аспектах реализации денежно-кредитной политики в XXI в. Эти концепции рассмотрены в сравнении с макроэкономическим мейнстримом. Как информационная технология, блокчейн может предложить денежно-кредитной политике широкие преимущества для улучшения её функционирования. Криптовалюты как основная форма реализации блокчейна в настоящее время не может быть серьёзным конкурентом фиатным деньгам. ММТ предлагает печатать больше денег в качестве ответа на экономические проблемы. Эта концепция не касается

© A.E. Shmatko, 2021

## Conceptual boundaries for monetary policy theory in XXI century: from blockchain to modern monetary theory

вопросов рыночной дисциплины финансовых посредников. Для блокчейн-системы не существует государства вместе с его бюджетом, налогами, социальной ответственностью, регулированием инфляции и другими вопросами. Сделан вывод, что будущая денежно-кредитная политика будет иметь совокупные характеристики этих концепций.

*Ключевые слова:* денежно-кредитная политика, мейнстрим, блокчейн, современная денежная теория.

The financial crisis of 2007–2009 is pointed for all over the world to look for

new solutions for the old problem – the lack of money. Central banks reacted on this with Quantitative Easing Policy, but even negative key interest rates have small implications on economy and the Global Recession became true.

This point should have more accurate description. First of all, let us look on the widely used practical recognition of recession, postulated by International Monetary Fund (IMF), that describes its definition as a declining of real gross domestic product (GDP) two or more quarters in a row [1, p. 52]. The dynamics of world economy real GDP growth is presented on fig. 1.

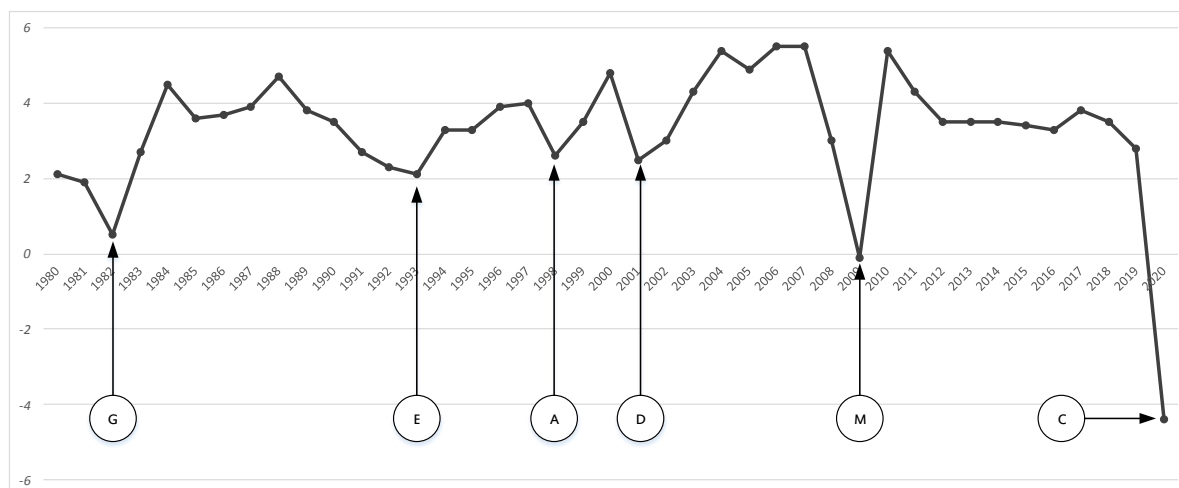


Fig. 1. World economy real GDP growth, annual % change  
Source: International Monetary Fund, World Economic Outlook [2]

As it could be seen, there were several crises from 1980: (G) – oil glut crisis, 0.5%; (E) 1992–1993 – European currency mechanism crisis, 2.1%; (A) 1997–1998 – Asian financial crisis, 2.6%; (D) 2001 – dot-com bubble crisis, 2.5%; (M) 2007–2009 – mortgage crisis, -0.1%; (C) 2020 – coronacrisis, -4.4%. The last is going on in 2021 at the moment of paper writing. The world economy was shocked with this crisis at the state of trying to go out from previous mortgage crisis, when it faced to the problem of business activity lowering, that could not be turned around by standard methods even in the be-

ginning of third decade of XXI century. The fig. 2–4 describe this situation.

Central bank key interest rate is one among the main instruments of monetary regulation. Fig. 2 illustrates world average values of this indicator. The part a) demonstrates the annual gradual growth from 1980 to 1991. The part b) depicts the data from 1991 to 2019, demonstrates the global lowering of central bank key interest rate since Dot-com bubble crisis in 2001, after feverish 1990s.

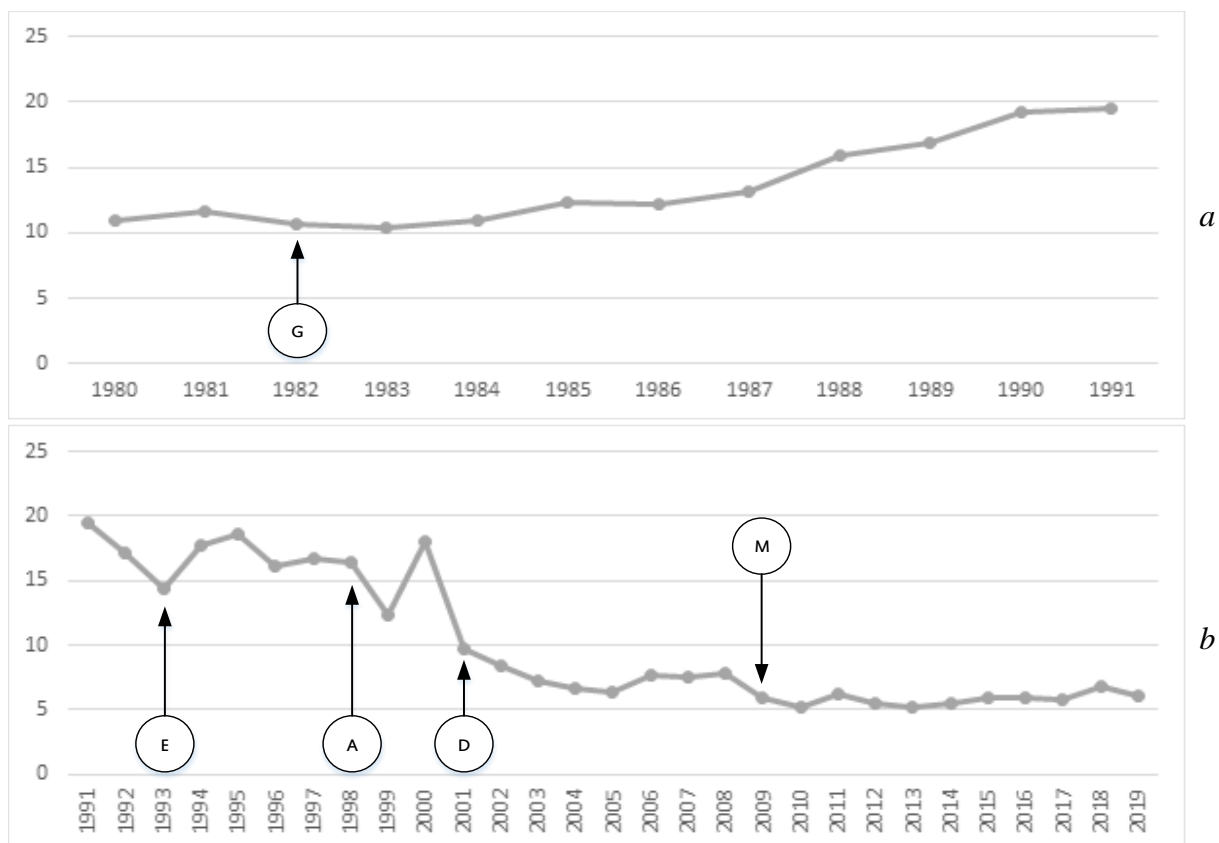
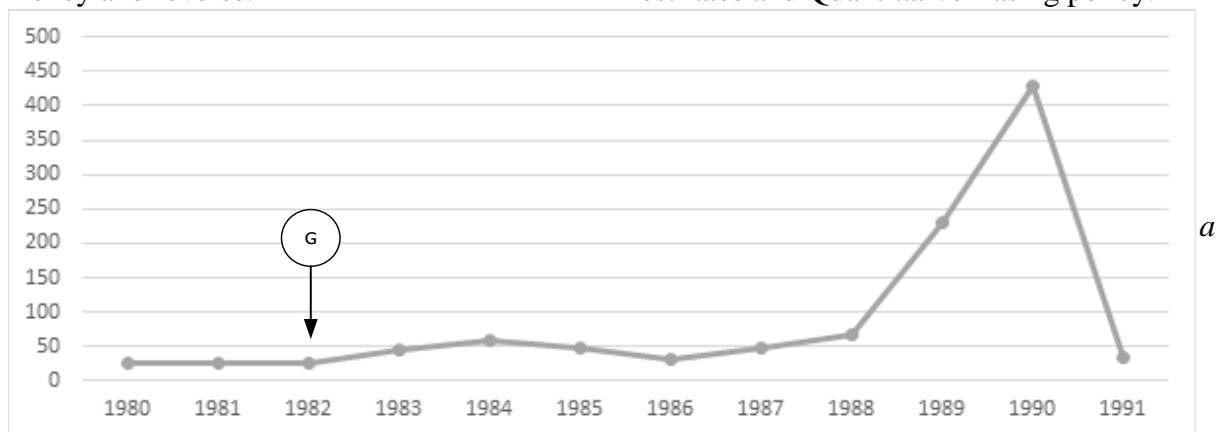


Fig. 2. World average monetary policy-related interest rate, % per annum:  
 a) from 1980 to 1991; b) from 1991 to 2019

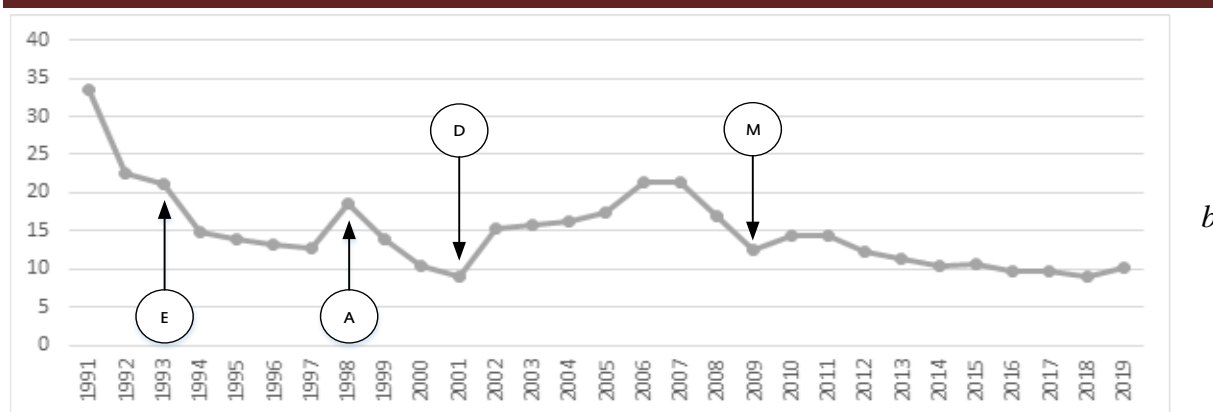
Source: calculated, International Monetary Fund, International Financial Statistics [3]

Central bank key interest rate is set to regulate money circulation in economy: the lower the rate is, the chipper is the credit money and reverse.

Fig. 3 illustrates the money supply shrink after mortgage crisis in 2007–2009 on a background of systemic lowering interest rates and Quantitative Easing policy.



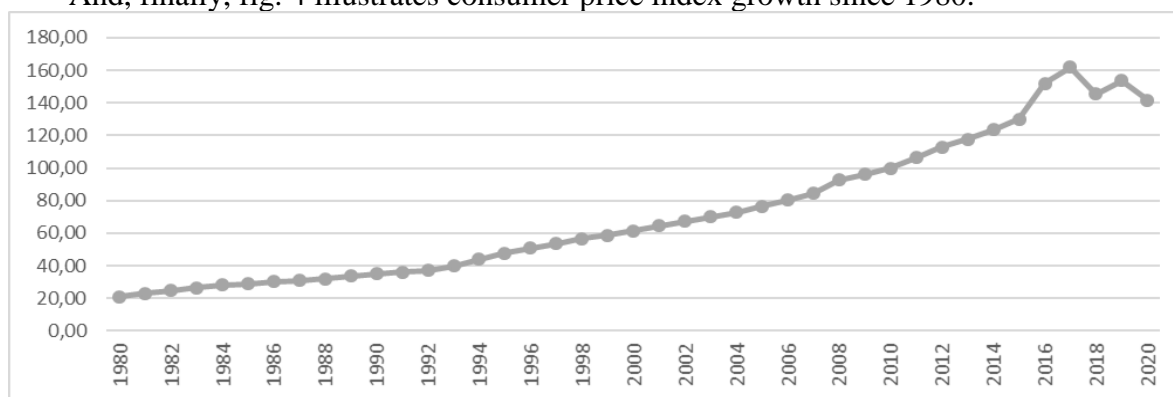
**Conceptual boundaries for monetary policy theory in XXI century:  
from blockchain to modern monetary theory**



*Fig. 3. World average broad money growth rate, %:  
a) from 1980 to 1991; b) from 1991 to 2019*

Source: calculated, International Monetary Fund, International Financial Statistics [4]

And, finally, fig. 4 illustrates consumer price index growth since 1980.



*Fig. 4. World average consumer price index (2010 base year), %*

Source: calculated, International Monetary Fund, International Financial Statistics [5]

Last figure can be interpreted as a general money demand, which is systematically growing during last four decades. So, demand is growing and supply is dropping, and that is the crisis of monetary system nowadays.

Lehman Brothers announced the bankruptcy on September 15, 2008. The crisis moved into the most hard and dramatic phase. Then the US Treasury Department initiated TARP project adopted by the US Congress, and there was the first serious step from the global economic and politic destroying brink.

Against this background, bitcoin as a new model of money system was presented on October 31, 2008 [6]. Initial block was

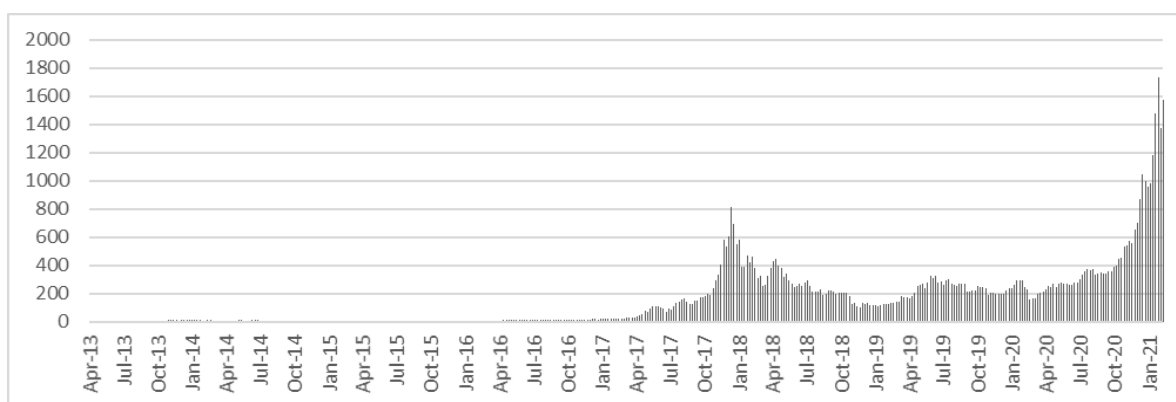
generated on January 3, 2009 [7]. Blockchain technology laying under not only bitcoin but all other cryptocurrencies had set fundamental challenge for traditional monetary systems that have very long evolution history of thousands of years. Paradigm of decentralization is like an atom bomb for centralized, tough hierarchical and super regulated two level bank system that is the core of current money system. Practical and theoretical discussion about the legal implementation of cryptocurrency and blockchain in financial system is continued to this day.

Moreover, it should be proved the necessity of blockchain and cryptocurrency assessment as monetary policy background,

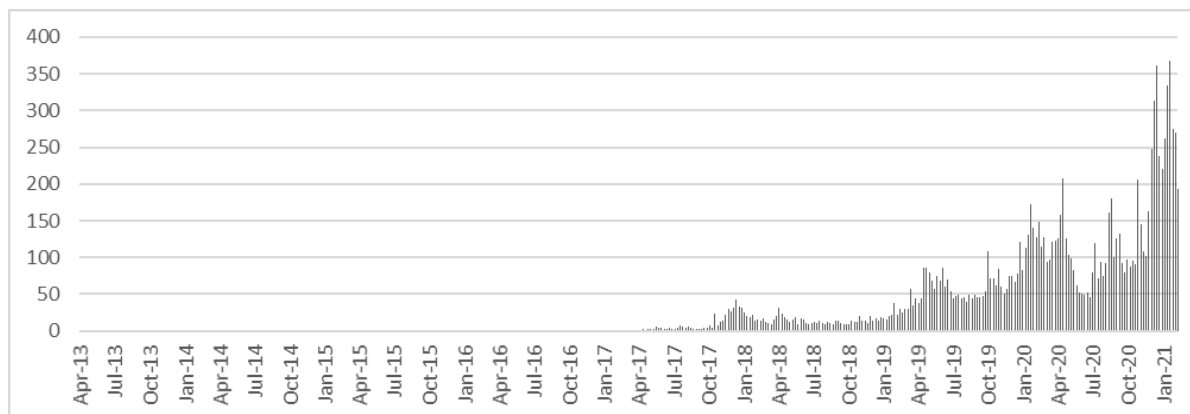
not only as a financial innovation. For example, Fig. 5–7 reflect comparison with foreign exchange market.

Data source for Fig. 4–5 is official site for cryptocurrency prices, charts and market capitalizations – CoinMarketCap, and for Fig. 6 – Bank for International Settlements Triennial Central Bank Surveys from 1989 till 2019. Total cryptocurrency market capitalization had exceeded 1.5 trillion USD in

February 2021. Daily turnover of crypto-market had peak value of 368 billion USD on the second week of February 2021. It is more than 17 times lower daily turnover of the world foreign exchange market in 2019 – 6.6 trillion USD. Therefore, cryptocurrency market as a part of global financial market is too small and cannot be powerful rival for traditional money system.



*Fig. 5. Total cryptocurrency market capitalization, billion USD*  
Source: CoinMarketCap.com [8]



*Fig. 6. Cryptocurrency market daily turnover, billion USD*  
Source: CoinMarketCap.com [8]

## Conceptual boundaries for monetary policy theory in XXI century: from blockchain to modern monetary theory

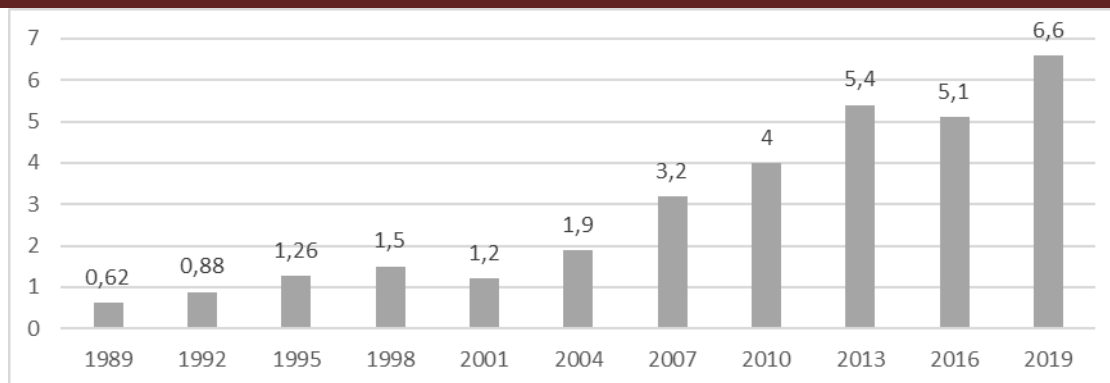


Fig. 7. Foreign exchange market daily turnover, trillion USD

Source: Bank for International Settlements, Triennial Central Bank Survey [9–17]

However, the number of cryptocurrencies on the beginning of 2021 is more than 8800; therefore, the interest about this phenomenon should have more detailed consideration.

Moreover, even current inefficient money system should have any chance to survive, so in the second decade of XXI century Modern Monetary Theory (MMT) increased theoretical discussion that have implications even on political processes. This theory is concerned only rules of monetary and budgetary policies and puts forward very easy answer on the lack of money problem – more money should be printed to cover government expenditures. This postulate has a lot of pros and cons as in the case of cryptocurrency.

*Therefore, the purpose of this research is to move forward theoretical analysis of monetary policy concepts to draw boundaries of financial institutions evolution future possibilities.*

The main challenge for economic theory in fields of MMT and blockchain concerns discussion agenda – a very few academic publications describe these topics. Most of sources about MMT mainly have political and populist accents, and blockchain – technical realisation and commercial benefits.

Sources about *blockchain* could be classified in four categories: analytical re-

ports, science fiction or journalistic books, papers with theoretical consideration of this problem and papers with special issues or some practical implementation.

Analytical reports concern small circle of problems and special issues in blockchain and cryptocurrency. For example, bitcoin asset management recommendations form the Bank of America Merrill Lynch [18] and J.P. Morgan Chase & Co [19]. The European Central Bank [20] and Federal Bureau of Investigation [21] describes Bitcoin as virtual community with own rules and, first of all, currency. Here the glocal features in finance could be seen: on the one hand it is limited collaboration with clear borders that could be localized in concrete servers, on the other hand it is widely distributed because of Internet with easy ways of connection. The European commission [22] introduces usage of blockchain in education. The Eurasian economic commission [23], KPMG [24, p. 22], Deloitte [25; 26], PricewaterhouseCoopers [27–29], Ernst&Young [30; 31] and Forbes [32; 33] describe their thoughts about blockchain development and perspectives as next quality step of integration for individuals, businesses, enterprises and states. Ak Bars Bank with ForkLog Research<sup>1</sup> [34] concerns some issues of bank

<sup>1</sup> Cryptocurrency and blockchain media company



system changes but only on the level of commercial bank. Legal firm Axon Partners with ForkLog Research [35] presented the report on legal regulation of blockchain and cryptocurrency in several countries.

Legal issues about blockchain are postulated as main nowadays by almost every author and this is common characteristic of all sources. These questions are: cryptocurrency as a legal medium of exchange, taxes on cryptocurrency, guarantee of conversion into fiat currencies and so on.

Reviewing papers of P. Tasca [36], U. Chohan [37], N. Arkhireiska [38], R. Danylchuk & O. Zhurakovska [39], R. Nurmukhametov [40], A. Malinovskaya [41] have descriptive characteristics of this phenomenon.

It is necessary to highlight the article by D. He [42] in the IMF journal «Finance and Development», which sets out the conceptual provisions of how the world might look like without central banks and their mechanism of money emission. The style of this article is of problem-setting character – each of the interrogative sentences is a task for a separate area of research.

Some theoretical issues of cryptocurrency are described by M. Jansen, [43], A. Dubianskii [44] and S. Dorozhkin [45]. How commercial banks will operate with cryptoaccounts presented in A. Luzgina [46; 47] in a very pragmatically mode. Deep theoretical analysis of cryptocurrency had been made by V. Usosky [48; 49], other points are described in I. Iuzefalchik [50], B. Bias et al. [51], S. Andryushin [52].

Special practical considerations and implementations are presented in M. Bespyataya [53], N. Gumenyuk and M. Gumenyuk [54], O. Golovinov [55], S. Trimborn [56], J. Warnez [57], D. Yermack [58], I. Zhegulev [59], O. Zakharkin et al. [60], A. Klechikov et al. [61], M. Stolbov [62], S. Foley et al. [63], H. Tang [64].

The number of books like A. Antonopoulos [65], R. Caetano [66], M. Swan [67], Prypto [68], N. Popper [69], D. Drescher [70], V. Barankin and V. Lazarev [71], E. Filippov [72], P. Vigna and M. Casey [73], S. Raval [74], D. Tapscott and A. Tapscott [75], A. Markov and A. Antonov [76] have more advertising character and could be considered as introductory sources with different depth of phenomenon description in addition to review papers.

There are eight main blockchain technologies in the beginning of 2021 for producing alternative coins, tokens, digital finances etc. [77].

*Bitcoin* is an experimental, decentralized digital currency that enables instant payments to anyone, anywhere in the world. Bitcoin uses peer-to-peer technology to operate with no central authority: managing transactions and issuing money are carried out collectively by the network. Bitcoin is designed around the idea of using cryptography to control the creation and transfer of money, rather than relying on financial intermediaries and central authorities.

To start working with bitcoin blockchain in full mode there should be 20 Gb in 2014 [65] and 340 Gb in 2021 [78] free disk space.

*Ripple* is basic infrastructure that optimizes the payment process. It is an Internet-based protocol for connecting banks and payment systems. Any counterparts can use Ripple as a common ledger to clear and settle transactions in real-time at the lowest-possible cost.

*Cryptonote* is an open-source technology and concept that allows the creation of completely anonymous cryptocurrencies unlike in Bitcoin in which the anonymity is postulated but it is not clearly true.

*Nxt* (pronounced “next”) is a radically enhanced cryptocurrency built from scratch to deliver a unique and decentralized financial platform. Not only does it open up new

## ***Conceptual boundaries for monetary policy theory in XXI century: from blockchain to modern monetary theory***

---

possibilities — from digital cash to transfer of shares — but it addresses all of the most serious deficiencies in existing cryptocurrencies.

*Ethereum* is an open source platform for smart contracts.

*Xcurrency* is built on Blockchain 2.0, a flexible digital platform which allows easy integration for current and future not only financial XCurrency applications.

*Bitshares* represents the first decentralized exchange with market pegged assets. Apart from that it is the first alt-coin that uses Delegated Proof of Stake (DPOS) for validating blocks.

*Zerocash* is a protocol that provides a decentralized cryptocurrency in which, as in Bitcoin, users collaborate to maintain the currency by broadcasting and verifying payment transactions. Zerocash, however, differs from Bitcoin in how these payment transactions are assembled and then verified. Zerocash extends Bitcoin's protocol by adding new types of transactions that provide a separate privacy-preserving currency, in which transactions reveal neither the payment's origin, destination, or amount. Zerocash creates a separate anonymous currency, existing alongside a (non-anonymous) base currency, which refers to as Basecoin. Each user can convert (non-anonymous) basecoins into (anonymous) Zerocash coins, which is called zerocoins. Users can then send zerocoins to other users, and split or merge zerocoins they own in any way that preserves the total value. Users can also convert zerocoins back into basecoins, though in principle this is not necessary: all payments can be directly made in terms of zerocoins.

One can agree with the opinion of A. Antonopoulos [65], that new cryptocurrencies like a laboratory for new monetary rules and policies, and they can create new markets or market niches.

The discussion about MMT is covered by the wide number of media such as

Forbes, Bloomberg, Wall Street Journal, Financial Times, New York Times etc.

This concept is developed by American and Australian economists. The main book in MMT is written by W. Mitchell, L. Wray and M. Watts [79] and there are several apologetical papers like L. Connors, W. Mitchell [80], U. Chohan [81], B. Fiebiger [82; 83], S. Fullwiler, S. Kelton and L. Wray [84] has more emotional polemical character with opponents of this complex of ideas.

Criticism of this concept is presented in several academic publications such as S. Moiseev [85], S. Andryushin [86], V. Burlachkov [87], A. Bisin [88].

Both type of sources has description of main postulates of MMT as:

the monopoly on all forms of money issue is completely concentrated in the hands of the sovereign government (Treasury + Central bank) without any monetary and fiscal restrictions;

the state budget deficit is covered by monetary emission, and not by revenues generated within the country's tax system;

servicing and repayment of public debt is carried out at the expense of money issue;

the state provides full employment by increasing government budget spending;

inflation is governed solely by fiscal policy measures, not through monetary policy instruments and channels;

flexible exchange rate allows maintaining sovereign independence in the area of fiscal and monetary policy of the government.

It could be done several implications from these points. First of all, MMT is not a pure monetary theory, it is a combined monetary-fiscal theory. Secondly, there is new function of taxes presented – money circulation regulation. Thirdly, main criticism of MMT is concerned operating with budget deficit and public debt – «money printing»



mechanism. Fourthly, it describes model of closed economy.

This theory seems to be like an expectation on quick answer to the problems of individuals without deep future assessment despite the proclamation of the authors about new model of social and economic development [80], where collectivistic behavior became more important than individualistic. However, this illusion is caused the authors' arguments that are grounded on simple thesis of «The economy of Us» that is come out into aims of this theory – guarantees of full employment and minimum individual revenue. That is why some researchers describe this theory as neomaxist.

As an alternative answer to the Global financial crisis 2007–2009, MMT does not have any solutions about market discipline for financial intermediaries that was the main cause of that crisis.

*Comparison with monetary mainstream.* In the beginning of the XXI century, in most countries of the world, price stability was chosen as the main goal of the monetary policy, which, along with the goals and objectives of fiscal policy, entered the so-called macroeconomic mainstream, the main parameters of which are [85, p. 117] as follows: monetary policy goal; fiscal policy goal; sources for financing of government spending; government social obligations during recession; price stability responsibility; inflation management; budget deficit implication on investment and inflation. The comparison of MMT and blockchain with mainstream is presented in tab. 1.

1. The goal of monetary policy in the mainstream is price stability. In the cryptocurrency world, the opinion has been established that these entities have non-inflationary nature, even deflatory one, which from the theoretical point of view can be confirmed, since the supply of cryptocurrencies has a specific limitation. However, there is no real data on the inflationary nature of cryptocurrencies, and all of them are

considered only through conversion into fiat currencies. Cryptocurrency holders consider this technology as personal financial independence as a main monetary goal. Financing government activities is the goal of monetary policy in MMT.

2. The goal of fiscal policy in the mainstream is to smooth the business cycle and increase the level of potential GDP. Blockchain is capable to modify the tax system in terms of its algorithmization and increasing its reliability. The cryptocurrency world itself does not consider taxes as one of its elements and, therefore personal fiscal independence is the main goal. For MMT main fiscal policy goal is achieving full employment.

3. The sources of financing for public expenditures are taxation and the issuance of public debt. Both components are missing in the cryptocurrency world. At its core, the blockchain was created in order to overcome the restrictions in the face of the state, but it can offer some models of algorithmization. Emission financing of public spending considered in MMT as solution for government spending problems.

4. During a recession, the government is committed to maintaining its social obligations by paying subsidies to the unemployed and vulnerable. Within the blockchain, this aspect can be seen as an improvement of this mechanism in order to improve the targeting of such payments in order to exclude those who do not need them. MMT postulates employment guarantees for the able-bodied population.

5. The central bank is responsible for price stability. In the cryptocurrency world, algorithmic central bank projects are being considered. Government (Treasury Department of Ministry of Finance) is responsible for price stability in a frame of MMT.

6. According to the provisions of the mainstream, inflation is controlled by tightening interest rate policy to reduce the money supply. Cryptocurrencies offer a variety

**Conceptual boundaries for monetary policy theory in XXI century:  
from blockchain to modern monetary theory**

of models for managing inflation, such as Gesell's money (Freicoin). As the key part of MMT, fiscal sterilization through the sale of government bonds on the open market and an increase in tax rates.

7. The impact of the budget deficit on investment and inflation — a large and chronic deficit leads to crowding out of private investment in favor of financing the state budget, which in the long term leads to

higher prices. Conceptually, the budget is absent in the cryptocurrency world, while it can be implemented at the blockchain level as an algorithmic entity. For MMT, private investment is not crowded out due to emission financing of the budget, moreover, they will grow, there are no inflationary consequences, since the fiscal authorities do not increase spending when full employment is achieved.

Table 1

*Macroeconomic policies comparison*

Subject	Macroeconomic mainstream	Modern Monetary Theory	Blockchain
Monetary policy goal	Price stability	Financing government activities	Personal financial independence
Fiscal policy goal	Smoothing the business cycle and raising the level of potential GDP	Achieving full employment	Personal fiscal independence
Sources for financing of government spending	Taxation and public debt issuance	Emission financing of public spending	Nothing, but could be algorithmic
Government social obligations during recession	Subsidies for the unemployed and disadvantaged	Employment guarantees for the able-bodied population	Nothing, but could be algorithmic
Price stability responsibility	Central bank	Government (Ministry of Finance)	Nothing, but could be algorithmic
Inflation management	Tightening interest rate policy to reduce the money supply	Fiscal sterilization through the sale of government bonds on the open market and an increase in tax rates	Different models of algorithmic regulation
Budget deficit implication on investment and inflation	Large and chronic deficits lead to crowding out of private investment in favor of financing the state budget, in the long term leads to higher prices	Private investment is not crowded out due to emission financing of the budget, there are no inflationary consequences, since the fiscal authorities do not increase spending when full employment is achieved	Nothing, but could be algorithmic

Source: [85, p. 117] and supplemented by the author.

*Conclusion.* Through the prism of the parameters of the macroeconomic mainstream, it has been established, that for monetary policy cryptocurrencies at the beginning of 2021 are more of an investment object than real competitors to fiat money, while blockchain technology makes it possible to expand the instrumental capabilities

of monetary policy implementation to eliminate its existing shortcomings.

Blockchain and cryptocurrencies on the one side and modern monetary theory on the other side both offer one simple thing – a lot of money. As for blockchain, it could be considered as a Libertarian ideology that made new spiral turn of money history, like in evolution of bank systems [89].

Blockchain and cryptocurrency system does not care about: economic growth and development; bank system functioning; social spending of the Government; ecological regulation of development etc. In the beginning of the third decade of the XXI century, it is just a modern Gold rush with domination of individual interest over social with wrong understanding of central bank money creation only through banknotes printing. Nowadays, the blockchain and cryptocurrency necessity illusion is grounded on one simple thing – ability to be converted into the dollars of the United States.

The other side of current research, MMT, consider economy as a result of human activities, but it does not take into account two most general forms of human collective behaviour – market and state, but only one – the state. And market discipline is not a part this theory.

Hyperinflation phobia is immanent for both MMT and blockchain, but fear is very bad motivation for any changes, moreover, as a historical fact, every inflation regulation mechanism has its own Chernobyl. Blockchain does not consider nonmonetary sources of inflation. For MMT inflation regulation is something very discussionable.

As could be seen, neither MMT, nor blockchain do not have any ideas about long-term future. Pure eschatological world of blockchain and pure hysterical world of modern monetary system do not have any human face – it is our pure biological essence because of their concentration on individual wellbeing. Therefore, the future world will be something in-between. In Human we trust.

### References

1. Claessens, S. What Is a Recession? / S. Claessens, M. Ayhan Kose // Finance and Development. – 2009. – March. – P. 52–53.
2. Real GDP growth, Annual percent change [Electronic source] / International Monetary Fund // World Economic Outlook. – URL: [https://www.imf.org/external/datamapper/NGDP\\_RPCH@WEO/OEMDC/ADVEC/WEOWORLD](https://www.imf.org/external/datamapper/NGDP_RPCH@WEO/OEMDC/ADVEC/WEOWORLD)
3. Financial, Interest Rates, Monetary Policy-Related Interest Rate, Percent per annum [Electronic source] / International Monetary Fund // International Financial Statistics. – URL: <https://data.imf.org/regular.aspx?key=61545867>
4. Monetary and Financial Statistics by Indicator [Electronic source] / International Monetary Fund // International Financial Statistics. – URL: <https://data.imf.org/regular.aspx?key=61545868>
5. Prices, Consumer Price Index, All items, Index [Electronic source] / International Monetary Fund // International Financial Statistics. – URL: <https://data.imf.org/regular.aspx?key=61545861>
6. Nakamoto, S. Bitcoin: A Peer-to-Peer Electronic Cash System [Electronic resource] / S. Nakamoto // Bitcoin.org. – URL: <https://bitcoin.org/ru/bitcoin-paper>.
7. Bitcoin Genesis Block Newspaper – The Times 03 Jan 2009 [Electronic source] // Official site the newspaper «The Times 03 Jan 2009». – URL: <https://www.thetimes03jan2009.com/>
8. Cryptocurrency Historical Data Snapshot [Electronic source] // CoinMarketCap.com. – URL: <https://coinmarketcap.com/historical/>
9. Central bank survey of foreign exchange and derivatives market activity 1995 // Triennial Central Bank Survey. – Basel: Bank for International Settlements, 1996. – 155 p.
10. Central bank survey of foreign exchange and derivatives market activity 1998 // Triennial Central Bank Survey. – Basel: Bank for International Settlements, 1999. – 48 p.
11. Foreign exchange and derivatives market activity in 2001 // Triennial Central

***Conceptual boundaries for monetary policy theory in XXI century:  
from blockchain to modern monetary theory***

---

Bank Survey. – Basel: Bank for International Settlements, 2002. – 52 p.

12. Foreign exchange and derivatives market activity in 2004 // Triennial Central Bank Survey. – Basel: Bank for International Settlements, 2005. – 49 p.

13. Foreign exchange and derivatives market activity in 2007 // Triennial Central Bank Survey. – Basel: Bank for International Settlements, 2007. – 59 p.

14. Report on global foreign exchange market activity in 2010 // Triennial Central Bank Survey. – Basel: Bank for International Settlements, 2010. – 95 p.

15. Global foreign exchange market turnover in 2013 // Triennial Central Bank Survey. – Basel: Bank for International Settlements, 2014. – 79 p.

16. Global foreign exchange market turnover in 2016 // Triennial Central Bank Survey. – Basel: Bank for International Settlements, 2016. – 79 p.

17. Global foreign exchange market turnover in 2019 // Triennial Central Bank Survey. – Basel: Bank for International Settlements, 2019. – 81 p.

18. Woo, D. Bitcoin: a first assessment / D. Woo, I. Gordon, V. Iaralov // Bank of America Merrill Lynch. – 2013. – 14 p.

19. Виман, О. Блокчейн как средство получения экономической выгоды. Руководство для управляющих активами / О. Виман // J.P. Morgan Chase & Co. – 2016. – 23 p.

20. Virtual currency schemes // European Central Bank. – 2012. – October. – 55 p.

21. Bitcoin Virtual Currency: Intelligence Unique Features Present Distinct Challenges for Deterring Illicit Activity // Federal Bureau of Investigation, Intelligence Assessment. – 2012. – 20 p.

22. Grech, A. Blockchain in Education. / A. Grech, A.F. Camilleri // Inamoratos Santos, A. (ed.). – Luxembourg: Publi-

cations Office of the European Union, 2017. – 136 p. – doi:10.2760/60649.

23. Блокчейн на «службе» стран мира / Евразийская экономическая комиссия // Обзор цифровой повестки в мире. – 2019. – № 7. – 22 с.

24. Pulse of Fintech H2'20 [Electronic resource] // KPMG. – 2021. – February. – URL:

<https://assets.kpmg/content/dam/kpmg/xx/pdf/2021/02/pulse-of-fintech-h2-2020.pdf>

25. Deloitte's 2019 Global Blockchain Survey [Electronic resource] // Deloitte Insights. – 2020. – URL: [https://www2.deloitte.com/content/dam/insights/us/articles/2019-global-blockchain-survey/DI\\_2019-global-blockchain-survey.pdf](https://www2.deloitte.com/content/dam/insights/us/articles/2019-global-blockchain-survey/DI_2019-global-blockchain-survey.pdf)

26. Deloitte's 2020 Global Blockchain Survey [Electronic source] // Deloitte Insights. – 2020. – URL: [https://www2.deloitte.com/content/dam/insights/us/articles/6608\\_2020-global-blockchain-survey/DI\\_CIR%202020%20global%20blockchain%20survey.pdf](https://www2.deloitte.com/content/dam/insights/us/articles/6608_2020-global-blockchain-survey/DI_CIR%202020%20global%20blockchain%20survey.pdf)

27. Блокчейн – новые возможности для производителей и потребителей электроэнергии? [Электронный ресурс] // PricewaterhouseCoopers. – 2016. – URL: [https://www.pwc.ru/ru/publications/blockchain/blockchain\\_opportunity-for-energy-producers%20and-consumers\\_RUS.pdf](https://www.pwc.ru/ru/publications/blockchain/blockchain_opportunity-for-energy-producers%20and-consumers_RUS.pdf)

28. PwC's Global Blockchain Survey 2018. Blockchain is here. What's your next move? [Electronic source] // PricewaterhouseCoopers. – 2018. – URL: <https://www.pwccn.com/en/research-and-insights/publications/global-blockchain-survey-2018/global-blockchain-survey-2018-report.pdf>

29. How blockchain can transform defence assets and give armed forces an advantage on the battlefield [Electronic source] // PricewaterhouseCoopers. – 2020. – August. – URL: <https://www.pwc.com/gx/en/aerospace-defence/pdf/blockchain-defence.pdf>

30. Blockchain [Electronic source] // Ernst & Young. – URL: [https://www.ey.com/en\\_gl/blockchain](https://www.ey.com/en_gl/blockchain).
31. Brody, P.R. Going Public. EY Global Blockchain Summit 2020 [Electronic source] / R.P. Brody // Ernst & Young. – 2020. – URL: [https://assets.ey.com/content/dam/ey-sites/ey-com/en\\_au/pdfs/going-public-how-public-blockchains-will-create-exponential-growth.pdf](https://assets.ey.com/content/dam/ey-sites/ey-com/en_au/pdfs/going-public-how-public-blockchains-will-create-exponential-growth.pdf)
32. Shin, L. Forbes Fintech 50 2018: The Future Of Blockchain And Cryptocurrency [Electronic source] / L. Shin // Forbes. – 2018. – February 13. – URL: <https://www.forbes.com/sites/laurashin/2018/02/13/forbes-fintech-50-2018-the-future-of-blockchain-and-crypto/?sh=37ce57081036#5b6d0a010366/>
33. Castillo, M. Blockchain 50 2021 [Electronic source] / M. Castillo // Forbes. – 2021. – February 2. – URL: <https://www.forbes.com/sites/michaeldelcastillo/2021/02/02/blockchain-50/?sh=2d0dff1c231c>
34. Блокчейн как способ решения задач банковской системы // ПАО «АК БАРС» БАНК, «АК БАРС Цифровые технологии», ForkLog Research. – 2017. – 32 с.
35. Правовое регулирование криптовалютного бизнеса [Электронный ресурс] / В. Лихута и др. // Axon Partners, ForkLog Research. – 2017. – URL: <https://axon.partners/wp-content/uploads/2017/02/Global-Issues-of-Bitcoin-Business-Regulation.pdf>
36. Tasca, P. Digital Currencies: Principles, Trends, Opportunities, and Risks / P. Tasca // ECUREX Research Working Paper. – 2015. – 110 p.
37. Chohan, U.W. Cryptocurrencies: A Brief Thematic Review [Electronic source] / U.W. Chohan // University of New South Wales Discussion Paper Series. – 2017. – August. – 4. – 9 p. – URL: [https://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=3024330](https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3024330).
38. Архірейська. Н.В. Блокчейн – інноваційна технологія постіндустріальної економіки / Н.В. Архірейська // Бізнес-Інформ. – № 7. – С. 125–129.
39. Данильчук, Р.К. Аналіз основних принципів технології blockchain / Р.К. Данильчук, О.С. Жураковська // Науковий огляд. – 2017. – № 10 (42). – С. 1–11.
40. Нурмухаметов, Р.К. Технология блокчейн: сущность, виды, использование в российской практике / Р.К. Нурмухаметов, П.Д. Степанов, Т.Р. Новикова / Деньги и кредит. – 2017. – № 12. — С. 101–103.
41. Малиновська, А.М. Віртуальні валюти: поширення та передумови до визнання / А.М. Малиновська // Вестник экономической науки Украины. – 2019. – № 2. – С. 165–169. – DOI: 10.37405/1729-7206.2019.2(37).165-169.
42. He, D. Monetary Policy in the Digital Age / D. He // Finance and development. – 2018. – June. – P. 13–16.
43. Jansen, M. Bitcoin: The Political ‘Virtual’ of an Intangible Material Currency / M. Jansen // International Journal of Community Currency Research. – 2013. – Vol. 17. – P. 8–18.
44. Дубянский, А.Н. Теории происхождения денег и криптовалюты / А.Н. Дубянский // Деньги и кредит. – 2017. – № 12. – С. 97–100.
45. Дорожкин, С. Криптовалюты: теория и практика / С. Дорожкин // Банкаўскі веснік. – 2018. – Жнівень. – С. 50–60.
46. Лузгина, А. Деньги и денежные средства как экономические категории и их взаимосвязь с криптовалютами / А. Лузгина // Банкаўскі веснік. – 2018. – Кастрычнік. – С. 26–35.
47. Лузгина, А. Криптовалюты: сущностные характеристики и практические аспекты / А. Лузгина // Банкаўскі веснік. – 2018. – Верасень. – С. 39–49.



***Conceptual boundaries for monetary policy theory in XXI century:  
from blockchain to modern monetary theory***

---

48. Усоский, В. Механизм обеспечения фидуциарных кредитных денег в рыночной экономике и криптовалюта / В. Усоский // *Банкаўскі веснік*. – 2018. – Кастрычнік. – С. 51–61.
49. Усоский, В. Криптовалюта как техногенный миф / В. Усоский // *Банкаўскі веснік*. – 2019. – Красавік. – С. 35–48.
50. Юзефальчик, И. Виртуальные валюты: возможные трактовки понятия и влияние на финансовую систему / И. Юзефальчик // *Банкаўскі веснік*. – 2018. – Сакавік. – С. 9–18.
51. Bias, V. The Blockchain Folk Theorem / V. Bias, C. Bisière, M. Bouvard, C. Casamatta // *The Review of Financial Studies*. – 2019. – V. 52. – №. 5. – P. 1662–1715.
52. Андрюшин, С.А. Централизованные и децентрализованные денежные системы / С.А. Андрюшин // *Вопросы теоретической экономики*. – 2018. – №. 1. – С. 26–49.
53. Беспятая, М.Н. Возможности использования технологии blockchain в цифровом маркетинге / М.Н. Беспятая // *Вестник Института экономических исследований*. – 2018. – № 3 (11). – С. 104–109.
54. Гуменюк, Н.В. Концептуальный механизм управления цепями поставок на основе технологии блокчейн / Н.В. Гуменюк, М.М. Гуменюк // *Вестник Института экономических исследований*. – 2019. – № 1 (13). – С. 119–127.
55. Головинов, О. Н. Перспективы развития информационно-коммуникационных технологий в таможенной деятельности Донецкой Народной Республики / О. Н. Головинов // *Вестник Института экономических исследований*. – 2020. – № 1(17). – С. 52–61.
56. Trimborn, S. CRIX or evaluating blockchain based currencies / S. Trimborn, W. K. Härdle // *SFB 649 Discussion Paper*. – 2016. – 021. – 28 p.
57. Warnez, J. Revenue registration and automatic taxation for platform businesses on blockchain / J. Warnez // *Copenhagen Business School*. – 2017. – DOI:10.13140/RG.2.2.18308.83843
58. Yermack, D. Corporate Governance and Blockchains / D. Yermack // *Review of Finance*. – 2017. – P. 7–31. – DOI: 10.1093/rof/rfw074
59. Жегулев, И. Блокчейн как инструмент развития ДНР [Электронный ресурс] / И. Жегулев // *Meduza*. – 2017. – URL: <https://meduza.io/feature/2017/10/17/blokcheyn-kak-instrument-razvitiya-dnr>
60. Захаркін, О.О. Оцінка волатильності криптовалютного ринку порівняно з іншими грошовими інструментами інвестування в Україні / О.О. Захаркін, Л.С. Захаркіна, О.О. Москальова // *Гроші, фінанси і кредит*. – 2017. – № 6(62). – С. 85–92.
61. Клечиков, А.В. Блокчейн-технологии и их использование в государственной сфере / А.В. Клечиков, М.М. Пряников, А.В. Чугунов // *International Journal of Open Information Technologies*. – 2017. – V. 5. – № 12. – С. 123–129.
62. Столбов, М. О некоторых последствиях внедрения блокчейна в финансах / М. Столбов // *Вопросы экономики*. – 2018. – № 6. – С. 133–145.
63. Foley, S. Sex, Drugs, and Bitcoin: How Much Illegal Activity Is Financed through Cryptocurrencies? / S. Foley, J.R. Karlson, T.J. Putninš // *The Review of Financial Studies*. – 2019. – V. 32. – № 5. – P. 1798–1853.
64. Tang, H. Peer-to-Peer Lenders Versus Banks: Substitutes or Complements? / H. Tang // *The Review of Financial Studies*. – 2019. – V. 52. – № 5. – P. 1900–1938.
65. Antonopoulos, A.M. Mastering Bitcoin. Unlocking digital cryptocurrencies / A.M. Antonopoulos. – Sebastopol: O'Reilly Media, Inc., 2015. – 273 p.



66. Caetano, R. Learning Bitcoin. Embrace the new world of finance by leveraging the power of crypto-currencies using Bitcoin and the Blockchain / R. Caetano. – Birmingham: Packt Publishing Ltd., 2015. – 215 p.
67. Swan, M. Blockchain. Blueprint for a New Economy / M. Swan. – Sebastopol: O'Reilly Media, Inc., 2015. — 129 p.
68. Prypto Bitcoin For Dummies / Prypto. – New Jersey: John Wiley & Sons, Inc., 2016. – 196 p.
69. Поппер, Н. Цифровое золото: невероятная история биткойна: Пер. с англ. / Н. Поппер. – М.: ООО «И.Д. Вильямс», 2016. – 368 с.
70. Drescher, D. Blockchain basics: A non-technical introduction in 25 steps / D. Drescher. – Frankfurt am Main: Apress, 2017. – 255 p.
71. Баранкин, В. Криптовалюта от «А» до «Я» / В. Баранкин, В. Лазарев. – М.: Dominion, 2017. – 51 с.
72. Филиппов, Е. Криптовалюта от «А» до «Я» / Е. Филиппов. – М.: Dominion, 2017. – 49 с.
73. Винья, П. Эпоха криптовалют. Как биткойн и блокчейн меняют мировой экономический порядок / П. Винья, М. Кейси. – М.: Манн, Иванов и Фербер, 2017. – 432 с.
74. Равал, С. Децентрализованные приложения. Технология Blockchain в действии / С. Равал. – СПб.: Питер, 2017. – 240 с. – (Серия «Бестселлеры O'Reilly»).
75. Тапскотт, Д. Технология блокчейн: то, что движет финансовой революцией сегодня / Д. Тапскотт, А. Тапскотт; [пер. с англ. К. Шашковой, Е. Ряхиной]. – М.: Эксмо, 2017. – 448 с.
76. Марков, А.В. Криптовалюта. Как потерять всех друзей и заставить всех себя ненавидеть / А.В. Марков, А. Антонов. – М.: «Издательство АСТ», 2018. – 146 с.
77. Technology [Electronic source] // Map of coins. – URL: [mapofcoins.com/technologies](http://mapofcoins.com/technologies)
78. Running A Full Node [Electronic source] // Bitcoin.org. – URL: [bitcoin.org/en/full-node](http://bitcoin.org/en/full-node)
79. Mitchell, W. Macroeconomics / W. Mitchell, L.R. Wray, M. Watts. – London: Red Globe Press, 2019. – 604 p.
80. Connors, L. Framing Modern Monetary Theory / L. Connors, W. Mitchell // Journal of Post Keynesian Economics. – 2017. – V. 40. – №. 2. – P. 239–259. – DOI: 10.1080/01603477.2016.1262746
81. Chohan, U.W. Modern Monetary Theory (MMT): A General Introduction / U.W. Chohan // CASS Working Papers on Economics & National Affairs. – 2020. – April. – 6. – 21 p.
82. Fiebiger, B. Modern Money Theory and the 'Real-World' Accounting of 1-1<0: The U.S. Treasury Does Not Spend as per a Bank / B. Fiebiger // Modern Monetary Theory: A Debate // PERI Working Paper Series. – Amherst, MA: Political Economy Research Institute, University of Massachusetts at Amherst, 2012. – № 279. – P. 1–16.
83. Fiebiger, B. A Rejoinder to «Modern Money Theory: A Response to Critics» / B. Fiebiger // Modern Monetary Theory: A Debate // PERI Working Paper Series. – Amherst, MA: Political Economy Research Institute, University of Massachusetts at Amherst, 2012. – № 279. – P. 27–32.
84. Fullwiler, S. Modern Money Theory: A Response To Critics / S. Fullwiler, S. Kelton, L.R. Wray // Modern Monetary Theory: A Debate // PERI Working Paper Series. – Amherst, MA: Political Economy Research Institute, University of Massachusetts at Amherst, 2012. – № 279. – P. 17–26.
85. Моисеев, С.Р. Хайп вокруг (не)денежной (не)теории /

***Conceptual boundaries for monetary policy theory in XXI century:  
from blockchain to modern monetary theory***

---

С. Р. Моисеев // Вопросы экономики. – 2019. – № 9. – С. 112–122.

86. Андриюшин, С.А. Деньги – это творение государства или рынка? (О «современной денежной теории», изложенной в учебнике У. Митчелла, Л.Р. Рея и М. Уоттса «Макроэкономика») / С.А. Андриюшин // Вопросы экономики. – 2020. – № 6. – С. 121–134.

87. Бурлачков, В.К. «Современная денежная теория»: используемые методы анализа и парадоксальность выводов / В. К. Бурлачков // Вопросы экономики. – 2021. – № 3. – С. 152–159.

88. Bisin, A. The Deficit Myth: Modern Monetary Theory and the Birth of the People's Economy. By Stephanie Kelton. New York: Perseus Books, PublicAffairs, 2020. Pp. vii, 325. \$30.00, cloth; \$18.99, e-book. ISBN 978–1–5417–3618–4, cloth; 978–1–5417–3620–7, e-book. / A. Bisin // Journal of Economic Literature. – 2020. – V. LIII. – P. 3–5.

89. Кирилеева, А.С. Новая классификация изменений эволюционного развития кредитно-банковской системы / А. С. Кирилеева / Вестник Института экономических исследований. – 2020. – № 2 (18). – С. 66–74.

**А.Е. ШМАТЬКО**, научный сотрудник  
отдела финансово-экономических исследований,  
e-mail: shmatko.a.e@econri.org

ГУ «Институт экономических исследований»,  
г. Донецк, Донецкая Народная Республика

*Статья поступила в редакцию 11.06.2021*