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REASONS AND MACROECONOMIC ASPECTS OF THE INTRODUCTION OF THE DIGITAL CURRENCY OF CENTRAL BANKS

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Central banks around the world actively participate in the research, elaboration, and introduction of central bank digital currency (CBDC). Mostly, the reasons relate to expansion of parallel circulation of private digital currencies and necessary changes in monetary policy framework. In the conditions of insufficient experience and empirical data, scientists and practitioners intend to create guidelines and find solutions for successful implementation of CBDC project. This article joins the debates in terms of reasons and macroeconomic aspects of introduction of CBDC. The tasks are as follows: to characterize peculiarities of CBDC in the context of private digital currencies; to characterize peculiarities of the modern monetary policy realized by central banks; to characterize the possible role of CBDC within the modern monetary policy; to make conclusions on possible effects of introduction of CBDC. Monographic method, methods of logical analysis and synthesis, deduction and induction are applied within the article. The novelty of the present article appears as characteristics of introduction of CBDC in the context of transition of monetary policy from quantitative easing to quantitative tightening, and the circulation of private digital currencies. The project of CBDC is very complicated and unknown for financial stability, personal data protection, and cybersecurity. In parallel, central banks need to increase monetary policy effectiveness in the conditions of high inflation, huge balance sheets, and circulation of private digital currencies. Activities to develop core principles and guidance for introduction of CBDC rely on possible positive effects for monetary policy effectiveness, financial inclusion, and anti-money laundering. Technical, financial, political, legal, environmental, and educational factors are significant. Additional attention has to be paid to willingness and readiness of end users for wide application of CBDC. In parallel with technical, financial, and legal aspects, educational activities devoted to CBDC are recommended.

Keywords: central banks, digital currencies, monetary policy, central bank digital currency, CBDC, macroeconomic aspects.

Centrālo banku digitālās valūtas ieviešanas iemesli un makroekonomiskie aspekti

Centrālās bankas visā pasaulē aktīvi piedalās digitālās valūtas (CBDC) izpētē, izstrādē un ieviešanā. Galvenokārt, iemesli ir saistīti ar privāto digitālo valūtu paralēlās aprites paplašināšanos un nepieciešamajām izmaiņām monetārās politikas ietvarā. Iepriekšējās pieredzes un pietiekamu empīrisku datu trūkuma apstākļos zinātnieki un praktiķi strādā, lai izveidotu vadlīnijas un rastu risinājumus veiksmīgai CBDC projekta īstenošanai. Šis raksts pievienojas diskusijām par CBDC ieviešanas iemesliem un makroekonomiskiem aspektiem. Rakstam ir izvirzīti vairāki uzdevumi: raksturot CBDC īpatnības privāto digitālo valūtu kontekstā; raksturot centrālo banku mūsdienu monetārās politikas īpatnības; raksturot CBDC iespējamo lomu mūsdienu monetārajā politikā; izdarīt secinājumus par iespējamo CBDC ieviešanas ietekmi. Rakstā tiek pielietotas monogrāfiskā metode, loģiskās analīzes un sintēzes metode, dedukcijas un indukcijas metodes. Šī raksta novitāte parādās kā CBDC ieviešanas iezīmju raksturojums kontekstā ar centrālo banku pāreju no monetārās mīkstināšanas uz monetāro stingrību un privāto digitālo valūtu apriti. Pēc būtības CBDC projekts ir ļoti sarežģīts ar vēl nezināmu ietekmi uz finanšu stabilitāti, personas datu aizsardzību, kibernetdrošību. Vienlaicīgi, centrālās bankas strādā, lai paaugstinātu monetārās politikas efektivitāti, augstas inflācijas, milzīgu bilanču un privāto digitālo valūtu aprites apstākļos. Pamatprincipu un vadlīniju izstrāde CBDC ieviešanai balstās iespējamā pozitīvā ietekmē uz monetārās politikas efektivitāti, finansiālo iekļaušanu un nelikumīgi iegūtu līdzekļu legalizācijas novēršanu. Tāpat, par būtiskiem tiek atzīti arī tehniskie, finansiālie, politiskie, tiesiskie, vides un izglītības faktori. Īpaša uzmanība jāpievērš galalietotāju vēlmei un gatavībai plašai CBDC pielietošanai. Paralēli tehniskajiem, finansiālajiem un juridiskajiem aspektiem ir ieteicamas CBDC vēltītas izglītojošas aktivitātes.

Atslēgvārdi: centrālās bankas, digitālās valūtas, monetārā politika, centrālās bankas digitālā valūta, CBDC, makroekonomiskie aspekti.

Introduction

Nowadays, in the conditions of switching accents in monetary policy frameworks, expansion of parallel circulation of private digital currencies, and discussions on appropriate model for central banks digital currency (CBDC), central banks pursue effectiveness of their monetary policy.

According to the United Nations (2022, p. 1) “105 countries, representing over 95 per cent of global GDP, are exploring the possibility of launching a CBDC.” Maintaining financial stability, improving financial inclusion, modernizing payment systems, stimulating economic development, and combating money laundering are among key reasons for high interest in CBDC project. Additionally, central banks follow rapid expansion of private digital currencies and evaluate possible financial and monetary risks (e.g., United Nations 2022). As a result of widespread interest, scientists and practitioners assess new digital monetary instruments and their possible effects on conventional monetary policy (e.g., United Nations 2022).

During the last decades, for stimulating stagnant economies, central banks of advanced economies realized unconventional monetary policy in a form of quantitative easing (QE) (e.g., Kim 2023; Harimaya, Jinushi 2023). Scientists express different opinions on success and failure of the approach, especially for emerging and small open economies (e.g., Kolasa, Wesolowski 2020; Kim 2023; United Nations 2022). At the moment, reduction of excess reserves from a monetary system through quantitative tightening (QT) become actual (Febrero, Uxo 2023; Tanaka 2022). In the context of CBDC, more tightly monetary policy is desirable for successful process of introduction.

Despite different level of financial development, the overall background for introduction of CBDC is similar across countries. The reasons lie in technological changes in economic behavior, global socioeconomic problems, increasing public debts, and expansion of circulation of private digital currencies. The coronavirus crisis has confirmed that the current system of regulation of international monetary and financial relations with an unlimited supply of money does not lead to a solution to the accumulated global socioeconomic problems. At the same time, the market hype around crypto assets is helping to promote the idea of launching sovereign digital currencies, which may bring some adjustments to the growth model based on credit money.

Over the past ten years, the creation of mobile money through digital platforms has enabled the integration big amount of new users into the financial system who previously did not have access to bank accounts, creating an inclusive financial system (inclusive economy). At the same time, privately issued digital currencies pose a threat to the implementation of monetary policy by central banks due to the emergence of parallel money circulation. In addition, regulators cannot fully control exchange rates and influence the money supply.

The development of digital currencies expands. In 2022, the most widely used stablecoins as Tether and Circle being ahead of traditional payment processors as Visa and Mastercard (e.g., Adejumo, Besabella 2023). Naturally, central banks and global financial institutions cannot stand aside and not notice the growing popularity of digital currencies and have joined this race (e.g., Atlantic Council. Geoeconomics Center. n/d). The United Nations (2022) in the Monthly Briefing on the world economic situation and prospects indicate that in a two-tier banking system where central bank interacts with commercial banks some forms of CBDCs already exist. However, the new patch of possible CBDC widen a range of users including individuals and business. A design of CBDC model is crucial for avoiding unfavorable consequences for financial system and monetary policy and getting benefits. In principle, in case of CBDC circulation, core objectives of monetary policy remain the same.

The article aims to detect reasons and characterize macroeconomic aspects of the introduction of CBDC. The tasks for the aim are: to characterize peculiarities of CBDC in the context of private digital currencies; to characterize peculiarities of modern monetary policy; to indicate the possible role of CBDC within the modern monetary policy; to make conclusions on possible effects of introduction of CBDC.

Analysis of the expected introduction of digital currency of central banks is based on various sources of information. Some of the most important sources that are relevant in conducting such an analysis are:

1. Official Statements from Central Banks, for example, the European Central Bank: Central banks typically issue official statements and reports about their intentions and plans regarding digital currencies. These documents may contain information about the development progress and timing of the introduction of digital currencies.

2. International organizations: International organizations such as the International Monetary Fund, the United Nations, and the Bank for International Settlements can provide information on trends and developments in digital currencies.

3. Financial news and analytical publications: A variety of financial news and analytical sources follow developments in the world of digital currencies and provide analysis and expert opinions.

4. Academic research: Academic research and articles can provide in-depth analysis of the technological, economic, financial, political, and educational aspects of digital currencies.

Using information from a variety of sources helps to better understand how and when central banks might introduce digital currencies and the implications of these decisions.

Primarily, general scientific methods were used in the article:

- 1) Monographic method – analysis of scientific literature;
- 2) Methods of logical analysis and synthesis;
- 3) Deduction and induction in system analysis of the research object.

The novelty of the present article appears as characteristics of introduction of CBDC in the context of transition of monetary policy from quantitative easing (QE) to quantitative tightening (QT), and the circulation of private digital currencies.

The article consists of four sections. The second section presents the CBDC characteristics in the light of private digital currencies stablecoins. The third section presents characteristics of the modern monetary policies of central banks and possible role of CBDC. The fourth section concludes the article.

Central bank digital currency (CBDC) in the light of private digital currencies stablecoins: An overview

Private digital currencies stablecoins. Widely used private digital currencies stablecoins as Tether and Circle demonstrate the biggest market share. Resilience to fluctuations in the exchange rate of stablecoins is achieved by linking stablecoins to various instruments, including fiat currencies, precious metals, digital currencies, or by replicating on a decentralized basis some elements of monetary policy used by central banks. The most commonly used stablecoins are usually backed by such currencies as US dollar, euro, pound sterling, etc. (GENIUSEE 2022).

The development of digital currencies expands. Tether USDT processed \$18.2 trillion in transactions in 2022, placing it ahead of traditional payment processors like Visa and Mastercard. For comparison, Mastercard and Visa processed transactions worth \$14.1 trillion and \$7.7 trillion, respectively (Adejumo, Besabella 2023). Tether has a 47% market share and Circle has a market share of 31% (Young, Baird 2022). Both reach almost 80% of stablecoin market (e.g., Young, Baird 2022). However, there is a difference between credit card volumes and stablecoin settlements. The difference is that credit card

transactions usually indicate on consumer spending, whereas fiat-pegged crypto assets are primarily used for crypto trading and decentralized finance.

Given the ongoing trends in private digital currencies, elaboration and introduction of digital currency issued by central banks is topical around the world during the last decade (e.g., United Nations 2022).

CBDC and its peculiarities. Modern fiat (unsecured) money exists in two forms: cash, issued and guaranteed by central banks, and non-cash, issued and guaranteed by commercial banks at the expense of deposits of depositors (Grym et al. 2017). Unlike the spontaneously formed value of cryptocurrencies, the value is equal to the value of national currencies, the maintenance of which is guaranteed by the central bank of the relevant jurisdiction.

“To the extent that money becomes digital, central bank money must be made available in digital form in all part of the economy and society” (Brunnermeier, Landau 2022, p. 11).

Christine Lagarde, President of the ECB, at the European Banking Congress Frankfurt, 18 November 2022 said, what a central banks are responding by advancing the development of central bank digital currencies (CBDC) (European Central Bank 2022). These currencies could give banks a tool to offer improved products and services, built on the stable foundation of digital public money. Scientists and practitioners also see that “CBDCs do have the potential to help defend or strengthen monetary sovereignty” (Chia, Helleiner 2024, p. 44).

“An important element of this model is the opportunity at any time to convert private money (provided by commercial banks) into public money or the money of the central bank 1:1, as well as to use this public money to make payments” (Vecbaštiks, Dārziņš 2022).

The European Central Bank introduced digital currency project in 2021 with the aim to move to the development stage in 2023 (United Nations 2022). At the same time, widespread use of the European CBDC may be possible later (United Nations 2022).

When convertibility is guaranteed, it promotes and maintains the reliability of both private and public money. Thus, functioning of the currency as a unified payment system is ensured (e.g., The Baltic Times 2022). “Thus, the money of the central bank ... maintains a functioning payment system and ensures the financial stability and trust in the currency. Currently, the money of central banks is available to the public in the form of cash. ... when the share of the digital money is on the rise, cash becomes less relevant as a means of payment” (The Baltic Times 2022; Vecbaštiks, Dārziņš 2022).

It is most likely that the suppression of CBDC volatility will be regulated administratively, through a reduction in the circulation of cash and possibly a ban on the circulation of private digital currencies. Only in this case, by minimizing the influence of the market mechanism, it will be possible to maintain the exchange rate between fiat and digital money 1:1.

Evaluation of possible risks of introduction of CBDC relate to changes in retail, wholesale and cross border payments. The changes may provide negative influence on monetary policy through effects on money velocity, bank deposit disintermediation, volatility of bank reserves, currency substitution, and capital flows (Lukonga 2023).

Lukonga (2023) displays the difficulties of the transition to digital currencies. There are still significant issues in the development of international settlements through CBDC, investment processes. Additional issue appear as a choice between a distributed ledger technology and a centralized database model as well as between conventional two-tier system or one-tier system for designing CBDC model (e.g., United Nations 2022). Each potential model demonstrates both positive and negative peculiarities concerning such aspects as competitiveness of commercial banks, data privacy, credit costs, international

cooperation, and overall financial stability. Particular attention has to be devoted to small countries, which are not able to develop their own CBDC (e.g., United Nations 2022).

Positive aspects, which are expected as a result of introduction of CBDC relate to improvements in functioning of the existing payment systems and their modernization in developing economies, reduction of shadow economy and money laundering, increasing financial inclusion, improvement in regulating of money supply (e.g., United Nations 2022).

Overall, for well-designed functioning, any digital currency requires: clear regulations and legislation that govern transactions and oblige companies and users to comply with security and anti-money laundering standards; monitoring and analysis systems that can identify potential illegal transactions and financial risks; educational campaigns for the public and bank employees about the risks and benefits of digital currency; collaboration between banks, financial institutions, and cryptocurrency and blockchain technology companies to develop innovative solutions and ensure security.

The modern monetary policy peculiarities and the role of central bank digital currency (CBDC): An overview of scientific and practical experience

In the Monthly Briefing on the world economic situation and prospects “Prospects and challenges of introducing a central bank digital currency”, the United Nations (2022, p. 2) mention that CBDC is expected to improve precision of regulating money supply.

During the recent years, several shocks of financial and non-financial nature decreased economic activity worldwide. In this context, central banks met necessity to stimulate stagnating economies what mostly was implemented through quantitative easing (QE), i.e., regulating money supply through large-scale purchases of assets. This limited time solution gained attention from both supporters and critics. At the moment, transition from QE to QT occurs. Thus, monetary policy become more tightly. In this section, some characteristics of the modern monetary policy is provided and possible role of CBDC in the future is described.

Peculiarities of the modern monetary policies. In their sense, QE operations aim to stimulate stagnant economy, to reduce long-term interest rates, and to overcome prolonged deflation (e.g., Harimaya, Jinushi 2023; Kolasa, Wesołowski 2020). Such activities are significant for economy recovery after crises, which slowed down economic activity. Large-scale purchases of assets (e.g., Dhital et al. 2023; Kim 2023), also by applying environmental criteria (e.g., Aloui et al. 2023) introduced new path of monetary policy that previously was not experienced. Positive and negative effects of this approach are studied in the context of competitiveness, capital flows, employment, credit availability, risk-taking behavior, and effects on other economies, which do not realize such kind of monetary policy (e.g., Kim 2023; Kolasa, Wesołowski 2020).

Positive effects of QE are presented in studies. For example, according to case studies provided by Harimaya, Jinushi (2023), Dhital, Dixon, and Evanczyk (2023), effectiveness for promoting bank lending and increase in loans are discovered. In the conditions of economy stagnation and prolonged deflation, expansion of lending to private sector is crucial (e.g., Harimaya, Jinushi 2023). However, Dhital, Dixon, and Evanczyk (2023) indicate that risky loans also increase as a result of QE activities. Nowadays, activities of private sector have to be in line with sustainability principles. QE program is a possible tool for stimulating green investments. For example, Green QE program of the European Central Bank

introduced new environmental criteria when purchasing private assets (e.g., Aloui et al. 2023). Such approach is the step forward for stimulating sustainable investments after Covid-19 pandemic (e.g., Aloui et al. 2023). Kolasa and Wesołowski (2020) in their study mention positive effects of QE on global demand and financial markets.

Critics of QE indicate that this leads to unemployment growth and outflow of depreciating capital to foreign markets (e.g., Doukas 2013). Central banks, used QE operations and have inflated their balance sheets with assets of questionable quality, putting themselves at risk. For example, scientists indicate that G4 central banks significantly increased their assets (e.g., Doukas 2013). QE programs were realized during the crises. For example, Kim (2023) mentions that Fed implemented large QE program between 2009 and 2014, and during the global Covid-19 pandemic. Reaction on economic shock during pandemic includes QE programs realized, for example, by the world's four leading central banks, which supported their own economies and international financial markets with more than \$9 trillion (Major 2021).

Theoretical frameworks explain the modern monetary policy in different ways. Opinions differ in the light of Keynesian and Friedman approaches. According to the Friedman thought, government's role in ensuring economic stability relates to controlling the supply of money and allowing the rest of the market to find a balance with possibly less government's intervention. According to the Keynesian economists, lower interest rates stimulates higher spending and thus decrease unemployment. However, low interest rates realized during QE programs had an adverse effect on productivity and stimulated capital outflows and higher-risk investments abroad (e.g., Doukas 2013). As a result, excessive money supply lowers the cost of capital and raises costs of labor (Doukas 2013).

For example, for the case of typical small open economy, which follow independent monetary policy, the effects are positive for domestic demand, but negative for international competitiveness at least in a short period of time (e.g., Kolasa, Wesołowski 2020). Kim (2023) mentions different effects of QE activities realized in highly developed economies on other countries – overall, positive effects due to lowering of global long-term interest rates and negative due to intensive capital inflows and currency appreciations for emerging economies.

Doukas (2013) mentions such negative effects as higher unemployment, capital outflow from advanced economies to economies with lower labor costs. Thus, excessive money supply does not solve long-term issues but contribute to overcoming short-term shocks.

Nowadays, the question on how to exit QE and effectively move to QT become topical (e.g., Febrero, Uxo 2023). This means to make monetary policy tightly through designing of appropriate strategies (e.g., Tanaka 2022).

CBDC and monetary policy. There are many reasons to explore digital currencies, and the motivation of different countries to issue a CBDC depends on their economic situation. Some common motivations are: promoting financial inclusion by providing easy and secure access to money for the unbanked or underbanked population; ensuring competition and sustainability of the domestic payment market, which may require incentives to provide cheaper and better access to money; but the main thing that the creators of digital currencies of the central bank rely on, affects such parties as increasing the efficiency of payments and reducing transaction costs; creating programmable money and increasing the transparency of cash flows; and ensuring the smooth and easy implementation of monetary and fiscal policy.

Within theoretical explanation of the recent monetary policy trends, to some extent an attempt to move to CBDC talks about trying to get away from Keynesian monetary policy to Friedman's monetary policy.

In principle, stable and predictable relationship between money, nominal GDP and inflation is necessary for realizing monetary policy goals (Jahan, Papageorgiou 2014). As a result of QE operations, the link between GDP and money supply growth was lost, the government was unable to ensure GDP growth at the expense of real factors of production, the initiative was taken over by central banks, with such stimulation as QE operations. Public debt increased significantly. The statistical data demonstrate high public debt in many advanced economies (e.g., Trading economics n/d).

Monetary policy decisions transmit to the real economy through financial market prices, quantities, balance sheets and expectations. Thus, financial institutions ensures effects from monetary policy on the banking sector (Lukonga 2023).

As a new payment instrument, the introduction of a CBDC can result in some households and businesses exchanging some of their cash holdings and deposits into CBDCs. The intensity of the process may change money velocity, bank disintermediation and volatility of commercial bank reserves (Lukonga 2023). As a result, effectiveness of money regulation procedure may be disrupted in terms of lending, interest rates, and central banks' ability to forecast commercial banks' reserves. Additionally, targeting of monetary policy goal (inflation) may be threatened (Lukonga 2023). According to Lukonga (2023), central banks need to choose such CBDC model which will comprehensively identify and mitigate macroeconomic risks.

To do this, it is necessary to move to a conservative monetary policy. Therefore, along with QE, central banks have begun to use QT. Namely the reduction of central bank balance sheets. This plays an active role along with rising interest rates in tightening monetary policy (European Parliament 2023). In other words, QT is aimed to reduce excess reserves from a monetary system through the sale of central bank's assets, to rise interest rates and to control inflation (e.g., Febrero, Uxo 2023). However, such operations may provide certain risks for financial stability if large amount of reserves will be necessary for commercial banks when central bank reduce them (e.g., Febrero, Uxo 2023). Overall, QT intends to undo QE.

These measures may be carried over to the issuance of CBDCs in the future. European Central Bank is now, for the first time ever, implementing quantitative tightening (QT). Between March and June 2023, the Eurosystem reduced its asset holdings under the asset purchase programme by EUR 15 billion per month (European Parliament 2023). QT, also known as balance sheet normalization, is an unconventional contractionary monetary policy through which central banks reduce their balance sheets. QT does not simply mean the end of bond purchases. According to Gros and Shamsfakhr (2023), QT means decline of bond holdings of central banks achieving through halting the reinvestment of maturing bonds and other assets on the balance sheet of the central bank, 'passive tightening', or by selling the assets, which is called 'active tightening'. The ECB is trying to slow down the velocity, raise interest rates, turn the monetary system into the mainstream of neoclassical theories.

According to the main idea, CBDC would be available as deposit accounts at the central bank to all households and corporations. Practically, the process of introduction of CBDC is technologically complicated and requires increase in the number of accounts from around 10000 to number between 300 and 500 million within the Eurosystem (Bindseil 2020). According to the experts, deposit based CBDC may protect better against money laundering through, for example, a high level of security and control of the circulating amount of CBDC base money, legal status and/or some minimum criteria on payment or economic activity (e.g., Bindseil 2020). For example, prevention of deposits' outflow after the introduction of digital euro may be reached through quantitative restrictions on individual deposits (Vecbaštiks, Dārziņš 2022). This will prevent a use of digital euro for financial investments (Vecbaštiks, Dārziņš 2022). In addition, restrictive conditions for digital euro deposits if they exceed a certain limit

may also be applied (Vecbaštiks, Dārziņš 2022). Client funds may be subject to temporary restrictions on their use, audits and other, for example, tax audits, as well as regular monitoring of the account.

The central bank could offer a digital token currency that would circulate in a decentralized way without central ledger. This is often associated with anonymity, i.e. meaning that the central bank would not know who currently holds the issued tokens (like in the case of banknotes).

In the conditions, when previous experience and empirical data are not available, it is hardly to predict precisely possible effects of the introduction of CBDC. This is documented in scientific literature (e.g., Luu et al. 2023; Barrdear, Kumhof 2022). However, Luu, Nguyen, and Nasir (2023) attempt to evaluate such effects. For example, Luu, Nguyen, and Nasir (2023) in their research conclude that CBDC contributes to financial stability, demonstrates more positive effects for emerging than advanced economies, and for large banks than small banks, although, does not ensure bank stability. Among positive effects, Chen and Siklos (2022) indicate that CBDC does not stimulate inflation. Although, Chen and Siklos (2022) express opposite viewpoint concerning financial stability by indicating that in case of introduction of CBDC it remains at risk. Scientists suppose higher willingness to introduce CBDC in case of better institutional regulations, young population, higher urbanization, and FDI inflows (e.g., Alfar et al. 2023).

In their research Luu, Nguyen, and Nasir (2023) offer to include CBDC adoption in stress testing. In the terms of monetary policy implementation, the interest in CBDC increases, especially in terms of instruments, which can contribute to digital transformation, crime prevention, and cybersecurity (e.g., Cotugno et al. 2024).

Overall, foundational principles and essential features for any CBDC – “Central bank digital currencies: foundational principles and core features” – are elaborated by The Bank of Canada, European Central Bank, Bank of Japan, Sveriges Riksbank, Swiss National Bank, Bank of England, Board of Governors of the Federal Reserve and Bank for International Settlements (BIS 2020). The principles are used as guidance in scientific research as well and are as follows (e.g., Barrdear, Kumhof 2022, p. 3): (i) “do no harm” to existing mandates for monetary and financial stability, (ii) coexist with existing forms of money (cash, reserves and bank deposits), and (iii) promote innovation and efficiency within the payment system.

Conclusions

The article joins the debates on reasons and macroeconomic aspects of introduction of CBDC. The authors analyze recent trends for characterizing peculiarities of CBDC in the context of private digital currencies, peculiarities of the modern monetary policy, possible role of CBDC within the modern monetary policy. The project of CBDC is very complicated and unknown for financial stability, personal data protection, and cybersecurity.

In the article “Digital euro – how much have we achieved?”, Vecbaštiks and Dārziņš (2022) highlight that: “Global technological companies are able to rely on their huge customer base to introduce stable crypto coins that might theoretically destabilize the current financial system and increase the risk of the payment market being dominated by third-country solutions and technologies.”

Christine Lagarde, President of the ECB, emphasizes the role of central banks in the field of stabilizing financial markets and digital currency and say the quote: “So, we need to be ready for the new reality that may well lie ahead. The time to think about how to respond to changing geopolitics is not when fragmentation is upon us, but before. Because, if I may paraphrase Ernest Hemingway, fragmentation can

happen in two ways: gradually, and then suddenly. Central banks must provide for stability in an age that is anything but stable” (European Central Bank 2023).

For ensuring effectiveness of monetary policy, stability of financial system and modernization of payments, digital money in a form of Central Bank Digital Currency (CBDC) is discussed as possible solution. Thus, the central bank will be the creator, operator, and custodian of the pool of digital currencies.

Some time ago, the issue of parallel circulation of CBDC, cash and private digital currency was discussed, now the models for introducing CBDC reflect the priority of this currency, with the help of which central banks plan to create a sustainable financial system.

The new CBDC will coexist with cash, reserves, and bank deposits (e.g., United Nations 2022; Barrdear, Kumhof 2022; BIS 2020). In the case of a successful introduction of CBDC, central banks, in addition to a stable currency, can receive the following tools for realizing monetary policy: creation of a stable inclusive economy; possibilities to ensure anti-money laundering; fight inflation by putting money into circulation with expiration dates; quickly and cheaply carry out monetary reforms; control the payment and receipt of taxes using direct access to customer accounts; carry out a direct audit on the instructions of tax and other supervisory institutions.

Elaboration of CBDC has to avoid direct hidden support for loyal businesses and restrictions for disloyal. Additional issues relate to the international settlements in the terms of taxes and foreign digital currencies. One more concern relate to environmental issues. This means that CBDC has to be energy effective (e.g., United Nations 2022).

CBDC also raises questions and challenges such as data privacy, security, cybersecurity threats and privacy concerns (e.g., Fanti et al. 2022). It is important to develop appropriate mechanisms and regulation to ensure the effective and secure functioning of CBDC.

Debates on a more appropriate model of CBDC continue to be topical. After the introduction of CBDC into circulation, a gradual transition from a two-tier banking system to a one-tier one, excluding intermediaries in the form of commercial banks, may occur. Although, one-tier system is considered as more risky (e.g., United Nations 2022).

In terms of monetary policy, transition of monetary regulation from QE procedures to QT procedures should stabilize inflation and provide opportunities for exchanging fiat money for digital money at the rate of 1:1 what is necessary for successful CBDC project implementation.

Overall, the material analyzed allows for conclusions about topicality and at the same time diversity of the process of introduction of CBDC. A lack of previous experience and empirical data makes the process very complicated and unknown for financial stability, personal data protection, cybersecurity. In parallel, central banks meet issues on necessity to increase monetary policy effectiveness. Current economic situation with high inflation, huge balance sheets, and circulation of private digital currencies make the process difficult. Attempts to elaborate core principles and guidance for introduction of CBDC rely on possible positive effects on monetary policy effectiveness, financial inclusion, and anti-money laundering. Technical, financial, political, and environmental factors will affect the process of introduction of CBDC. Additional attention has to be paid to willingness and readiness of end users for wide application of CBDC. In parallel with technical, financial, and legal aspects, educational activities devoted to CBDC are recommended.

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