

Impact of the European Central Bank Monetary Policy on the Financial Indicators of the Bulgaria, Croatia, Romania and Ukraine

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Abstract: The recent financial crisis has forced the central banks of many countries to use new monetary policy methods. The purpose of this research is to study the impact of the ECB's unconventional monetary policy on the Central and Eastern European countries, as they have economic and trade relations with the euro area. The influence of the ECB policy on the yield of long-term government bonds Bulgaria, Romania, Croatia and Ukraine and the investment flows in these countries were studied using VAR models. Unconventional monetary policy measures were presented by the volume of ECB's assets balance sheet. The quarterly data was taken from the International Monetary Fund and Organization for Economic Co-operation and Development. As a result, was revealed a significant influence of the ECB's long-term interest rate on the yield government bonds of the studied countries. Also, the ECB policy stimulated the flow of investments, mainly in debt securities of Croatia, Romania, and Ukraine, with a predominance of portfolio investments.

Keywords: unconventional measures; CEE countries; government bonds yield; ECB balance sheet; investments

JEL Classification: F15; F21 F30; F33; F34; F36; F45; O52; O57

1. Introduction

Since the beginning of the global financial crisis of 2008-2009, the European Central Bank, like other central banks of advanced economies, has introduced unconventional monetary measures to overcome problems such as the liquidity trap, high uncertainty in financial markets and the serious consequences of a long-term period of low inflation. The main ECB announcements of unconventional monetary policy are presented in table 1.

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Table 1. ECB Unconventional Monetary Policy Announcements

Date	Announcements
22.08.2007	Longer-Term Refinancing Operations
16.02.2009	Foreign currency liquidity provision
05.03.2009	Liquidity providing measures include the fixed-rate full-allotment procedure (FRFA)
07.05.2009	ECB press conference: “The Eurosystem will purchase euro-denominated covered bonds issued in the Euro Area.” (CBPP1)
20.11.2009	COLL – the extension of eligible collateral assets
10.05.2010	ECB press release: “The Governing Council decided to conduct interventions in the Euro Area public and private debt securities markets (SMP).”
06.10.2011	ECB press release: “The Governing Council has today decided to launch a new Covered Bond Purchase Program (CBPP2). Purchases will be for an intended amount of €40 billion
26.07.2012	Speech by Mario Draghi, President of the ECB, at the Global Investment Conference Start of OMT Program - the short-term sovereign bond purchase program
05.06.2014	ECB press release: “The Governing Council has decided to conduct a series of Targeted Longer-Term Refinancing Operations [...] over a window of two years.”
04.09.2014	ECB press conference: “The Eurosystem will purchase a broad portfolio of simple and transparent asset-backed securities with underlying assets consisting of claims against the Euro Area non-financial private sector under an Asset-Backed Securities Purchase Program. [...] will also purchase a broad portfolio of euro-denominated covered bonds issued by Monetary Financial Institutions domiciled in the Euro Area under a new Covered Bond Purchase Program (CBPP3).” Start of ABSPP Program - asset-backed securities purchases
17.11.2014	Start of long-term sovereign bond purchase programs (PSPP)
10.03.2016	ECB press release: “ECB adds Corporate Sector Purchase Program to the expanded Asset Purchase Program [...]. Investment-grade euro-denominated bonds issued by non-bank corporations established in the Euro Area will be included in the list of assets eligible for regular purchases under a new Corporate Sector Purchase Program [...]. Combined monthly purchases under the expanded Asset Purchase Program are to increase to €80 billion from €60 billion.”
13.12.18	Termination of net asset purchases under the Eurosystem Asset Purchase Program (APP)
11.11.2019	The start of a new phase of the asset purchase program.
19.03.2020	ECB announced that it would spend 750 bil.euro in bond purchases to calm down severing debt markets.

Source: authors' calculations, data from ECB, Luis Filipe Martins *et al.* (2018), Stamm, C. M.; Grigoriadis T.(2019), Eurico Ferreira *et al.* (2019)

As a result of the above measures, the ECB balance increased significantly, which can be seen in Figure 1. The largest increase was observed during the OMT and APP (ABSPP, PSPP, CSPP, CBPP3) policies implementation in 2012 and in 2014 respectively.

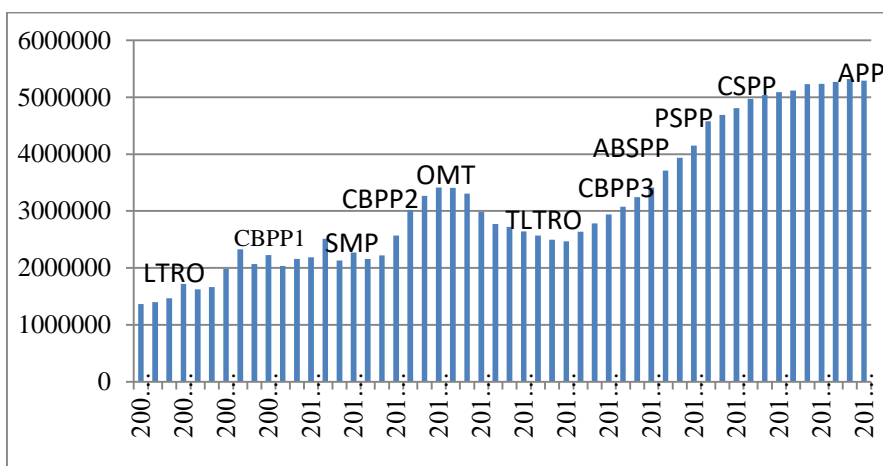


Figure 1. ECB balance sheet (million euros) and Unconventional Monetary Policy Programs 2007-2019

Source: Data from IMF and ECB.

Unconventional measures have had a strong impact on countries that are members of the eurozone but also on countries that are not members of it, and especially on emerging markets countries. The influence of unconventional monetary policy through transmission channels can stimulate capital flows and changes in expectations, which in turn through trade relations and exchange rates affect other economies.

CEE countries such as Romania and Bulgaria, which became members of the European Union in 2007, as well as Croatia - in 2013 and Ukraine, which currently has a course of European integration, were selected for analysis. These countries have economic, political and trade relations with the countries of the European Union and the Euro area (table.2).

Table 2. Trade with the EU (%)

Country	2000	2005	2010	2015	2019
Bulgaria	45	49	44	45	48
Croatia	61	55	51	59	63
Romania	55	52	53	55	58
Ukraine	20	21	18	23	35

Source: Authors' Calculations, Data from IMF

Taking into account these close ties of the region with the Eurozone, it is expected that the liquidity provided by the ECB may affect capital flows. The article has tested the hypothesis of the ECB monetary policy non-traditional measures influence on national long-term interest rates and the investment flows.

2. Literature Review

Michael D. Bauer and Christopher J. Neely (2014) examined how Fed asset purchases affect bond yields in other countries. The effects were evaluated for Canada, Australia, Germany, Japan. The signal effect was detected for Canada, for other countries the effects had limited impact. The authors conclude that the effects of signaling are generally significant for countries with a strong response to returns regarding surprises in US monetary policy, and the effects of portfolio balance correspond to the degree of interchangeability of international bonds.

Jose A. Zabala Maria A. Prats (2019) evaluated the effectiveness of unconventional monetary policy instruments for inflation and economic growth. The methodology was based on an assessment of the vector autoregressive model for the period from the first quarter of 2007 to the fourth quarter of 2018. Four variables were analyzed: EONIA, total assets in the balance sheet of the ECB, inflation and the economic growth in the euro area. The authors' results confirm the existence of money transmission in the study period, as well as the effectiveness of the ECB monetary policy.

The purpose of the Jakub Janus (2019) analysis was to investigate the secondary effects of ECB's unconventional monetary policy on macro-financial variables in Poland. The ECB monetary policy was expressed in the shadow interest rate, which takes into account unconventional policy measures. The analysis also used several leading political statements and actions of the ECB. As a result, the author found that the secondary effects of the ECB's unusual policy towards Poland had little effect throughout the entire period 2008–2018. More significant side effects of volatility were identified for long-term interest rates after the first important decrease in interest rates in 2008 and after the introduction of a negative interest rate policy in 2014.

Andrea Colabella (2019) studied the side effects of the ECB's monetary policy for non-euro countries in the period 2004-2016, using the GVAR methodology applied to a large sample of countries and a wide range of variables. As a result of the analysis, the author obtained the following outcomes: an increase in the shadow interest rate in the euro area caused a large-scale and steady decline production in the countries of Central and Southeast Europe. The increase in the shadow rate in the euro area was also transmitted to the short-term interest rates of a number of countries, although such increases were short-term and were not as widespread as

secondary effects of GDP. Side effects were transmitted mainly through the trading channel, and also, to a lesser extent, through the short-term channel of interest rates

Also, Yakubovkyi S.O. and Alekseievska H.S. (2017/2019) Saskiater Ellen (2019) Massimiliano Serati and Andrea Venegoni (2019) Franziska Collingro (2019) studied the effectiveness of non-traditional monetary policy measures and their impact on developing countries. A study of the investment attractiveness of CEE countries was carried out by Rodionova et al. (2019)

3. Methodology and Data

The main hypothesis is that ECB's unconventional monetary policy has a significant impact on the yield of 10 government bonds and on investment flows in Romania, Bulgaria, Croatia, and Ukraine. Vector Autoregression (VAR) models were built for hypothesis analysis.

The beginning of the analysis is to estimate the influence of the average Eurobonds yield on the yield of ten-year government bonds of the CEE countries. For Ukraine, data provided for five-year government bonds. Unconventional monetary policy was expressed in the balance sheet of the ECB. Model 1 is presented in the form:

$$\begin{aligned}
 10YN_t &= a_1 + \sum_{i=1}^l \beta_{1i} 10YE_{t-i} + \sum_{i=1}^l \gamma_{1i} ECBbalance_{t-i} \\
 &\quad + \sum_{i=1}^l C_{1i} 10YN_{t-i} + \varepsilon_{1t} \\
 10YE_t &= a_2 + \sum_{i=1}^l \beta_{2i} 10YN_{t-i} + \sum_{i=1}^l \gamma_{2i} ECBbalance_{t-i} \\
 &\quad + \sum_{i=1}^l C_{2i} 10YE_{t-i} + \varepsilon_{2t} \\
 ECBbalance_t &= a_3 + \sum_{i=1}^l \beta_{3i} 10YN_{t-i} + \sum_{i=1}^l \gamma_{3i} ECBbalance_{t-i} \\
 &\quad + \sum_{i=1}^l C_{3i} 10YE_{t-i} + \varepsilon_{3t}
 \end{aligned} \tag{1}$$

Where *ECBbalance* is the balance sheet of the European Central Bank, *10YN* is the yield on 10-year national bonds of the studied country (%); *10YE* is the yield on 10-year Eurobonds (%).

The second model assesses the impact of the ECB balance on different types of investments in Romania, Bulgaria, Croatia and Ukraine:

$$\begin{aligned}
 TI_t &= a_1 + \sum_{i=1}^l \beta_{1i} ECBbalance_{t-i} + \sum_{i=1}^l C_{1i} TI_{t-i} + \varepsilon_{1t} \\
 ECBbalance_t &= a_2 + \sum_{i=1}^l C_{2i} TI_{t-i} + \sum_{i=1}^l \beta_{2i} ECBbalance_{t-i} + \varepsilon_{2t}
 \end{aligned}
 \tag{2}$$

Where TI is type of investments ((portfolio or direct) (USD millions)). Also ε is error term; a is a constant term; β , γ and C denote the coefficients to be estimated, l is the lag order selected.

The first step was estimating VAR models. After that Granger causality was tested. The optimal amount of lag length was selected taking into account the AIC and SIC criteria.

The quarterly data was taken from the International Monetary Fund, Organization for Economic Co-operation and Development and National Banks.

4. Results

The attractiveness of CEE countries for investors is due to higher returns in their financial markets. The yield of ten-year government bonds of Bulgaria, Croatia, Romania and five-years government bonds of Ukraine in comparison with the average yield of Eurobonds are presented in Figure 2.

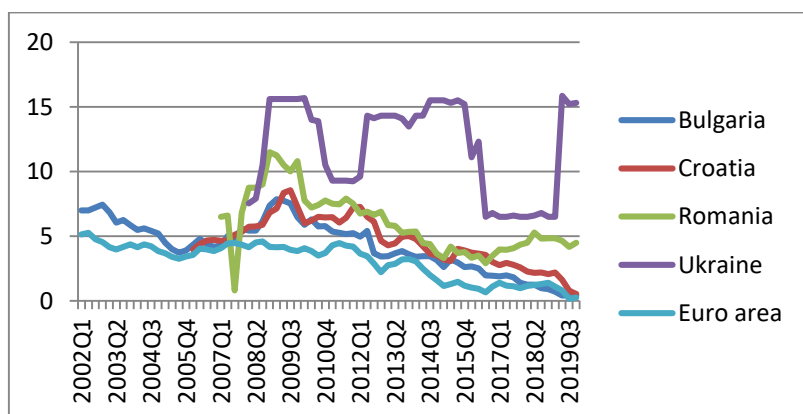


Figure 2. Long-Term Government Bonds Yield (%)

Source: Data from Organization for Economic Co-Operation and Development

The yield of Eurobonds during the study period has a tendency to crush, in particular after 2013. Similar trends can be seen in Bulgaria and Croatia. In Romania, there was an increase in yield from 2007 until 2010, after a marked reduction and in 2017, the yield began to grow and at the end of 2019 amounted to 5%. The most unstable

situation was observed in Ukraine. The fall in yields in 2010, growth during 2012-2015. In 2016 - 2018, there were insignificant fluctuations, and during this period the NBU did not bring government long-term bonds to the primary market. In 2019, there was a sharp increase in profitability, which almost doubled. The last placement of 5 years of domestic bonds was carried out by the NBU in September 2019 in the amount of UAH 12,875.66 million with a yield of 14.75%. And already in the first two months of 2020, the NBU has placed government bonds on the primary market in the amount of 3,932.90 million UAH with a yield of 9.80%

Table 3 present the results of the Granger test for the first model that estimate the impact of ECB assets on yield national bonds Romania, Bulgaria, Croatia, and Ukraine.

Table 3. The Result of Granger Test for the Model 1

Country	AIC and SIC	Lags			
		Indicators	ECB balance	10YE	10YN
Bulgaria (2002Q1 2019Q4)	2	ECB balance		4.35(0.11)	3.12(0.209)
		10YE	6.61(0.03) ^b		0.69(0.70)
		10YN	0.75(0.70)	4.53(0.10) ^c	
Croatia (2006Q1 2019Q4)	3	ECB balance		7.74 (0.05) ^b	4.77 (0.18)
		10YE	3.64 (0.30)		1.24 (0.74)
		10YN	3.24 (0.35)	9.26 (0.02) ^b	
Romania (2007Q1 2019Q4)	5	ECB balance		5.44 (0.36)	5.85(0.32)
		10YE	1.88 (0.86)		13.40 (0.21)
		10YN	4.20 (0.52)	6.39 (0.26)	
Ukraine (2008Q1 2019Q4)	2		ECB balance	10YE	5+ YN
		ECB balance		9.04 (0.11)	12.18 (0.12)
		10YE	6.61 (0.03) ^b		9.13 (0.23)
		5+YN	0.35 (0.83)	4.19(0.10) ^c	

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.

Source: Authors` Calculations, Data from IMF ,OECD, NBU .

According to the Granger test, an increase in the ECB's assets did not directly affect the yield of government bonds of the studied countries. But the correlation was found between the yield of Eurobonds and the unconventional actions of the ECB. The influence of the ECB's unconventional monetary policy through changes in long-term profitability in the euro area was transferred to the financial markets of the CEE countries. The influence of the yield of 10-year Eurobonds on the yield of national bonds of Bulgaria, Croatia and Ukraine was revealed. As a result, the long-term yield has decreased (Fig. 2).

Table 4. Results Granger Causality Test for the Model 2

Country	A I C S I C	Direct investment				Portfolio investment				
		Indicators	Lags			A I C S I C	Indicators	Lags		
			ECB balance	ID	IE			ECB balance	ID	IE
Bulgaria (2007Q1 2019Q4)	1	ECB balance		9.88 (0.20)	6.54 (0.21)	1	ECB balance		1.51 (0.21)	10.35 (0.21)
		ID	0.85 (0.35)		3.88 (0.04) _b		ID	0.07 (0.78)		7.64 (0.00) ^a
		IE	2.95 (0.08) _b	0.76 (0.38)			IE	0.44 (0.50)	1.71 (0.19)	
Croatia (2002Q1 2019Q4)	2	ECB balance		1.37 (0.50)	0.66 (0.71)	2	ECB balance		7.75 (0.20)	2.02 (0.36)
		ID	0.52 (0.77)		4.43 (0.10)		ID	5.66 (0.06)		1.24 (0.53)
		IE	0.17 (0.91)	4.18 (0.12)			IE	0.02 (0.98)		4.52 (0.10) ^c
Romania (2002Q1 2019Q4)	1	ECB balance		0.35 (0.55)	1.34 (0.24)	1	ECB balance		0.02 (0.86)	0.93 (0.33)
		ID	6.59 (0.01) _a		4.45 (0.03) _b		ID	10.53 (0.00) _a		2.48 (0.11) ^c
		IE	2.65 (0.10) _c	1.18 (0.27)			IE	2.62 (0.10) _c	1.51 (0.21)	
Ukraine (2002Q1 2019Q4)	1	ECB balance		0.22 (0.63)	0.06 (0.80)	2	ECB balance		4.36 (0.19)	0.06 (0.96)
		ID	7.91 (0.00) _a		18.44 (0.00) _a		ID	4.82 (0.08) _c		8.23 (0.02) _b
		IE	3.39 (0.06) _c	7.09 (0.00) _a			IE	3.63 (0.16)	8.56 (0.01) _a	

Note: IE – investment in equity and investment fund shares; ID - investment in debt instruments. 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.

Source: Authors' Calculations, Data from IMF, OESD, NBU.

The results of the Granger test for model 2 are shown in table 4. We can conclude that the ECB balance had an impact on direct investment flows in Bulgaria, Romania and Ukraine. In Bulgaria, the influence extended to direct investments in capital. In Romania and Ukraine was find the effect on capital investments and investments in debt instruments, but the greater influence was observed specifically on debt

instruments. Also, the impact of the ECB balance sheet was found on the flow of portfolio investments in debt instruments in Croatia, Romania and Ukraine.

4. Conclusion

The influence of the European Central Bank's unconventional monetary policy on CEE countries which have close economic relations with the EU countries. In particular, the analysis revealed the effect of the yield ten-year Eurobonds on the yield long-term government bonds of the studied countries. Changes in the ECB balance sheet also have affected investment flows, in particular, investors were interested in debt securities.

The unconventional monetary policy of the central banks of the developed countries remains currently important. On March 7, 2019 The ECB pushed back its first post-crisis rate hike until 2020, promising to keep rates at a record low. And on September 12, 2019, the ECB Governing Council decided that net purchases will be resumed as part of the Governing Council Asset Purchase (APP) program on a monthly basis from November 1, 2019 in the amount of 20 billion euros. On March 19, 2020, the European Central Bank announced a new program for the purchase of bonds worth 750 billion euros. Also, the Fed has taken interest rates down to virtually zero and massively increased cash injections into financial markets, including an additional \$1.5 trillion and \$1 trillion at the beginning and in the middle of March 2020.

In further studies, it is necessary to continue the study of unconventional monetary policy measures, in particular the latest statements by the ECB and the Fed in the context of the impact on the US and EU economies as well as on developing countries.

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