PAPER

Impact of the European Central Bank Monetary Policy on the Financial Indicators of the Eastern European Countries

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Abstract The article presents the study results of the European Central Bank Monetary Policy influence on the Poland, Hungary, Czech Republic, and Slovak Republic financial indicators. By running vector autoregression models and applying Granger causality tests the study reveals the impact of the European Central Bank Monetary Policy on the yield of government bonds, interest rates and the inflow of foreign investments into the CEE countries. The results of the analysis demonstrate that the ECB monetary policy had an overall positive impact on the economies of Poland, Hungary and Czech Republic. In the context of a general decrease of interest rates under the influence of the ECB's unconventional monetary policy, these countries managed to achieve sustainable economic growth along with a decrease in the ratio of government debt to GDP and the ratio of interest payable on debt to GDP as well as stock indices growth. The opposite situation is observed in the euro area countries with a high debt burden, primarily in Greece and Italy. Although the ECB policy had led to the decrease of the interest payable on debt to GDP of the high debt euro area countries, the trend of the ratio of government debt to GDP growth for them (except Ireland) has an upward trend. In this situation, the ECB cannot significantly change the goals of its monetary policy, because any, even slight, increase in the discount rate will lead to a new euro area debt crisis with an epicenter in Italy and Greece. The situation may get worse after a probable sharp decline in the US stock market, caused by its current overheating

Keywords: European Central Bank; monetary policy; unconventional measures; CEE countries; government bonds yield; interest payable; stock indices.

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1. Introduction

During the global financial crisis, the central banks of the G7 countries adopted unprecedented monetary policy measures to stabilize their economies and financial systems. The most common method of this policy is the purchase of different types of assets, which is called "quantitative easing" in the economic literature. The European Central Bank was among these banks. The first unconventional method used by the ECB was the announcement of 3-month longer-term refinancing operations (LTRO). After that, in 2009, the announcement of the covered bond purchase program (CBPP) aimed at restoring the functioning of the covered bond market, which is an important source of bank financing. The ECB introduced more unconventional measures in the framework of the Securities Markets Program (SMP) in May 2010 after the emergence of tensions in sovereign debt markets in some countries of the euro area. But these events did not bring the desired result and in 2014 the implementation of the program of targeted long-term refinancing (TLTRO) started. In January 2015, the European Central Bank was forced to launch a quantitative easing (OE) program due to very low economic activity in the euro area. This program included monthly purchases of securities in the secondary market. In October 2017, the quantitative easing program was extended, and the ECB intended to support it until inflation was met with a two percent target. All these measures had a significant impact on the balance sheet of the central bank.

Figure 1. ECB total assets (millions EUR)



Source: data from ECB (2020).

Starting in 2010, ECB has been actively increasing the volume of assets (Figure 1). In 2013 and 2014, there was a slight decrease as compared to the previous year, but in 2015, due to the launch of new asset purchase programs, the upward trend resumed again, and continues to this day.

Despite the fact that the main object of the ECB's policy was the countries of the Eurozone, the countries of the CEE also experienced the consequences of this policy. The following countries of the CEE: Poland, Hungary and the Czech Republic still retain their own currencies. In the paper the impact of the ECB monetary policy on

their financial indicators are explored.

2.Literature review

The issues of the Central Banks monetary policy in general and its influence on the national financial systems and economic development of different countries have been widely studied in the literature.

Halova Klara, Horvath Roman (2015) explore how the unconventional monetary policy of the European Central Bank affects macroeconomic stability in Central and Eastern Europe. They evaluate various panel autoregressions using monthly data for 2008-2014. Using central bank assets as indicators of unconventional policy measures. Scientists conclude that GDP and prices in Central and Eastern Europe are temporarily rising after the expansionary shock of unconventional monetary policy.

Carsten M. Stann, Theocharis N. Grigoriadis (2019) report that the ECB's unconventional monetary policy has produced significant side effects for Eastern Europe and Russia. In particular, asset prices, especially sovereign returns and CDS spreads, reacted strongly to ECB actions.

Alessio Ciarlone, Andrea Colabella (2016) prove that the ECB's asset purchase programs applied to CESEE countries, helping to improve their financial conditions. An event study analysis method was used in the research. Significant responses to announcements of ECB asset purchase programs and actual asset purchases were in the CESEE countries. This indicates a portfolio rebalancing.

Anita Angelovska - Bezhoska (2018) empirically evaluated the impact of the quantitative easing ECB's policy on capital flows in the countries of the Central and Eastern regions. As a result of the study, the unconventional monetary policy of the ESB did not have a special effect on the activation of cross-border financial flows in the regions.

A study by Lesuisse P. (2017) aims to identify the ECB's monetary policy direct impact in Central and Eastern Europe (CEE). The scientist is guided by the exchange rate regime to determine various reactions. The exchange rate regime plays a significant role in studying prices, but does not play a role when it is focus on real variables such as GDP.

In the article Halyna Alekseievska et al. (2019) studied the main outcomes of unconventional monetary policy measures of the developed countries and formulated recommendations for the developing countries. The results of the analysis show that unconventional monetary policy methods of the central banks of the developed countries reached major goals - to prevent bankruptcies of large financial institutions in national economies. In developing countries, the use of unconventional methods is still limited.

The results of other research – Rodionova et al. (2019) and Yakubovskiy et al. (2019) showed the high level of income of foreign investors in East European economies in the conditions of unconventional monetary policy of the developed countries.

There is also a large number of studies contributed to identifying the influence of different financial factors on national and world economies development. Among them there are the studies of Babenko (2019), Dominese (2019, 2020), Matyushenko (2019)

and Rogach (2019, 2020). A wide range of possible monetary policy transmission channels is also considered in the literature. In particular, Bairn (2011), Krishnamurthy and Vissing-Jorgensen (2011), ECB (2015), Falagiarda et al. (2015), Georgiadis G. and Gräb J. (2016), Fratzscher et al. (2018), study and describe the various transmission channels of non-standard monetary policy of both the EU and the Fed. The most common channels are: interest rate channel, signaling channel, exchange rate channel, credit channel and portfolio rebalancing channel.

The first channel is the interest rate channel. With monetary tightening, the cost of capital rises, which leads to lower investment. In addition, since monetary policy changes domestic interest rates compared to foreign ones, relative demand indicates that investors will redistribute their funds. (Berge and Cao, 2014).

Signaling channel is the channel that can affect market uncertainty by providing new information about the state of the economy. The Falagiarda et al. (2015) suggest that a change in confidence as a result of a monetary policy decision can, on the one hand, cause capital flows reflecting close ties in CEE countries; on the other hand, renewed confidence may cause a reassessment of risk and lead to an outflow of capital from CEE countries, especially if earlier the inflow was caused by periods of high uncertainty in the euro area.

Through a credit channel local liquidity conditions also have international implications (Falagiarda et al., 2015). Amid excess liquidity, banks improved access to finance through interbank operations and foreign exchange markets, which stimulates lending and investment activity. Given the wide presence of banks that are headquartered in the EU, operating in the CEE region, an international credit channel can have direct consequences for countries in the region (Stann and Grigoriadis, 2019).

One of the main channels for transmitting monetary policy works through the reaction of private agents of the securities market to changes in the price and return on assets - a portfolio rebalancing channel (Chinn, 2013). This channel transmits the actions of asset purchase policies. When the central bank buys any asset, and this limits its offer, the price of the asset rises and its profitability automatically decreases. Investors interested in high returns replace this asset with another. Investors enter the international market to replace assets and, as a result, international spreads on comparable assets appear. Relative changes in prices motivate international capital flows, which are the engine of international side effects. Dahlhaus and Vasishtha (2014) and Hamilton and Wu (2012) distinguish this channel as the central transmission channel through which asset purchases affect cross-border capital flows and transfer domestic monetary policy abroad.

3. Hypothesis, methodology and data

In general, in empirical studies, the influence of the volume of assets of the European Central Bank on various types of foreign investment flowing into CEE countries did not receive enough attention.

To test the hypothesis that the value of the ECB's assets is an important factor causing the inflow investment in emerging markets, the Vector Autoregression (VAR) was chosen, since it provides the ability to evaluate the rich dynamics in multiple time series.

The first model is an assessment influence unconventional monetary policy measures of the ECB, expressed in the balance sheet of the ECB assets, and also the yield of ten-year Eurobonds on the yield of ten-year government bonds of CEE countries. For comparison, we take countries outside the euro zone, the Czech Republic, Poland and Hungary, as well as countries that are its members, the Slovak Republic, which goes the same way of transforming the economy, and also the troubled countries of the European Union, Greece and Italy. This model is presented in the form:

$$Y10_{t} = a_{1} + \sum_{i=1}^{p} \beta_{1i} Y10_{-}E_{t-1} + \sum_{i=1}^{p} \gamma_{1i} TAECB_{t-i} + \sum_{i=1}^{p} C_{1i} Y10_{t-i} + \varepsilon_{1t}$$

$$Y10_{-}E_{t} = a_{2} + \sum_{i=1}^{p} \beta_{2i} Y10_{t-i} + \sum_{i=1}^{p} \gamma_{2i} TAECB_{t-i} + \sum_{i=1}^{p} C_{2i} Y10_{-}E_{t-1} + \varepsilon_{2t}$$
(1)
$$TAECB_{t} = a_{3} + \sum_{i=1}^{p} \beta_{3i} Y10_{-}E_{t-1} + \sum_{i=1}^{p} \gamma_{3i} TAECB_{t-i} + \sum_{i=1}^{p} C_{3i} Y10_{-}E_{t-1} + \varepsilon_{3t}$$

Where TAECB is the total assets of the balance sheet of the European Central Bank(USD millions), Y10 is the yield on 10-year government bonds of the studied country (%); Y10_E is the yield on 10-year government bonds on average in the euro area(%).

The next step in evaluating is finding out how influential the internal economic conditions for the yield of government bonds are.

$$Y10_{t} = a_{1} + \sum_{i=1}^{r} \beta_{1i} IR_{t-i} + \sum_{i=1}^{r} C_{1i} Y10_{t-1} + \varepsilon_{1t}$$

$$IR_{t} = a_{1} + \sum_{i=1}^{p} \beta_{2i} IY10_{t-i} + \sum_{i=1}^{p} C_{2i} IR_{t-1} + \varepsilon_{2t}$$
(2)

Where IR is the short-term rate of the country's central bank (%), because this is the main instrument of monetary policy in these countries.

And it is also necessary to determine the impact of the ECB policy on domestic indicators of the economy, in particular the short-term interest rate.

$$IR_{t} = a_{1} + \sum_{i=1}^{p} \gamma_{1i} TAECB_{t-i} + \sum_{i=1}^{p} C_{1i}IR_{t-i} + \varepsilon_{1t}$$

$$TAECB_{t} = a_{2} + \sum_{i=1}^{p} \gamma_{2i}IR_{t-i} + \sum_{i=1}^{p} C_{2i}TAECB_{t-i} + \varepsilon_{2t}$$
(3)

In particular, in order to assess the impact of the balance of assets of the ESB and various types of investments in CEE countries, the following VAR systems are presented:

$$LIIP_{t} = a_{1} + \sum_{i=1}^{p} \gamma_{1i} TAECB_{t-i} + \sum_{i=1}^{p} C_{1i} LIIP_{t-i} + \varepsilon_{1t}$$

$$TAECB_{t} = a_{2} + \sum_{i=1}^{p} C_{2i} LIIP_{t-i} + \sum_{i=1}^{p} \gamma_{2i} TAECB_{t-i} + \varepsilon_{2t}$$
(4)

Where LIIP denotes a certain indicator of Liabilities according to the international investment position (USD millions). LDIE - Direct investment - Equity and investment fund shares; LDID - Direct investment - Debt instruments; LPIE - Portfolio investment - Equity and investment fund shares; LPID - Portfolio investment - Debt instruments.

In all of these models: ε is error term; α is a constant term; β , γ and C denote the coefficients to be estimated, p is the lag order selected.

Models are evaluated as follows. First, an unlimited VAR is estimated. Granger causality is then tested. The optimal amount of lag length was selected taking into account the AIC and SIC criteria.

The quarterly data statistics from the International Monetary Fund and Organization for Economic Co-operation and Development are used in the models.

4. Results

During the financial crisis, investors viewed the bonds of CEE countries as an attractive substitute for Eurobonds, as government bond yields in Poland and Hungary were several times higher than the euro area average (figure 2). Certainly, during the Greek debt crises its national bond yield was the highest for the euro area countries, but the risk from this investment was unreasonably high.



Figure 2. 10-year government bonds yield (%)

In 2010, the ratio of public debt to GDP in several Eurozone countries reached such a dangerous level that the ECB was forced to take additional measures which led to the launch of the Securities Markets Program (SMP). Initially focused on debt securities in Greece, Ireland and Portugal, the SMP was expanded in August 2011 to cover debt securities of Italy and Spain. In addition, two Long Term Refinancing Operations (LTROs) were introduced by the ECB.

The results of the Granger test that evaluate the hypothesis of the impact of

Source: data from ECB (2020).

the value of the ECB assets on the yield of government bonds of CEE countries in comparison with three Eurozone countries are shown in the table 1.

| | AIC | Lags | | | | | |
|--------------------|------------|--------------|-------------------------|--------------------------|-------------------------|--|--|
| Country | and SIC | Indicators | TAECB | Y10_E | Y10 | | |
| Poland | | TAECB | | 0.10 (0.75) | 0.02 (0.96) | | |
| (2004Q1 | 1 | Y10_E | 2.5 (0.10) ° | | 0.02 (0.87) | | |
| 2019Q2) | | Y10 | 0.01 (0.90) | 4.5 (0.04) ^b | | | |
| Hungary | | TAECB | | 1.2 (0.52) | 1.3 (0.49) | | |
| (2002Q1 | 2 | Y10_E | 8.4 (0.01) ^a | | 2.8 (0.23) | | |
| 2019Q2) | | Y10 | 2.2 (0.31) | $9.7 (0.00)^{a}$ | | | |
| Czech Republic | | TAECB | | 0.4 (0.4842) | 1.5 (0.21) | | |
| (2004Q1 | 1 | Y10_E | 2.6 (0.10)° | | 1.4 (0.28) | | |
| 2019Q2) | | Y10 | 0.01 (0.90) | 1.01 (0.90) | | | |
| Slovak | | TAECB | | 2.2 (0.32) | 4.7 (0.19) | | |
| Republic | 2 | Y10_E | 8.4 (0.01) ^a | | 0.2 (0.88) | | |
| (2002Q1 2019Q2) | 2 | Y10 | 0.3 (0.82) | 17.3 (0.00) ^a | | | |
| Italy | | TAECB | | 2.3 (0.1281) | 4.6 (0.03) ^b | | |
| (2002Q1 | 1 | <u>Y10</u> E | 0.25 (0.61) | | 0.9 (0.3186) | | |
| 2019Q2) | | Y10 | $4.2(0.03)^{b}$ | $7.5(0.00)^{a}$ | | | |
| Greece | | TAECB | | 6.8 (0.23) | $17.05(0.00)^{a}$ | | |
| (2002Q1 | 5 | Y10_E | 1.86 (0.86) | | 3.9 (0.55) | | |
| 201902) | | Y10 | $21.1(0.00)^{a}$ | 13.0 (0.02) ^b | | | |

Table 1. Granger's test for the model 1

Note: behind the country name the sample range is listed in parentheses. The numbers in the parentheses beside the Wald statistics are the P-values: a, b, c represent the 1%, 5%, and 10% significance levels, respectively. All coefficients are filled in the table.

Source: authors' calculations, data from IMF (2020).

According to the Granger causality test for the assets of the ECB balance sheet do not affect the yield of government bonds of the studied countries, except Greece and Italy. At the same time bonds purchase of the ECB together with the interest rate policy on the main refinancing operations had strong impact on the yield of Eurobonds. In this case, the main goal of the unconventional monetary policy of the ECB to reduce the long-term interest rate in the euro area was successfully achieved. Moreover, as it is shown in the table 1, the yield of Eurobonds has a significant impact on the yield of government bonds in Poland, Hungary and, of course, on the bond yield of the euro area countries – Italy, Greece, Slovak Republic.

In the case of Greece and Italy, there is also a two-way relationship between the ECB balance sheet and government bond yields. This is due to the fact that when applying quantitative easing, a large volume of debt securities of these troubled countries was bought in order to overcome the European debt crisis.

| | Model 2 | | | | | Model 3 | | | |
|---|----------------------------|------------|-------------------------|-------------------------|----------------------------|------------|---------------|------------------------|--|
| | AIC and SIC crit. | | Lags | | AIC and SIC crit. | | Lags | | |
| Country | | Indicators | IRC | Y10 | | Indicators | IR | TAECB | |
| Poland (2004Q1 2019Q2) | 2 | IR | | 6.8(0.03) ^b | n | IR | | 8.7(0.01) ^a | |
| | | Y10 | 0.1 (0.92) | | 2 | TAECB | 7.8(0.92) | | |
| Hungary (2002Q1 2019Q2) | 2 | IR | | 6.5(0.03) ^b | 3 | IR | | 10.4(0.01) a | |
| | | Y10 | 11.6(0.00) ^a | | | TAECB | 4.6 (0.19) | | |
| Czech Republic (2004Q1 2019Q2) | 2 | IR | | 13.2(0.00) ^a | - 4 | IR | | 17.9(0.00) a | |
| | 2 | Y10 | 1.5(0.4) | | 4 | TAECB | 5.2(0.25) | | |

Table 2. Granger causality test for the model 2 and 3

Note: behind the country name the sample range is listed in parentheses. The numbers in the parentheses beside the Wald statistics are the P-values: a, b, c represent the 1%, 5%, and 10% significance levels, respectively. All coefficients are filled in the table.

Source: authors' calculations, data from IMF (2020).

The results of the Granger test that evaluate the hypothesis of the impact of the shortterm rate of the country's central bank on 10-year government bonds yields and of the impact of the ECB policy on the national short-term interest rates are shown in table 2.

According to the Granger causality test in Hungary, there is a double interdependence between the short-term interest rate and the yield of long-term government bonds. An only one-sided relationship is proved in Poland and the Czech Republic. In these countries, the yield on 10-year government bonds affects the short-term interest rate of the Central Banks.

Results of the model 3 predictably demonstrate the relationship between the shortterm interest rates of Poland, Hungary and Czech Republic and the value of the ECB balance sheet assets.

Expansion policy of the ECB aimed at stimulating investment activity in the EU countries was supposed to lead to an increase of foreign investments into the EEC area. The results of the Granger test that evaluate the hypothesis of the impact of the value of the ECB assets on the inflow of various types of foreign investments are shown in table 3. For all countries, AIC and SIC criteria are equal to 1.

| | Direct investment | | | | Portfolio investment | | | | | |
|--|-------------------|----------------------------|----------------|-------------------------------|------------------------|-----------------|-----------------|--------------------|----------------------------|--|
| Country | Indica- tors | Lags | | AIC | | Lags | | | | |
| | | TAECB | LDID | LDIE | and SIC criteria | Indica- tors | TAECB | LPID | LPIE | |
| Poland (2004Q1 2019Q2) | TAECB | | 0.7 (0.39) | 0.3 (0.58) | 2 | TAECB | | 4.9 (0.84) | 4.8 (0.62) | |
| | LDID | 1.5 (0.21) | | 0.19 (0.65) | | LPID | 7.1 (0.02) b | | 41.3 (0.0) ^a | |
| | LDIE | 1.19 (0.27) | 9.9 (0.99) | | | LPIE | 7.1 (0.02)b | 1.1 (0.57) | | |
| Hungary (2002Q1 2019Q2) | TAECB | | 0.8 (0.36) | 1.4 (0.23) | | TAECB | | 0.16 (0.68) | 0.7 (0.39) | |
| | LDID | 1.6 (0.10)° | | 8.6 (0.00) a | 1 | LPID | 0.5 (0.44) | | 2.5 (0.11) | |
| | LDIE | 0.52 (0.47) | 0.05 (0.82) | | | LPIE | 0.29 (0.58) | 5.4 (0.01) a | | |
| Czech Republic (2004Q1 2019Q2) | TAECB | | 0.04 (0.83) | 0.0 (0.97) | | TAECB | | 1.6 (0.20) | 0.3 (0.54) | |
| | LDID | 3.8 (0.04) ^b | | 3.8 (0.04) | 1 | LPID | 8.0 (0.00)a | | 0.8 (0.35) | |
| | LDIE | 9.3 (0.00) ^a | 4.9 (0.02) | | | LPIE | 1.8 (0.17) | 3.3 (0.06) | | |
| Slovak Republic (2002Q1 2019Q2) | TAECB | | 0.7 (0.37) | 0.5 (0.47) | | TAECB | | 9.3 (0.25) | 1.2 (0.64) | |
| | LDID | 8.4 (0.00)ª | | 7.5 (0.00) ^a | 3 | LPID | 14 (0.00)a | | 6.5 (0.0)° | |
| | LDIE | 3.3 (0.06) ^b | 1.8 (0.17) | | | LPIE | 3.49 (0.32) | 1.8 (0.75) | | |

| Table 3. | Granger | causality | test for | the model | 4 |
|----------|---------|-----------|----------|-----------|---|
|----------|---------|-----------|----------|-----------|---|

Note: behind the country name the sample range is listed in parentheses. The numbers in the parentheses beside the Wald statistics are the P-values: a, b, c represent the 1%, 5%, and 10% significance levels, respectively. All coefficients are filled in the table.

Source: authors' calculations, data from IMF (2020).

Based on the data of model 4, the balance sheet of the ECB's assets affects the flow of foreign direct investment in Hungary, Czech Republic and Slovak Republic. In Hungary and Czech Republic, this effect is more reflected in the flows of foreign direct investment in equity, and in Slovak Republic in debt assets. In these countries there is also a correlation between different types of direct investments. For Poland the correlation was not determined.

The ECB's asset balance affects inflows portfolio investments in Poland and for investments in capital and shares, and also in debt instruments, in the Czech Republic and the Slovak Republic. In most cases, an increase in the ECB's assets had an impact on investment flows and it was mainly debt instruments.

The overall impact of the ECB monetary policy on the main national indicators of the explored countries is shown in table 4.

| Country | GDP at market prices, bln, euro | | Government debt to GDP | | Interest payable on debt to GDP | | Stock indexes changes, % | |
|--------------------|------------------------------------|--------|---------------------------|-------|------------------------------------|------|-----------------------------|--|
| | 2010 | 2018 | 2010 | 2018 | 2010 | 2018 | 2010-2018 | |
| Poland | 361.8 | 496.4 | 53.1 | 48.9 | 2.5 | 1.4 | WIG - +51.7 | |
| Hungary | 99.0 | 133.8 | 80.6 | 70.2 | 4.1 | 2.4 | BUX - +87.1 | |
| Czech Republic | 156.7 | 207.6 | 37.4 | 32.6 | 1.3 | 0.8 | SE PX* - +35.2 | |
| Slovak Republic | 68.1 | 89.7 | 41.0 | 49.4 | 1.3 | 1.3 | SAX - +38.2 | |
| Italy | 1611.3 | 1765.4 | 119.2 | 134.8 | 4.3 | 3.7 | FTSE MIB - -11.9 | |
| Greece | 226.0 | 184.7 | 146.2 | 181.2 | 6.0 | 3.3 | ASE68.8 | |

Table 4. Dynamics of national indicators

Note: ASE - Greece Stock Market Index; FTSE MIB - Italy Stock Market Index; WIG - Warsaw Stock Exchange Index; SE PX - Czech Republic Stock Market; BUX – Hungary Stock Market; SAX - Slovakia Stock Market; * - data for 2009-2018.

Source: authors' calculations, data from IMF (2020).

Results of the analysis of the data given in table 4, show that the ECB monetary policy had an overall positive indirect impact on the economies of Poland, Hungary and Czech Republic. In all of these countries the economic growth was accompanied by a decrease in the ratio of government debt to GDP and in the ratio of interest payable on debt to GDP as well as by stock indices growth.

The opposite situation is observed in the countries of the euro area with a high level of government debt, primarily in Greece and Italy. Indeed, in these countries the ECB monetary policy led to the decrease of the interest payable on debt to GDP, but the ratio of government debt to GDP has increased, as in all of the high debt Eurozone countries, except Ireland. Stock indices have also declined in Italy and Greece.

Conclusion

The global financial crises that began in 2008 showed the weakness of the financial systems of most developed countries. The peak of the crisis in the EU countries came at the end of 2009 when several euro area member states were unable to cope with refinancing of their government debt without external assistance.

From 2010 to overcome the crisis the ECB (as the Federal Reserve System, Bank of Japan and other Central Banks of developed countries) started to use unconventional monetary policy measures. The application of these measures in this case is unique since the ECB is the central bank of more than one country. Its policy affects not

only countries that are part of the euro currency union, but also countries that are not its members. This influence spreads through many channels of monetary policy transmission. The most common are the interest rate channel and the rebalancing channel, which were investigated in the article. The results of the analysis proved that the ECB's unconventional policy, in particular quantitative easing aimed at lowering long-term interest rates, affected the yield of government bonds of almost all EU countries (not only the countries – members of the euro area). All this subsequently led to a reduction in the yield of 10 government bonds in CEE countries. On this basis, the interest rate channel is effective in the process of transferring monetary policy shocks to foreign markets.

Portfolio rebalancing channel is also applicable for transferring the influence of trade policy on CEE countries. It has been revealed that carrying out a non-traditional monetary policy and increasing the ECB's balance affect the investments flows into the studied countries, but this cap is mainly debt instruments both in direct and portfolio investments. At the time of worsening economy and debt crisis, which had an adverse effect on the euro area countries, investors are interest in CEE countries with higher interest rates and incomes increased.

Thus, the results of the analysis show that the ECB monetary policy had an overall positive impact on the economies of Poland, Hungary and the Czech Republic. In the context of a general decrease of interest rates under the influence of the ECB's unconventional monetary policy, these countries managed to achieve sustainable economic growth along with a decrease in the ratio of government debt to GDP and in the ratio of interest payable on debt to GDP as well as by stock indices growth.

The opposite situation is observed in the euro area countries with high debt burden, primarily in Greece and Italy. Although the ECB policy had led the high debt euro area countries to the debt-to-GDP ratio decrease, there is the upward trend of the government debt to GDP ratio (except Ireland). In this situation, the ECB simply cannot significantly change the goals of its monetary policy, because any, even slight, increase in the discount rate will lead to a new euro area debt crisis with an epicenter in Italy and Greece.

The investment attractiveness of the EU countries was also influenced by the situation in the US economy, in which the use of unconventional methods by the Fed led to a sharp increase in stock indexes (almost 200% increase of the Dow Jones Industrial Average over the past 10 years). In this situation, even European investors preferred to invest in American high-yield securities rather than in European low-yield assets. At the same time, after a sharp decline in the US stock market, caused by its current overheating, European investors are likely to suffer losses, which will lead to a further deterioration of the situation in the euro area.

References

- Alekseievska H., Kyfak A., Rodionova T., Yakubovskiy S. (2019) Modeling Outcomes of Unconventional Monetary Policy International Journal of Recent Technology and Engineering (IJRTE) ISSN: 2277-3878, Volume-8 Issue-4, pp10263-10268. DOI:10.35940/ ijrte.D4503.118419
- Angelovska–Bezhoska A., Mitreska A., Bojcheva-Terzijan S. (2018). <u>The Impact of the ECB's</u> <u>Quantitative Easing Policy on Capital Flows in the CESEE Region</u>. Journal of Central Banking Theory and Practice, No.2, pp. 25-48. DOI: 10.2478/jcbtp-2018-0011
- Babenko V., Sidorov V., Koniaieva Y., Kysliuk L. (2019) Features in scientific and technical cooperation in the field of non-conventional renewable energy. Global Journal of Environmental Science and Management, No.5, pp.105–112. DOI: <u>10.22034/</u> <u>GJESM.2019.05.SI.12</u>
- Beirne J. et al. (2011) The Impact of the Eurosystem's Covered Bond Purchase Programme on the Primary and Secondary Markets, European Central Bank Occasional Paper Series, No.122, pp.1-36.
- Berge T.J. and Guangye C (2014) Global Effects of U.S. Monetary Policy: Is Unconventional Policy Different?", Economic Review, Federal Reserve Bank of Kansas City, pp 5-31.
- Chinn M. (2013) Global Spillovers and Domestic Monetary Policy. BIS Working Papers Bank for international settlements, No. 436, pp 1-56.
- Ciarlone A., Colabella A. (2016). Spillovers of the ECB's non-standard monetary policy into CESEE economies. Questioni di Economia e Finanza, Bank of Italy, Economic Research and International Relations Area. No.351. pp 1-40.
- Dahlhaus T., Vasishtha G. (2014) The Impact of U.S. Monetary Policy Normalization on Capital Flows to Emerging-Market Economies. Working Paper Bank of Canada, No. 53, pp.1-28.
- Darvidou K., Siskos E., Rogach O. (2020) Competitiveness of Travel and Tourism Sector in Greece and Ukraine: Comparative Analysis. Journal Transition Studies Review. Vol. 27, no 1, pp. 77–93.
- Dominese G. (2019) Innovation and Growth in a Dual Technologies Scenario: Civil and Military top Advanced Industries Competition. Journal Global Policies and Governance. Vol. 8, no 2, pp. 3–43.
- Dominese G. (2020) Dual Technologies Sectors Innovation and Growth Civil and Defence Industries in Europe versus U.S. and China, Journal Transition Studies Review. Vol 27, no 1, pp. 3–46.
- European Central Bank (2015) The transmission of the ECB's recent non-standard monetary policy measures, Economic Bulletin, No.7, pp. 32–52.
- European Central Bank (2020) https://www.ecb.europa.eu/stats/ecb_statistics/html/index. en.html. Accessed January 2020.
- Falagiarda M., McQuade P., Tirpak M. (2015) Spillovers from the ECB's non- standard monetary policies on non-euro area EU countries: evidence from an event study analysis. European Central Bank Working Paper Series, No. 1869, pp. 1-54.
- Fratzscher M., Lo Duca M., Straub R. (2018) On the International Spillovers of US Quantitative Easing. The Economic Journal, No.128 (608), pp. 330–377. DOI: <u>10.1111/ecoj.12435</u>
- Georgiadis G. and Gräb J. (2016) Global Financial Market Impact of the Announcement of the

ECB's Extended Asset Purchase Programme. Journal of Financial Stability, No.26 (232), pp. 257–265. DOI: 10.1016/j.jfs.2016.07.009

- Halova K., Horvath R. (2015) International spillovers of ECB's unconventional monetary policy: The effect on Central and Eastern Europe. Institut für Ost- und Südosteuropaforschung Working Papers, No. 351, pp.1-29.
- Hamilton J.D. Wu J.C. (2012) The Effectiveness of Alternative Monetary Policy Tools in a Zero Lower Bound Environment. Journal of Money, Credit and Banking, No. 44 (1), pp. 3-46. DOI: <u>10.1111/j.1538-4616.2011.00477.x</u>
- International Monetary Fund (2020) <u>http://data.imf.org/?sk=7A51304B-6426-40C0-83DD-CA473CA1FD52</u>. Accessed January 2020.
- Krishnamurthy A. Vissing-Jorgensen A. (2011) The Effects of Quantitative Easing on Interest Rates: Channels and Implications for Policy. Brookings Papers on Economic Activity, No. 2, pp. 215–287.
- Lesuisse P. (2017) External Monetary Shocks to Central and Eastern European Countries. Études et Documents. CERDI, No. 5, pp. 1-27
- Matyushenko I., Danova M., Feoktystova O., Melnyk R. (2019) Formation of teams of performers of projects at innovative enterprises within the framework of the "Industry 4.0" concept. International Journal of Supply Chain Management. Vol.8, No.4, pp. 962–969.
- Organization for Economic Co-operation and Development (2020) <u>https://www.oecd-ilibrary.org/economics/data/main-economic-indicators/main-economic-indicators-complete-database_data-00052-en</u>. Accessed January 2020
- Ramazanov S., Antoshkina L., Babenko V., Akhmedov R. (2019) Integrated model of stochastic dynamics for control of a socio-ecological-oriented innovation economy. Periodicals of Engineering and Natural Sciences, Vol.7, No.2, pp.763–773.
- Rodionova T., Yakubovskiy S., Kyfak A. (2019) Foreign Capital Flows as Factors of Economic Growth in Bulgaria, Czech Republic, Hungary and Poland, Research in World Economy, Vol.10, No.4, pp.48-57. DOI: <u>https://doi.org/10.5430/rwe.v10n4p48</u>
- Rogach O., Shnyrkov O., Dziuba P. (2019) Skewness-Based Portfolio Selection: Implications for International Investing in Frontier Markets. Journal Transition Studies Review. Vol. 26, No. 2, pp. 23–28.
- Stann Carsten M., Grigoriadis Theocharis N. (2019) <u>Monetary policy transmission to Russia</u> <u>& Eastern Europe</u>. Free University Berlin, School of Business & Economics <u>Discussion</u> <u>Papers</u> No. 6, pp.1-46 DOI:<u>10.17169/refubium-2372</u>
- Yakubovskiy S., Rodionova T., Derkach, T. (2019) Impact of foreign investment income on external positions of emerging markets economies. Journal Transition Studies Review, No.26(1), pp.81-91. DOI: 10.14665/1614-4007-26-1-005.
- Yakubovskiy S., Rodionova T., Kyfak A. (2019) Inflow of Foreign Capital as a Factor of the Development of Current Accounts of the Eastern European Countries. Journal Transition Studies Review, No.26(2), pp. 3-14. DOI: 10.14665/1614-4007-26-001