THE IMPACT OF MACROECONOMIC DETERMINANTS ON COMMERCIAL BANK PROFITABILITY IN CENTRAL AND SOUTHEASTERN EUROPEAN COUNTRIES

Branimir Kalaš[*], Vera Mitrović, Nada Milenković. Jelena Andrašić

University of Novi Sad, Faculty of Economics in Subotica, Subotica, Serbia
[*]*branimir.kalas@ef.uns.ac.rs*

Abstract

The purpose of this paper is to investigate the impact of macroeconomic variables on bank profitability indicators in Central and Southeastern European countries (CESE). The research sample includes 13 countries of CESE countries: Albania, Bosnia and Herzegovina, Bulgaria, Croatia, the Czech Republic, Hungary, Macedonia, Montenegro, Poland, Romania, Serbia, Slovakia and Slovenia, for the period 2008-2015. The core idea is to empirically evaluate the impact of the main macro indicators, such as gross domestic product, inflation and the real interest rate on bank profitability and their potential relationship. The subject of this paper applies a two-step model: model 1 includes return on asset (ROA), while model 2 includes return on equity (ROE) as the dependent variable. On the other hand, independent variables are gross domestic product (GDP), inflation (INF) and real interest rate (RIR). The results of the panel study indicate that there is a significant effect of GDP and INF on bank profitability indicators in selected countries. Namely, the 1% increase in GDP and INF rise ROA for 0.47% and 0.48%, where inflation has a greater influence on ROA and ROE compared to GDP. The results of the random effect model show that the 1% increase in GDP and INF raise ROE for 0.49% and 0.42%. Likewise, real interest rate has no significant effect on ROA and ROE in selected countries. Based on empirical findings, policymakers should focus on rapid economic growth with controlled inflation that will enhance bank profitability in Central and Southeastern European countries.

Key words: bank profitability, macroeconomic determinants, Central and Southeastern European countries, panel models.

УТИЦАЈ МАКРОЕКОНОМСКИХ ДЕТЕРМИНАНТИ НА ПРОФИТАБИЛНОСТ КОМЕРЦИЈАЛНИХ БАНАКА У ЦЕНТРАЛНОЈ И ЈУГОИСТОЧНОЈ ЕВРОПИ

Апстракт

Сврха овог рада је истраживање утицаја макроекономских варијабли на показа-теље профитабилности банака у земљама централне и југоисточне Европе. Узорак

1392

истраживања обухвата 13 земаља централне и југоисточне Европе: Албанија, Босна и Херцеговина, Бугарска, Хрватска, Чешка, Мађарска, Македонија, Црна Гора, Пољ-ска, Румунија, Србија, Словачка и Словенија, за период 2008–2015. године. Основна идеја јесте емпиријско процењивање утицаја главних макро показатеља, као што су бруто домаћи производ, инфлација и реална каматна стопа на профитабилност бана-ка, те њиховог потенцијалног односа. Предмет рада приказује моделе у два корака: модел 1 укључује принос на имовину (РОА), док модел 2 подразумева принос на ка-питал (РОЕ) као зависну варијаблу. С друге стране, независне варијабле су бруто до-маћи производ (БДП), инфлација (ИНФ) и реална каматна стопа (РИР). Резултати панел-студије указују на то да постоји значајан ефекат БДП и ИНФ на профитабил-ност банака у одабраним земљама. Наиме, раст БДП и ИНФ од 1% повећава РОА за 0,47% и 0,48%, где инфлација има већи ефекат на РОА и РОЕ у односу на БДП. Резултати насумичног ефекта модела показују да раст БДП и ИНФ од 1% повећава РОЕ за 0,49% и 0,42%. Такође, реална каматна стопа нема значајан утицај на РОА и РОЕ у одабраним земљама. На основу емпиријских сазнања, творци политика треба да се усредсреде на убрзани економски раст уз контролисану инфлацију, који ће по-бољшати профитабилност банака у земљама централне и југоисточне Европе.

Кључне речи: банка, профитабилност, макроекономске детерминанте, земље централне и југоисточне Европе, панел-модели.

INTRODUCTION

The banking system manifests an important part of each economy where financial performance of banks is the basis for understanding the financial position and potential opportunity for the development of the banking system (Todorović et al. 2018). How efficient and well-functioning is the banking system can be viewed through the bank determinants of profitability. Profitability of banks is a reflection of how banks operate and, it should mirror the quality of management, as well as, efficiency and risk management (Herrero et al. 2009).

There are many indicators for measuring the level of profitability, and the authors researched and considered the return on assets (ROA) and return on equity (ROE), and the effect of main macroeconomic variables on them. The research includes Central and Southeastern European countries for the period 2008-2015. In contemporary business conditions and market economy, banks have a great significance to economic development in South Eastern Europe and especially the Western Balkan countries, because the shares of banks are over 90% of assets of the financial system in these countries. Knežević & Dobromirov (2016) emphasize the higher share of foreign banks in transition economies and accelerated progress in bank privatization and consolidation. Stubos & Tsikripis (2004) argue that the creation of a viable and sound financial system in SEE countries has been a fundamental aspect of the transition to a market economy. Therefore, banks have a significant function in the financial system of the SEE countries, as capital markets are constrained to the equity markets (Staikouras et al. 2007). Janković (2019) argues that

the financial system of the Republic of Serbia is bank-centric, which is a similar situation to other economies in the region. Authors have researched bank profitability in 13 CESE countries to reflect that macroeconomic framework does not have the essential effect on bank profitability, which is different compared to previous studies. Likewise, former transition economies improved their macroeconomic performances, but it is not directly linked to banking profitability. Similarly, Bucevska & Misheva (2017) researched bank profitability in selected Balkan countries and determined that inflation and economic growth are not significant to bank profitability.

The structure of this research is as follows: after the introduction, we give a brief literature review where theoretical background posits the basis for model specification. The third part includes the methodological framework that defines variables and econometric preconditions for adequately created panel models. The fourth part is devoted to bank profitability in CESE countries for the period 2008-2015. The following part gives the empirical results of panel models such as the RE and FE model which have estimated the effect of macroeconomic variables on bank's profitability in observed countries.

LITERATURE REVIEW

Commercial banks have a relevant role in the relation to depositors and investors in terms of economic resource allocation (Ongore & Kusa, 2013). Many authors confirm the contribution of bank organizations to the economic growth of the country. (Brock & Suarez, 2000; Williams, 2003; Vong, 2007; Kosmidou, 2007; Naaborg & Lensink, 2008; Pejic Bach et al. 2009; Suffian, 2011; Firth et al. 2013; Otuori, 2013; Dawood, 2014). The banking sector is an essential sector, which influences economic growth of any country.

The factors of bank's profitability might change when there are changes in the macroeconomic environment (Athanasoglou et al. 2008). Festić & Romih (2008) determine the effect of macroeconomic factors on bank's performance, while Bikker & Vervliet (2017) point out that the macroeconomic environment is highly determinative for bank profitability. Many papers have determined a positive nexus between these variables (Bikker & Hu, 2002; Dietrich and Wanzenried, 2009; Alper and Anbar, 2011). However, there are empirical studies which have examined the negative relationship (Molyneux & Thornton, 1992; Sufian & Chong, 2008; Hassan et al. 2013). Staikouras & Wood (2011) highlight that the effect of inflation can be significant for the stability of the financial system.

There are many studies which have researched internal and external factors that affect commercial bank profitability (Goodard et al. 2004; Albertazzi & Gambacorta, 2009; Ponce, 2012; Chronopoulos et al. 2013;

Frederick, 2014; Stančić et al. 2014; Ozili, 2015; Pervan et al. 2015; Saona, 2016).

Šuturova & Teply (2014) created the profitability equation using micro and macro determinants in order to measure potential effects on bank profitability and, their findings are based on the capital-profitability nexus. Busuioc-Witoswchi & Luca (2016) argue that profitability can have a positive effect on the capital level in situations when a bank increases capital through retained earnings. Empirical studies of Iannota et al. (2007), Athanasoglou et al. (2008) and Alexiou & Sofoklis (2009) showed a positive impact of capital on bank profitability. Similarly, Havrylchyk et al. (2006) revealed a positive nexus between capital and profit whereby a more efficient bank should have higher profitability level.

Berger & Bouwman (2013) argue that capital enables small banks to survive, and support the medium and large banks' performance during crises. Golin (2001), Rose et al. (2005) and Fraker (2006) determined ROA and ROE as two most essential indicators in banking, while other authors emphasize the importance of the net interest margin (NET) of banks' profitability factors (Demirguc-Kunt & Huizinga, 1999; Ayanda et al. 2013). Samad (2015) researched the profitability of forty-three commercial banks of Bangladesh using a regression model with panel data 2009-2011 and found that higher interest rates increase banks' profitability, as well as the positive linkage between inflation and profitability of bank. However, there is a different result by Guru et al. (2002) and Jiang et al. (2003) who researched the negative link between these variables.

In addition, Mamatzakis and Remoundos (2003) analyzed seventeen commercial banks in Greece for the period 1989-2000, and their findings confirmed that there is no significant nexus between inflation and real interest rate, which have no significant effect on bank profitability. Ariyadasa et al. (2016) found that gross domestic product, inflation and interest have a significant effect on bank profitability in Sri Lanka for the period 2006-2014. Al-Homaidi et al. (2018) investigated profitability determinants in India for the period and their findings revealed that inflation and interest rates have positive impact on ROA, while gross domestic product a negative effect on ROA. Bouzgarrou et al. (2017) investigated bank profitability determinants in India for the period 2000-2012. Their analysis showed that gross domestic product positively affected the profitability measured by ROA, while inflation rate negatively affected profitability.

METHODOLOGICAL FRAMEWORK

The goal of this paper is to find out the linkage between macroeconomic variables and indicators of banks' profitability in Central and Southeastern European countries from 2008-2015. Authors have

investigated the effect of macroeconomic variables on bank profitability in 13 countries: Albania, Bosnia and Herzegovina, Bulgaria, Croatia, the Czech Republic, Hungary, Macedonia, Montenegro, Poland, Romania, Serbia, Slovakia, and Slovenia, using annual data from 2008 to 2015.

The research focuses on the effects of macroeconomic indicators GDP, INF and RIR as macroeconomic variables on ROA and ROE, and as internal factors that are dependent variables in the given model. Brooks (2008) defined a fundamental framework for panel data estimation:

$$y_{it} = \alpha + \beta\, x_{it} + \mu\, i_t \tag{1}$$

Y_{it} = return on assets (*ROA*) and return on equity (*ROE*)

α constant

$\beta\, x_{it}$ = coefficients of the variables (*GDP, INF, RIR*)

i = 13 countries

t = 2008 - 2015

μ_{it} = residual

Observed variables are:

- *Return on assets* – bank's profitability indicator between net income and total assets, measured by annual growth rate;
- *Return on equity* – bank's profitability indicator between net income and equity capital, measured by annual growth rate;
- *Gross domestic product* – monetary value of finished goods and services made within a country in a year, measured by annual growth rate;
- Inflation – rise in prices on the general level, measured by the consumer price index;
- *Real interest rate* – the interest rate which has been corrected to remove the impact of inflation, measured by annual growth rate.

  Model 1 is:

  $$ROA = \alpha + \beta GDP + \beta INF + \beta RIR + \mu \tag{2}$$

  Model 2 is:

  $$ROE = \alpha + \beta GDP + \beta INF + \beta RIR + \mu \tag{3}$$

Profitability represents one of the fundamental indicators in banking and, its importance is the measure of success of banking operations. It can be measured in different ways, but the authors are focused on two indicators which are usually used:

$$ROA = Net\ income/Total\ assets \tag{4}$$
$$ROE = Net\ income/Equity\ capital \tag{5}$$

ROA is calculated as the ratio between net income and total assets and, it is considered as the best measure of the efficiency of banking operations. ROE is the most important indicator of the bank for shareholders since it shows how much return they can expect.

Table 1. Methodology review of variables

Variables	Source	Notation	Expected impact on bank's profitability
Return on assets	NB reports	ROA	/
Return on equity	NB reports	ROE	/
Gross domestic product	WB, IMF reports	GDP	+
Inflation	WB, IMF reports	INF	+
Real interest rate	WB, IMF reports	RIR	+

Source: Authors' illustration

By reviewing Table 1, authors present the methodology review of dependent and independent variables and determine the expected impact on the bank's profitability. It shows that the impact of GDP, INF and RIR should be positive on the indicators of bank's profitability ROA and ROE.

MODEL SPECIFICATION

In order to determine an adequate model, it is required to implement the Hausman test, which is one of the most important tests in the panel estimation data:

$$H = (\beta^{FE} - \beta^{RE})'[Var(\beta^{FE}) - Var(\beta^{RE})]^{-1}(\beta^{FE} - \beta^{RE}) \approx \chi^2(k) \qquad (6)$$

The fixed effect model implies a constant of changes with each observation unit, where it is constant in time and defined as:

$$Y_{it} = \alpha i + \beta_1 X_{it1} + \beta_2 X_{it2} + ... \beta_n X_{itn} + \mu_{it}; \; i=1, N; \; t = 1, T \qquad (7)$$

Where N implies the number of observations, T number of period, α constant, β parameters and μ random error. The stochastic effect model includes the random selection of observation units and examines the difference between them are random. It can be defined as:

$$Y_{it} = \beta_{1i} + \beta_2 X_{it2} + ... \beta_n X_{itn} + \mu_{it}$$

$$\beta_{1i} = \beta_{1 +} \varepsilon_i \qquad i = 1,2,..., N \qquad (8)$$

$$Y_{it} = \beta_1 + \beta_2 X_{it2} + ... \beta_n X_{itn} + \varepsilon_i + \mu_{it} \qquad (9)$$

β1i is the stochastic variable with mean value β1, while εi manifests a random error with mean value 0 и variance σ2ε.

DATA AND ANALYSIS

In order to analyze the effect of macroeconomic indicators on bank profitability in Albania, Bosnia and Herzegovina, Bulgaria, Croatia, the Czech Republic, Hungary, Macedonia, Montenegro, Poland, Romania, Serbia, Slovakia and Slovenia, it is necessary to manifest their trend from 2008 to 2015.
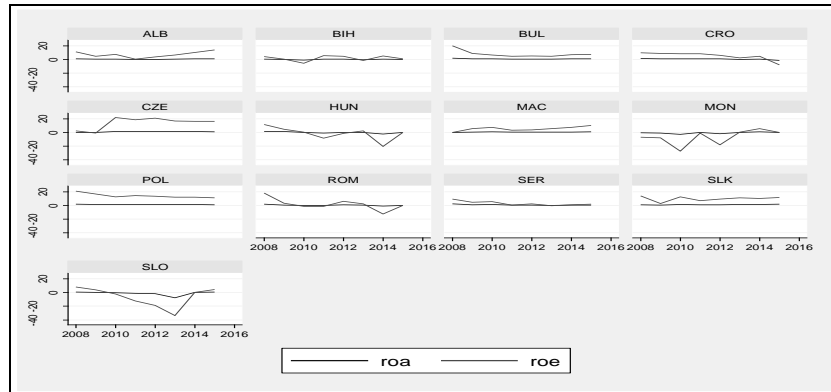
Figure 1. Bank profitability indicators in Central and Southeastern European countries

Banking sectors of the selected countries recorded average values of ROA (0.40%) and ROE (4.27%). Considering the profitability level by the country, indicators were above average in Albania (0.64% and 7.40%), Bulgaria (0.97% and 8.17%), Croatia (0.75% and 5.2%), the Czech Republic (0.94% and 14.01%), Macedonia (0.56% and 5.45%), Poland (1.17% and 13.94%), Slovakia (1% and 9.66%). On the other hand, the profitability level is below average in Bosnia and Herzegovina (0.22% and 1.89%), Hungary (-0.01% and -1.41%), Montenegro (-0.66% and -6.96%), Romania (0.12% and 1.7%), Slovenia (-1.13% and -6.40%). Serbia is the only country where the banking sector had higher ROA (0.62%) than average and below average ROE (2.92%). It is notable that the banking sectors of the Czech Republic, Poland and Slovakia had the highest rate of average values, while Montenegro, Slovenia and Hungary recorded negative rates of profitability.
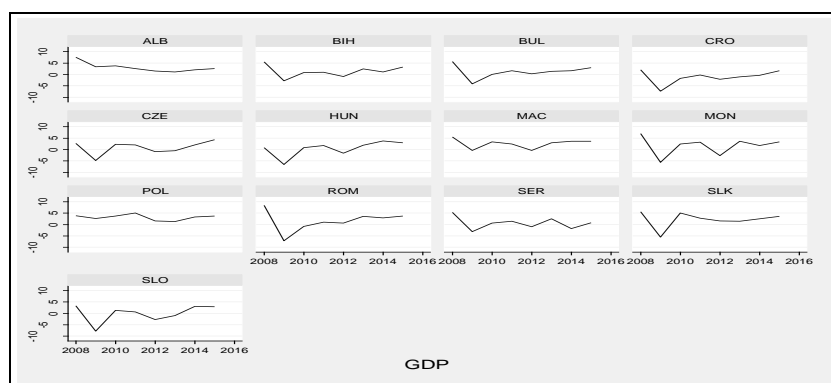

Figure 2. GDP growth rate in Central and Southeastern European countries

Figure 2 reflects the trend of GDP in the 13 observed countries in the period 2008-2015. There has been a similar tendency, especially in 2009 when it came to the fall of GDP as result of the global economic crisis with the exception of Albania and Poland which recorded GDP growth of 3.35% and 2.63% in the observed group. A similar trend is noticed in 2012 when Bulgaria, Romania, and Slovakia recorded positive rates in addition to the mentioned countries as Albania and Poland. Looking at 2015, all countries have growth rates of this indicator, while the Czech Republic, Romania, Macedonia, and Slovakia have the highest growth of 3.5%.
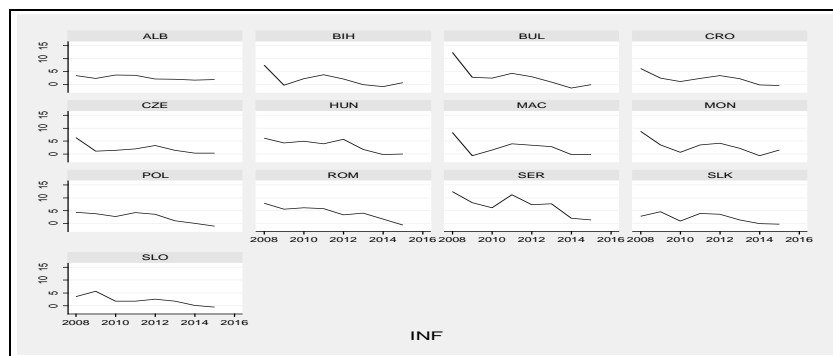

Figure 3. Inflation rate in Central and Southeastern European countries

Figure 3 analyzes the level of inflation in the 13 observed countries in the period 2008-2015. Authors used IMF (International Monetary Fund) data where CPI (Consumer Price Index) measures inflation. Looking at the period, in 2008 the average inflation was 6.9%, whereas Bulgaria and Serbia had the greatest growth rate of 12%. However, after that, there is an intensive inflation fall as the result of pumping money into the EU market, which is particularly reflected in the price levels in the European Union. Thus, in the past two years, EU countries have had a problem with deflation where they recorded a negative growth of 0.33%. If compared, 2008 and 2015, show that this indicator average dropped to 6.72%.

Figure 4 reflects a trend of real interest rate in the 13 observed countries in the period 2008-2015. Using the average of this indicator, Slovakia and Slovenia had the smallest value above 3.5%, Macedonia, Hungary, the Czech Republic, and Poland above 4%, while Albania and Montenegro had the greatest value at level 7-8%. In addition, the real interest rate in BiH increased by 5% or 5.38% while Bulgaria had the biggest growth of this indicator for 3.56% in the observed period.
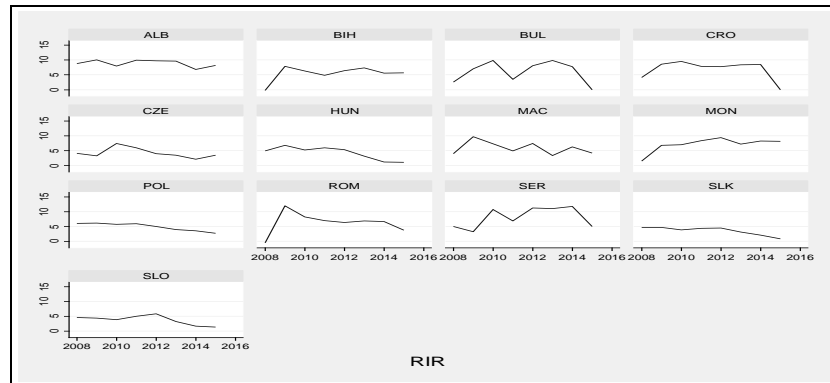
Figure 4. Real interest rate in Central and Southeastern European countries

EMPIRICAL RESULTS

In the paper, authors have used descriptive and correlation analysis of the observed factors to determine the level of their coherence with the segmented correlation by country to reflect the different characters of relations between indicators. Also, the annual reports of national banks and financial institutions as International Monetary Fund and World Bank was used as a database.

Table 2. Descriptive analysis

Variable	Observation	Mean	Std. Dev.	Min	Max	Skewness	Kurtosis
ROA	104	3.954808	1.163394	-7.7	2.12	0.0000	0.0000
ROE	104	4.234615	9.422197	-33.6	21.8	0.0000	0.0005
GDP	104	1.315673	3.092392	-7.78	8.46	0.0009	0.0479
INF	104	2.908077	2.833301	-1.42	12.41	0.0000	0.0173
RIR	104	5.790288	2.829386	-0.53	11.95	0.8144	0.3041

Source: Author's calculation

Table 2 reflects the descriptive statistics of the observed variables as profitability indicators (ROA and ROE) and macroeconomic indicators (GDP, INF, and RIR) for the 13 countries with 104 observations in the period 2008-2015. In this period, ROA was an average of 3.9548% with a standard deviation of 1.1634%, and the least and most values are -7.7% and 2.12% Likewise, ROE has similar value with a higher standard deviation of 9.4222 and a greater difference between the minimum and most values from negative 33.6% to positive 21.8%. Next, macroeconomic indicators have standard deviations, more than 2%, respectively GDP 3.0924%, INF 2.8333%, and RIR 2.8294%. Their minimum values are negative and range from 33.6% to 0.53%, while most values are in the range from 8.46% to 12.41%. To determine time series stationary, the analysis included the Levin Lin Chu test.

Table 3. Levin Lin Chu test

H_0: Panels contain unit roots				
H_a: Panels are stationary				
Variable	Statistic	The p-value	Number of panels	Accepted/Rejected Hypothesis
ROA	-9.9471	0.0000	13	Rejected H_0
ROE	-7.9641	0.0000	13	Rejected H_0
GDP	-3.3452	0.0004	13	Rejected H_0
INF	-16.4813	0.0000	13	Rejected H_0
RIR	-4.9889	0.0000	13	Rejected H_0

Source: Authors' calculation

Table 4. Multicollinearity test

Variable	VIF	1/VIF
GDP	1.19	0.843040
INF	1.01	0.993238
RIR	1.13	0.881287
Average value	1.11	

Source: Authors' calculation

Based on Table 3, the alternative hypothesis can be accepted and confirm the stationary of panel series (p-value < 0.05). This statistics tool shows whether there exists a correlation between independent variables, and if the value of VIF is more than 10, there is a strong presence of multicollinearity, while the Tolerance test has a reference value of 0.1. According to data from Table 5, there is no problem of multicollinearity because the value of VIF is higher than the reference value of 10, and the value of the Tolerance test is higher than 0.1 for all observed independent variables.

Table 5. Correlation matrix

Variable	ROA	ROE	GDP	INF	RIR
ROA	1.0000				
ROE	0.9045*	1.0000			
GDP	0.1509	0.2181*	1.0000		
INF	0.1222	0.0595	0.0359	1.0000	
RIR	0.0072	-0.0568	-0.3406*	0.0373	1.0000

Source: Authors' calculation

Table 5 reflects the correlation between ROA and ROE as an internal factor and GDP, INF and RIR as external factors for the 13 countries in the period 2008-2015, and the results manifested a positive correlation between these variables, but it is a very weak correlation and below the reference value of 0.30. Looking for the individual, the correlation between ROA and

GDP is a positive, but weak and it is the same situation with INF and RIR. The correlation confirmed the weak positive correlation between ROE, GDP, and INF with values of 0.2181 and 0.0595. However, there is a negative correlation between ROE and RIR -0.0568, which means that the increase of the real interest rate leads to the decline of ROE.

Table 6. Correlation between macroeconomic variables and bank profitability

ALB	ROA	ROE	GDP	INF	RIR
ROA	1	*	*	*	*
ROE	0.9940	1	*	*	*
GDP	0.2983	0.3417	1	*	*
INF	-0.2737	-0.2739	0.6261	1	*
RIR	-0.7248	-0.7141	-0.0869	0.17049	1
BIH	ROA	ROE	GDP	INF	RIR
ROA	1	*	*	*	*
ROE	0.9928	1	*	*	*
GDP	-0.0159	0.0588	1	*	*
INF	0.0185	0.2569	0.5650	1	*
RIR	-0.3302	-0.3992	-0.7633	-0.8779	1
BUL	ROA	ROE	GDP	INF	RIR
ROA	1	*	*	*	*
ROE	0.9960	1	*	*	*
GDP	0.4918	0.5117	1	*	*
INF	0.8067	0.8316	0.4499	1	*
RIR	-0.4645	-0.4266	-0.5334	-0.3361	1
CRO	ROA	ROE	GDP	INF	RIR
ROA	1	*	*	*	*
ROE	0.9968	1	*	*	*
GDP	-0.3106	-0.3632	1	*	*
INF	0.6548	0.6145	0.0326	1	*
RIR	0.6454	0.6928	-0.5913	0.0459	1
CZE	ROA	ROE	GDP	INF	RIR
ROA	1	*	*	*	*
ROE	0.9896	1	*	*	*
GDP	0.3919	0.4298	1	*	*
INF	-0.4082	-0.3574	0.0917	1	*
RIR	0.24906	0.3805	0.2564	0.1411	1
HUN	ROA	ROE	GDP	INF	RIR
ROA	1	*	*	*	*
ROE	0.9773	1	*	*	*
GDP	-0.5904	-0.4507	1	*	*
INF	0.6061	0.5793	-0.5487	1	*
RIR	0.5424	0.4408	-0.7477	0.864639	1
MAC	ROA	ROE	GDP	INF	RIR
ROA	1	*	*	*	*
ROE	0.9774	1	*	*	*
GDP	-0.08492	-0.0434	1	*	*
INF	-0.8285	-0.8729	0.3987	1	*
RIR	0.0924	0.0949	-0.7293	-0.4794	1

Source: Authors' calculation

The correlation analysis was performed to determine variables which are highly related to each other. Tables show the correlation matrix of internal and external factors by countries in the period 2008-2015. Firstly, in most countries, there is a positive correlation between the indicators of profitability (ROA and ROE) and the macroeconomic indicator (GDP), except in Bosnia and Herzegovina, Croatia, Hungary and Macedonia where it recorded a negative correlation.

Table 7. Correlation between macroeconomic variables and bank profitability

MON	ROA	ROE	GDP	INF	RIR
ROA	1	*	*	*	*
ROE	0.9971	1	*	*	*
GDP	0.2547	0.2573	1	*	*
INF	-0.1224	-0.1123	0.2054	1	*
RIR	-0.003	0.0289	-0.4944	-0.7301	1
POL	ROA	ROE	GDP	INF	RIR
ROA	1	*	*	*	*
ROE	0.9442	1	*	*	*
GDP	0.1579	0.2250	1	*	*
INF	0.7912	0.7358	0.1723	1	*
RIR	0.7066	0.7131	0.2499	0.9590	1
ROM	ROA	ROE	GDP	INF	RIR
ROA	1	*	*	*	*
ROE	0.9989	1	*	*	*
GDP	0.3263	0.3216	1	*	*
INF	0.5295	0.5547	-0.0667	1	*
RIR	-0.5343	-0.5303	-0.9369	-0.0145	1
SER	ROA	ROE	GDP	INF	RIR
ROA	1	*	*	*	*
ROE	0.9975	1	*	*	*
GDP	0.3929	0.3618	1	*	*
INF	0.4853	0.4404	0.5144	1	*
RIR	-0.4669	-0.4394	-0.0975	-0.2894	1
SLK	ROA	ROE	GDP	INF	RIR
ROA	1	*	*	*	*
ROE	0.7797	1	*	*	*
GDP	0.6856	0.9019	1	*	*
INF	-0.8781	-0.6362	-0.5218	1	*
RIR	-0.7393	-0.3052	-0.2346	0.8791	1
SLO	ROA	ROE	GDP	INF	RIR
ROA	1	*	*	*	*
ROE	0.9172	1	*	*	*
GDP	0.1506	0.1917	1	*	*
INF	0.1224	0.1769	-0.7388	1	*
RIR	-0.0076	-0.1961	-0.4715	0.6918	1

Source: Authors' calculation

Furthermore, the negative relation between profitability indicators (ROA and ROE) and inflation (INF) is confirmed only in Albania, the Czech Republic, Macedonia, Montenegro and Slovakia, while in other countries a positive correlation between observed variables seems to be established. Finally, the positive correlation between profitability indicators (ROA and

ROE) and real interest rate (RIR) was confirmed in Croatia, the Czech Republic, Hungary, Macedonia and Poland. Moreover, the strong correlation found in Poland is 0.7.

Table 8. Model 1 estimation – ROA

Return on assets (ROA)						
Fixed-effects model						
	Coef.	Std. Err.	T	P>(t)	95% Conf. Interval	
Variable						
C	.0969556	.3606363	0.27	0.009	-.6197333	.1180567
GDP	.0383207	.040123	0.96	0.002	-.0414153	.1418253
INF	.0610614	.0406402	1.50	0.017	-.0197024	.1112399
RIR	.0130121	.049428	0.26	0.093	-.0852157	.8136445
R-squared	0.6541		F-statistics (3,88)			1.13
			Prob>F			0.3430
Number of observation						104
Random-effects GLS model						
	Coef.	Std. Err.	T	P>(t)	95% Conf. Interval	
Variable						
C	1.142501	2.553558	0.44	0.056	-3.932159	6.21716
GDP	.4707132	.284099	1.66	0.001	-.0938738	1.0353
INF	.4806054	.287761	1.67	0.008	-.0912591	1.05247
RIR	.1926601	.349985	0.55	0.583	-.5028615	.8881816
R-squared	0.6541		F-statistics (3,88)	1.95	Prob>F	0.1275
Hausman test						0.9122 (0.53)
Number of observation						104

Source: Authors' calculation

Table 9. Model 2 estimation - ROE

Return on assets (ROE)						
Fixed-effects model						
	Coef.	Std. Err.	T	P>(t)	95% Conf. Interval	
Variable						
C	1.142501	2.553558	0.44	0.003	-3.932159	6.21716
GDP	.4707132	.284099	1.66	0.012	-.0938738	1.0353
INF	.4806054	.287761	1.67	0.006	-.0912591	1.05247
RIR	.1926601	.349985	0.55	0.019	-.5028615	.8881816
R-squared	0.5990		F-statistics (3,88)	1.95		
			Prob>F	0.1275		
Random-effects GLS model						
	Coef.	Std. Err.	T	P>(t)	95% Conf. Interval	
Variable						
C	1.49615	3.006176	0.50	0.008	-4.395847	7.388148
GDP	.4973995	.2752424	1.81	0.001	-.0420657	1.036865
INF	.4209267	.2797749	1.50	0.023	-.1274221	.9692754
RIR	.1554927	.3316572	0.47	0.629	-.4945435	.8055288
R-squared	0.5990		Wald chi2(3)	5.97	Prob>F	0.1275
Hausman test						0.7075 (1.39)
Number of observation						104

Source: Authors' calculation

Tables 8 and 9 show panel regression results for bank profitability indicators such as ROA and ROE for the 13 countries from 2008-2015. Based on the value of the Hausman test 0.9122 for model 1 and 0.7075 for model 2 the null hypothesis that random effect models are adequate cannot be rejected. The results of the fixed effect model for ROA shows that authors revealed a significant effect of two macroeconomic indicators on bank profitability. More specifically, that the gross domestic product and inflation have significant impact on ROA. Additionally, gross domestic product has positive effect ROA, where 1% increase of GDP enhances ROA for 0.03%. Also, inflation has greater impact on return on assets and as we can see, the 1% increase of inflation leads growth of ROA for 0.06%. Finally, real interest rate does not have a significant effect on return on assets. Similarly, the random effect model manifests significant and positive impact of gross domestic product and inflation on ROE for the observed period. Compared to previous results of effects on ROA, inflation and gross domestic product have a greater impact on ROE than ROA. Namely, the 1% increase of INF and GDP rise ROE for 0.49% and 0.42%. Likewise, results confirmed that the real interest rate has no significant impact on profitability indicators.

CONCLUSION

Bank profitability reflects the success of banking operations. The subject of this paper is an analysis of the influence of macroeconomic determinants on bank profitability in Central and Southeastern European countries from 2008-2015 with the aim of determining different tendencies in the form of relationships and correlations between the observed variables.

By using the correlation matrix, various results between the same variables and characters of these relations are presented. The correlation analysis confirmed that GDP is positively related to ROA and ROE in most of the analyzed countries, while negative correlation is identified in Bosnia and Herzegovina, Croatia, Hungary and Macedonia. However, the negative correlation between INF and bank profitability indicators is only determined in Albania, the Czech Republic, Macedonia, Montenegro and Slovakia. Finally, the positive correlation between bank profitability indicators and real interest rate is identified in Croatia, the Czech Republic, Hungary, Macedonia and Poland.

The results of panel models indicate that there is a significant effect of GDP and INF on bank profitability indicators in the selected countries. Namely, the 1% increase in GDP and INF rise ROA for 0.47% and 0.48%, where inflation has a greater influence on ROA and ROE compared to GDP. The results of the random effect model show that the 1% increase in GDP and IFN raise ROE for 0.49% and 0.42%. Likewise, the real interest rate has no significant impact on ROA and ROE in the

selected countries. Empirical findings of this research confirm the previous studies of Ariyadasa et al. (2016), as well as Al-Homaidi (2018), which determined significant and positive impact of gross domestic product and inflation on bank profitability.

The paper enables a better understanding of the nexus between macroeconomic indicators and bank profitability. It is essential for policymakers to identify the level and intensity of gross domestic product and inflation to bank profitability. These empirical results provide a different approach to the selected countries where most of analyzed economies should stimulate economic growth and inflation to provide a higher level of bank profitability. Further research would include adding more variables and expanding the group of observed countries, and focusing on the banks in Asia and their comparison with the EU countries.

REFERENCES

Albertazzi, U., & Gambacorta, L., (2009). Bank profitability and the business cycle. *Journal of Financial Stability*, *5(4),* 393 - 409. DOI: 10.1016/j.jfs.2008.10.002.

Alexiou, C., & Sofoklis, S. (2009). Determinants of bank profitability: Evidence from the Greek banking sector. *Economic Annals*, *182*, 93 - 118.

Al-Homaidi, E.A., Tabash, M.I., Farhan, N.H.S., Almaqtari, F.A., & McMillan, D. (2018). Bank-Specifi and Macro-Economic determinants of profitability of Indian commercial banks: A panel data approach. *Cogent Economics & Finance 6(1),* 1-35. doi: 10.1080/23322039.2018.1548072.

Alper, D., Alper, D., & Anbar, A. (2011). Bank specific and macroeconomic determinants of commercial bank profitability: empirical evidence from Turkey. *Business and Economics Research Journal*, *2(2)*, 139 - 152.

Ariyadasa, C., Selvanathan, E.A., Siddigue, M.A.B., & Selvanathan, S. (2016). On the profitability of commercial banks: the Sri Lankan case. *Applied Economics*, 49(21), 2106-2116. doi: 10.1080/00036846.2016.1231909.

Athanasoglou, P., Delis, M., & Staikouras, C. (2006). Determinants in the Bank profitability in South Eastern European region. *Journal of Financial Decisions Making*, *2*, 1 - 17.

Athanasoglou, P., Brissimis, N., & Delis, M. (2008). Bank specific, industry specific and macroeconomic determinants of bank profitability. *Journal of International Financial Markets, Institutions and Money*, 18(2), 121 -136. doi: 10.1016/j.intfin.2006.07.001.

Ayanda, A.M., Christopher, E.I., & Mudashiru, M.A. (2013). Determinants of bank's profitability in a developing economy: Evidence from Nigerian banking industry. *Interdisciplinary Journal of Contemporary Research in Business*, *4(9)*, 155 - 181.

Berger, A.N., & Bouwman, C.S. (2013). How does capital affect bank performance during financial crises? *Journal of Financial Economics*, 109(1), 146 - 176. doi: 10.1016/j.jfineco.2013.02.008.

Bikker, J., & Hu, H. (2002). Cyclical Patterns in Profits, Provisioning and Lending of Banks and Procyclicality of the New Basel Capital Requirements. *BNL Quarterly Review*, *221*, 143 - 175.

Bikker, J., & Vervliet, T. (2017). Bank profitability and risk-taking under low interest rates. *International Journal of Finance & Economics*, *23(1)*, 3-18. doi: 10.1002/ijfe.1599.

Bouzgarrou, H., Jouida, S., & Louhichi, W. (2017). Bank profitability during and before the financial crisis: Domestic vs. foreign banks. *Research in International Business and Finance, 44*, 26-39. doi: 10.1016/j.ribaf.2017.05.011.

Brock, P., & Suarez, L. (2000). Understanding the behavior of bank spreads in Latin America. *Journal of Development Economics*, *63(1)*, 113-144. doi: 10.1016/ S0304-3878(00)00102-4.

Brooks, C. (2008). *Introductory Econometrics for Finance*. Cambridge, University Press.

Bucevska, V., & Misheva, B.H. (2017). The Determinants of Profitability in the Banking Industry: Empirical Research on Selected Balkan Countries. *Eastern European Economics*, 55(2), 1-22. doi: 10.1080/00128775.2016.1260473.

Busuioc-Witowschi, I.R., & Luca, F.A. (2016). Bank capital, risk and performance in European banking: A case study on seven banking sectors. *Prague Economic Papers*, *25(2)*, 127 – 142. doi: 10.18267/j.pep.541

Chronopoulos, D., Liu, H., McMillan, F.J., & Wilson, J. (2013). The dynamics of US bank profitability. *The European Journal of Finance*, *21(5)*, 426-443. doi: 10.1080/1351847x2013.838184.

Dawood, U. (2014). Factors impacting profitability of commercial banks in Pakistan for the period of (2009-2012). *International Journal of Scientific and Research Publications*, *4(3)*, 2250 - 3153.

Demirguc-Kunt, A., & Huizinga, H. (1999). Determinants of commercial bank interest margins and profitability: Some international evidence. *World Bank Economic Review*, 13 (2), 379-408. doi: 10.1093/wber/13.2.379

Dietrich, A., & Wanzenried, G. (2009). What determines the profitability of commercial banks?" New evidence from Switzerland. *12th Conference of the Swiss Society for Financial Market Researches*. Discussion Paper, Geneva.

Dietrich, A., & Wanzenried, G. (2011). Determinants of bank profitability before and during the crisis: Evidence from Switzerland. *Journal of International Financial Markets, Institutions and Money*, *21*, 307-327. doi: 10.1016/j.intfin.2010.11.002

Festić, M., & Romih, D. (2008). Cyclicality of the banking sector performance and macro environment in the Czech republic, Slovakia and Slovenia. *Prague Economic Papers*, *17(2)*, 99-117. doi:10.18267/j.pep.323

Firth, M., Li, W., & Wang, S. (2013). The growth, determinants, and profitability of nontraditional activities of Chinese commercial banks. *The European Journal of Finance*, *22*, (4-6), 259-287. doi: 10.1080/1351847x.2013.791632

Fraker, G.T. (2006). *Using Economic Value Added (EVE) to Measure and Improve Bank Performance*. RMA-Arizona Chapter, Retrieved from: http://www.maaz.org/ pictures/measuringbankperformance.pdf

Frederick, N.K. (2014). Factors Affecting Performance of Commercial Banks in Uganda: A Case for Domestic Commercial Banks. *Proceedings of 25th International Business Research Conference*, 13-14 January, Cape Town, South Africa.

Gooddard, J., Molyneux, P., & Wilson, J. (2004). Dynamics of growth and profitability in banking. *Journal of Money, Credit and Banking*, *36(6)*, 1069 - 1090.

Golin, J. (2001). *The Bank Credit Analysis Handbook: A Guide for Analysts, Bankers and Investors*. John Wiley & Sons (Asia) Pre Ltd.

Guru, K., Staunton, J., & Balashanmugam, B. (2002). Determinants of commercial bank profitability in Malaysia. *Journal of Money, Credit and Banking*, *17*, 69 - 82.

Havrylchyk, O., & Jurzyk, E. (2006). *Profitability of foreign banks in Central and Eastern Europe: Does the entry mode matter?*. Bank of Finland, BOFIT Discussion Papers 5.

Herrero, A., Gavila, S., & Santabarbara, D. (2009). What explains the low profitability of Chinese banks? *Journal of Banking and Finance*, *33(11),* 2080 - 2090. doi: 10.1016/j.jbankfin.2009.05.005

Iannota, G., Nocera, G., & Sironi, A. (2007). Ownership structure; risk and performance in the European banking industry. *Journal of Banking and Finance*, *31(10)*, 2127 - 2149. doi: 10.1016/j.jbankfin.2006.07.013

IMF. (2016). retrieved from: https://www.imf.org/external/pubs/ft/weo/2016/01/weodata/weoselgr.aspx

Janković, M. (2019). Impact of financial structure on economic growth: Example of Serbia, Croatia and Slovenia, *The Annals of the Faculty of Economics in Subotica*, *55(42),* 147-162.

Jiang, G., Tang, N., Law, E., & Sze, A. (2003). *Determinants of Bank Profitability in Hong Kong. Hong Kong Monetary Authority Research Memorandum*, September. Retrieved from: http://www.hkma.gov.hk/media/eng/publication-and-research/quarterly-bulletin/qb200309/fa1.pdf

Kosmidou, K. (2007). Factors influencing the profitability of domestic and foreign commercial banks in the European Union. *Research in International Business and Finance*, 21(2), 222 – 237.

Knežević, A., & Dobromirov, D. (2016). The determinants of Serbian banking industry profitability. *Economic Research-Ekonomska istrazivanja*, *29(1)*, 459-474. doi: 10.1080/1331677X.2016.1174390

Mamatzakis, C., & Remoundos, C. (2003). Determinants of Greek commercial banks profitability, 1989-2000. *Spoudai*, *53(1)*, 84 - 94.

Molyneux, P., & Thorton, J. (1992). Determinants of European Bank Profitability; A Note. *Journal of Banking and Finance*, *16(6)*, 1173 - 1178. doi: 10.1016/0378-4266(92)90065-8

Naaborg, I., & Lensink, R. (2008). Banking in transition economies: does foreign ownership enhance profitability?. *The European Journal of Finance*, *14(7)*, 545-562. doi: 10.1080/13518470701322268

Ongore, V.O., & Kusa, G.B. (2013). Determinants of Financial Performance of Commercial Banks in Kenya. *International Journal of Economics and Financial Issues*, *3(1)*, 237 - 252.

Otuori, O.H. (2013). Influence of exchange rate determinants on the performance of commercial banks in Kenya. *European Journal of Management Sciences and Economics*, *1(2)*, 86 - 98.

Ozili, P. (2015). Determinants of Bank Profitability and Basel Capital Regulation: Empirical Evidence from Nigeria. *Research Journal of Finance and Accounting*, *6(2)*, 124 - 132.

Pejic Bach, M., Posedel, P., & Stojanovic, A. (2009). Profitability determinations of banks in Croatia. *Zbornik Ekonomskog fakulteta u Zagrebu*, *7(1)*, 81-92.

Pervan, M., Pelivan, I., & Arnerić, J. (2015). Profit persistence and determinants of bank profitability in Croatia. *Economic Research-Ekonomska istrazivanja*, *28(1)*, 284-298. doi: 10.1080/1331677X.2015.1041778

Ponce, A. (2012). What determines the profitability of banks? Evidence from Spain. *Accounting & Finance*, *53(2)*, 561-586. doi: 10.1111/j.1467-629X.2011.00466.x

Rose, P., & Hudgins, S. (2005). *Bank Management and Financial Services*, *6th Edition*. New York, McGraw-Hill.

Samad, A. (2015). Determinants Bank Profitability: Empirical Evidence from Bangladesh Commercial Banks. *International Journal of Financial Research*, *6(3)*, 173 - 179.

Saona, P. (2016). Intra- and extra-bank determinants of Latin American Banks' profitability. *International Review of Economics & Finance*, *45*, 197-214. doi: 10.1016/j.iref.2016.06.004

Staikouras, C., Mamatzakis, E., & Koutsomanoli-Filippaki, A. (2007). Operating performance of the banking industry: An empirical investigation of the South East European Region. *South-Eastern Europe Journal of Economics*, *2*, 245 - 266.

Staikouras, C., & Wood, G. (2011). The Determinants of European Bank Profitability. *International Business & Economic Research Journal*, *4(6)*, 57 - 68.

Stančić, P., Čupić, M., & Obradović, V. (2014). Influence of board and ownership structure on bank profitability: evidence from South East Europe. *Economic Research-Ekonomska istrazivanja*, *27(1),* 573-589. doi: 10.1080/1331677X.2014.970450

Stubos, G., & Tsikripis, L. (2004). *Banking Sector Developments in South-eastern Europe*. Working Paper 4.4 Global Development Network Southeast Europe (GDN-SEE).

Sufian, F., & Chong, R. (2008). Determinants of Bank profitability in a developing economy: Empirical evidence from the Philippines. *Asian Academy of Management Journal of Accounting and Finance*, *4(2)*, 91 - 112.

Sufian, F. (2011). Profitability of the Korean Banking Sector: Panel Evidence on Bank-Specific and Macroeconomic Determinants. *Journal of Economics and Management*, *7(1)*, 43 - 72.

Sutorova, B., & Teply, P. (2014). EU Banks' Profitability and Risk Adjustment Decisions under Basel III. *Ekonomicky časopis*, *62(7)*, 667 - 691.

Todorović, V., Furtula, S., & Durkalić, D. (2018). Measuring performance of the Serbian banking sector using CAMELS model. *Teme, 42(3)*, 961-977.

Vong, P. I., & Chan, H.S. (2007). Determinants of Bank Profitability in Macau. *Macau Monetary Research Bulletin*, *12(6),* 93 - 113.

Williams, B., (2003). Domestic and international determinants of bank profits: Foreign banks in Australia. *Journal of Banking & Finance*, *27*, 1185 - 1210, doi: 10.1016/S0378-4266(02)00251-0

World Bank. (2016). retrieved from: http://data.worldbank.org/indicator

УТИЦАЈ МАКРОЕКОНОМСКИХ ДЕТЕРМИНАНТИ НА ПРОФИТАБИЛНОСТ КОМЕРЦИЈАЛНИХ БАНАКА У ЦЕНТРАЛНОЈ И ЈУГОИСТОЧНОЈ ЕВРОПИ

Бранимир Калаш, Вера Мировић, Нада Миленковић, Јелена Андрашић
Универзитет у Новом Саду, Економски факултет у Суботици, Суботица,
Република Србија

Резиме

Банкарски сектор представља један од најважнијих сегмената сваке привреде. Имајући у виду да је финансијски систем одабраних земаља значајно банкоцентричан, стабилност и сигурност пословања банака представља један од фундаменталних предуслова за адекватно функционисање економије. Ефикасност банкарског сектора може се посматрати кроз мерење успешности пословања банака путем два главна показатеља, као што су поврат на имовину и поврат на капитал. Економски услови опредељују пословање банака, при чему њихова профитабилност долази до изражаја у условима економског просперитета и убрзаног развоја. У раду су испитиване макроекономске варијабле које утичу на профитабилност банака у одабраним земљама југоисточне Европе: Албанија, Босна и Херцеговина, Бугарска, Хрватска, Чешка, Мађарска, Македонија, Црна Гора, Пољска, Румунија, Србија, Словачка и Словени-

ja, у периоду 2008–2015. године. Посматрани су макроекономски агрегати као што су бруто домаћи производ, инфлација и реална каматна стопа, као најчешћи показатељи који се доводе у везу са профитабилношћу банака. Мерење профитабилности банака извршено је путем панел-модела који укључују принос на имовину и принос на капитал као две главне детерминанте успешности банака. Корелациона анализа је потврдила да је БДП позитивно повезан са приносом на имовину (РОА) и принос на капитал (РОЕ) у већини анализираних земаља, док је негативна повезаност идентификована у Босни и Херцеговини, Хрватској, Мађарској и Македонији. С друге стране, негативна корелација између показатеља профитабилности банака и инфлације утврђена је само у Албанији, Чешкој, Македонији, Црној Гори и Словачкој. На крају, позитивна повезаност између показатеља профитабилности банака и реалне каматне стопе идентификована је у Хрватској, Чешкој, Мађарској, Македонији и Пољској. Резултати панел-студије указују на то да постоји значајан ефекат БДП и ИНФ на профитабилност банака у одабраним земљама. Наиме, раст БДП и ИНФ од 1% повећава РОА за 0,47% и 0,48%, где инфлација има већи ефекат на РОА и РОЕ у односу на БДП. Резултати насумичног ефекта модела показују да раст БДП и ИНФ од 1% повећава РОЕ за 0,49% и 0,42%. Такође, реална каматна стопа нема значајан утицај на РОА и РОЕ у одабраним земљама. На основу емпиријских сазнања, творци политика треба да се усредсреде на рапидни економски раст уз контролисану инфлацију, које ће побољшати профитабилност банака у земљама централне и југоисточне Европе.