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## **Profitability Determinants of Big European Banks**

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**Abstract:** The subject of research in this paper is the profitability of the biggest banks in the European financial market, some of which operate in Montenegro. The profitability of banks is influenced by a large number of factors, including internal banking and external macroeconomic factors. The aim of this paper is to use statistical and econometric methods to examine which factors and with what intensity affect the profitability of large banks in Europe. The empirical analysis used highly balanced panel models with annual data on 47 large banks from 14 European countries over the period 2013-2018. Three static panel models were estimated and evaluated (pooled ordinary least squares, model with fixed effects and model with random effects), as well as dynamic model utilizing general methods of moments. The POLS model was chosen as the best, confirming that all macroeconomic factors have a statistically significant impact on the profitability of big banks, while the impact of internal factors, which are controlled by the bank's management, is not significant. GDP growth rate, inflation rate and market concentration have a positive effect on profitability, while the membership of the European Union has a negative impact on profit, meaning that banks with headquarters outside the EU are more profitable.

**Keywords:** bank profitability, big banks, macroeconomic variables, panel analysis, static models, GMM model

**JEL Classification:** C51, C52, C58

## 1. Introduction

The banking sector plays an important role in the economic system. As credit institutions, banks operate as intermediaries that mobilize the savings of the population and the economy, with the intention of placing them in order to make a profit. A stable and profitable banking sector is able to withstand negative shocks and maintain the stability of the financial system by providing finance for economic needs. Like other companies, banks aim to make a profit, which they make in the largest percentage on the basis of interest on loans. Given that interest rates in developed European countries are constantly falling, this should affect the decline in bank profitability. However, contrary to intuitive expectations, their profitability is still high. With this research we want to determine which factors and in what way affect the profitability of banks.

The subject of research in this paper is the profitability of the largest banks in the European financial market, some of which operate in Montenegro. Given that the profitability of banks is influenced by a large number of factors, internal banking and external macroeconomic, here we want to determine which factors and in what way affect the profitability of large European banks.

The results of this research can be significant for banks operating in our country and in the Western Balkan region because they can be used to adjust banks' business policies to improve their market position. Also, given that Montenegro is in the process of joining the European Union, this analysis will help local banks to see the patterns and prospects of profitability of large European banks in whose competitive space they will find themselves after integration.

The paper is organized as follows. A literature review is presented in the next section. The third section reviews the basic methodological issues regarding estimation and selection of relevant econometric models and data used in the analysis. The fourth section presents the empirical results and discussion. Finally, conclusions are presented in the fifth section.

## 2. Literature review

There is significant theoretical and empirical evidence on the impact that the financial development has on strengthening economic growth and development (Asanović, 2020). Financial system has still been dominated by the banking sector especially in emerging and developing markets. Hence, health, stability and

soundness of the banking sector exhibit importance for the health of all the other economic units (Yilmaz, 2019).

Profitability and the way of making a profit are among the most researched problems in the field of banking. In addition, stress scenarios play an important role in research conducted in the banking sector, i.e. risk testing that projects situations such as deep recessions and financial crises and analyse banks' ability to withstand the effects of these developments. The ability of the financial system to withstand such economic shocks and its very stability largely depends on the profitability of banks (Flamini, Mc Donald and Schumacher, 2009).

Many authors analyse the profitability of banks depending on the geographical area in which the banks make a profit, the structure and type of ownership of the bank. Also, the profitability of banks is often related to the quality of bank management, i.e. the ability of decision makers (Staikouras and Wood, 2004; Hirtle and Stiroh, 2007).

In their paper, Bucevska and Hadzi Misheva (2017) analyse the relevance of the SCP hypothesis (Structure-Conduct-Performance) and the efficiency hypothesis in order to explain the determinants of the profitability of the banking sector in the countries of the former Yugoslavia. The annual panel data on 126 banks in the period from 2005 to 2009 were used in the analysis. Three static models were formed: pooled OLS (POLS), fixed effect (FE) and random effect (RE), as well as a dynamic model utilizing generalized method of moments (GMM). By comparing static models with formal econometric tests, it was concluded that the most appropriate one was model with fixed effects (FE). After analysing the model with fixed effects, it was concluded that due to the presence of correlation, this model could not be used. Therefore, the authors specified a dynamic model with the lag of the dependent variable included in it utilizing the generalized method of moments (GMM). By analysing this model, it was concluded that banks with a comparative advantage make higher profits in the market. Profitability is expressed by two indicators: return on asset (ROA) and return on equity (ROE).

Kalluru and Bhat (2011), examining the determinants of bank profitability of Indian banks in the post-reform period, conclude that in addition to efficiency, bank profitability is influenced by internal variables and macroeconomic determinates. In the analysis they found that the type of bank ownership and industrial variables used in the model proved to be significant. The analysis was performed using panel models with fixed and random effects on a sample of 87 commercial banks over a period of 14 years.

Knezevic and Dobromirov (2016) investigated the impact of bank-specific, market-specific and macroeconomic factors on the profitability of the banking sector in Serbia in the period 2004–2011. Their results have shown that bank-specific and market-specific factors have influence on bank profitability, but macroeconomic factors do not. They found that influence of liquidity ratio and a measure of financial development on profitability of banks are in contrast in Serbia compared to EU countries.

Batten and Vo (2019) investigated the determinants of bank profitability in Vietnam. By analysing the panel data in the period from 2006 to 2014, they came to the conclusion that profitability was influenced by the size of the bank, capital adequacy ratio, risk, costs and productivity. Profitability in this paper is expressed by three indicators, ROA, ROE and Net Interest Margin (NIM) while FE and GMM models were used for analysis.

Al Arif and Awwaliyah (2019) analysed the influence of market structure on the profitability of the Islamic banking industry in Indonesia. This research used panel regression with random effect model. The result indicates that market structure - proxies by market share (MS) and concentration ratio (CR4) - does not affect profitability of the Indonesian Islamic banking industry. The empirical results show that the variables that affect profitability are the liquidity ratio (proxy by financing to deposit ratio), default rate (proxy by non-performing financing), and the operational efficiency ratio.

Filipović, Pečarić, and Sorić (2011) analysed the performance of banks in the Croatian market to identify the determinants of bank profitability. This research was conducted on a sample of the 18 largest banks in Croatia in the period 2003–2008. The analysis showed that banks with a larger market share make higher profits.

Rekik and Kalai (2018) analysed the profitability and efficiency of banking systems. Unbalanced panel data on 110 banks from 13 countries in the period 1999–2012 were used in the analysis. A model with fixed effects and a generalized method of moments were used. They implemented accounting and economic approach which gave similar results. It was estimated that banks can increase profitability by increasing the quality of capital, improving the quality of management, increasing non-interest income and bank growth.

Obamuyi (2013) analysed the determinants of bank profitability in developing countries. For the analysis, he used data on 20 banks in the period from 2006 to 2012. Models with fixed and random effects have been estimated. The Haus-

man test indicated that the model with fixed effects was most suitable for use. He concluded that the profitability of banks is affected by capital, management costs, interest rates and the economic situation in the country.

Stančić, Čupić, and Obradović (2014) investigated the impact of the structure of the Board of Directors and the ownership structure on bank profitability. An unbalanced panel data model covering 74 banks in Southeast Europe was used in the analysis. The results showed that the size of the Board of Directors negatively affects the profitability of banks. They also concluded that privately owned banks perform better than state-owned and foreign banks. Return on total assets (ROA) was used as an indicator of profitability.

In the work of Rahman and Reja (2015), a multiple regression model with fixed effects was used in the research of bank profitability. The research focused on the type of ownership of banks. They concluded that changes in profitability of banks depended on the ownership structure, as well as that the state's ownership of a bank had a significant impact on changing the bank's performance.

Iskandar, Che-Yahya and Ab Wahid (2019) surveyed the determinants of commercial bank profitability in Malaysia and concluded that credit risk, management efficiency and liquidity risk were among the most important determinants of bank profitability. It was also determined that the capital adequacy ratio does not have a statistically significant impact on the profitability of banks. A regression model with fixed effects was used in the analysis while profitability indicators were presented as ROA and ROE.

In his research, Iacobelli (2017) analysed the 16 globally largest banks with the largest market capitalization. He observed the time period from 1980 to 2015. The GMM and the fixed effects model show that the characteristics of the bank, the structure of the economy and the macroeconomic variables have a significant impact on the profitability of banks. He concludes that economic growth, inflation and productivity boost profitability, while higher credit risk reduces profitability. Iacobelli suggests that management should focus on adjusting internal factors along with accepting external ones.

There is a large body of scientific work on the profitability of the financial sector in less developed and developing countries. However, the market of developed countries is less analysed.

Staikouras and Wood (2004) classified the determinants of the profitability of European Union banks. In a sample of 685 banks, the impact of internal and external profitability factors was analysed using ordinary least squares (OLS)

and panel model with fixed effects. They proved that profitability, in addition to the ability of the bank's management to make the right decisions, is also influenced by factors from the macroeconomic environment, of which market concentration has the strongest impact. Petria, Capraru and Ihnatov (2015) study of bank profitability determinants include data on banks from all 27 EU member states in the eight-year period from 2004 to 2011. Empirical results of the analysis of internal and external profitability factors show that, among the internal factors, credit risk, management efficiency, business diversification stand out as factors that have a significant impact on bank profitability, while external factors affecting profitability are market concentration and economic growth. An interesting conclusion in this paper is that the impact of competition on profit is positive. Pasiouras and Kosmidou (2007) analyse the impact of internal and external factors on the profitability of foreign and domestic commercial banks in 15 EU countries, observing the period from 1995 to 2001. Like previous authors, they noted that in addition to internal, profitability is significantly influenced by other factors, of which the structure of the financial market and macroeconomic conditions stand out. In this study, market concentration did not prove to be statistically significant for domestic banks, unlike in the case of foreign banks.

### 3. Methodology and data

#### 3.1. Econometric methodology

The aim of this paper is to use statistical and econometric methods to examine which factors, in what way and with what intensity affect the profit of the largest banks in Europe. Based on the theoretical analysis of the determinants of profitability and previous empirical research, two sets of variables have been formulated here to test their impact on the profitability of banks. The first set consists of internal factors, i.e. variables that are under the control of the bank's management, namely the size of the Board of Directors of the bank (BS), the composition of the Board of Directors (BC), concentration of ownership (CONC), loans in relation to the bank's assets (LA), capital adequacy ratio (CAR), size of the bank (V) and bank growth (R). The second group consists of external factors, i.e. macroeconomic variables, namely the total assets of the five largest banks in relation to total bank assets in the country (BC5), the inflation rate (IR), the Herfindahl-Hirschman Index (HHI), the GDP growth rate (GGR) and the dummy variable expressing membership to the European Union (EU).

In this paper, profitability, defined as the rate of return on invested capital, is measured as Return on Equity (ROE).

Highly balanced panel models with annual data on 47 large banks from 14 European countries are used in the empirical analysis. Three static panel models were estimated, i.e. pooled ordinary least squares (POLS), the model with fixed effects (FE) and the model with stochastic or random effects (RE), as well as the dynamic model with the first lag of the endogenous variable using general methods of moments (GMM).

The selection of the best model for analysis was performed using the F-test, the Breusch-Pagan LM test, and the Hausman test. Several diagnostic tests were used to check for the assumptions regarding specification and quality of the estimated regression models. The RESET Ramsey test is implemented to check the specification of the model; the VIF test is used to test the level of multicollinearity in the models; heteroscedasticity and autocorrelation were tested by the White and Wooldridge test, respectively. The Sargent-Hansen J test was implemented to test all orthogonality condition for the over-identified GMM model.

### 3.2. Data used in the analysis

On October 10, 2019, the renowned American economic website "Business Insider" published a list of the 50 largest European banks in 2019, ranked according to total assets. The banks on that list served as a sample for this analysis. Initially, the analysis was supposed to be done on a sample of 300 observations, but for three French banks (Credit Agricole Group, Societe Generale SA and La Banque Postale SA) it was not possible to find the necessary data and they were omitted from the analysis. The annual data for the period from 2013 to 2018 were used in the analysis. A time series (T) of six years was observed, while the number of observed entities (N) was 47 in total. Therefore, the number of observations included in this panel analysis is 282 ( $N \times T$ ). This specific time period was chosen because we want to analyse the impact of determinants of profitability of the largest banks in Europe in stable economic conditions, i.e. in a period without economic fluctuations. At the same time, the analysis of this period avoids market distortion caused by the euro area crisis, when due to the inability to repay overdue debts, several member states of this area fell into a financial crisis that lasted from 2009 to the end of 2012.

Official data published in the annual reports of the analysed banks were used as the main source of data for the analysis of internal profitability factors. Those determinants on which a bank's management has a direct influence are analysed.

For the analysis of external profitability factors, official data on macroeconomic variables collected from the databases of Global Financial Development, World Development Indicators and World Integrated Trade Solution (WITS) available on the World Bank website, as well as from the website of the European Central Bank were used.

Table 1 presents the list of variables used in the empirical analysis.

**Table 1: Summary description of used variables**

Variable	Definition
Board size, BS	Number of members of the Board of Directors.
Board composition, BC	Percentage of independent members of the Board of Directors.
Ownership concentration, CONC	Percentage of the number of shares owned by the dominant shareholder.
Loans to assets, LA	The ratio of loans and bank assets.
Capital adequacy ratio, CAR	The ratio of capital and risk assets of the bank.
Size of the bank, V	Total capital of the bank.
Growth of the bank, R	Change in the total capital of the bank in a period of one year.
Bank concentration 5, BC5	Percentage share of total assets of the five largest banks in relation to total banking assets in the country.
GDP growth rate, GGR	Annual percentage change in GDP.
Inflation rate, IR	Annual percentage change in consumer price index.
Herfindahl-Hirschman Index, HHI	A measure of market concentration.
EU member country, EU	A dummy variable, which for banks from EU countries has a value of 1 and a value of 0 otherwise.
Return on Equity, ROE	Measure of the profitability of a bank in relation to its equity.

Table 2 gives the descriptive statistics of the variables.

**Table 2: Descriptive statistics**

Variable	Obs	Mean	Std.Dev.	Min	Max
Banks	282	24	13.589	1	47
Years	282	2015.5	1.711	2013	2018
BS	282	14.773	4.921	6	32
BC	282	.56	.223	.056	1
CONC	282	41.25	31.143	3.44	100
LA	282	.59	.215	.231	3.334
CAR	282	18.498	4.459	11.6	42.9
V	282	1.12e+07	4.43e+07	43720	2.52e+08
R	282	-.035	.565	-9.26	.902
BC5	235	80.902	10.666	38.057	97.601
GGR	282	1.639	1.143	-2.83	4.21
IR	282	1.231	1.757	-1.144	15.534
ROE	282	5.975	8.688	-56.06	24.3
HHI	275	765.88	547.815	245	3310
EU	282	.851	.357	0	1

Source: Authors' calculation

STATA software package, ver. 13 was used for empirical analysis and data processing.

#### 4. Empirical results and discussion

In order to test the importance of internal and external factors on bank's profitability measured as return on equity (ROE), the following model is specified:

$$ROE_{it} = \alpha + \beta_1 BS + \beta_2 BC + \beta_3 CONC + \beta_4 LA + \beta_5 CAR + \beta_6 V + \beta_7 R + \beta_8 BC5 + \beta_9 GGR + \beta_{10} IR + \beta_{11} HHI + \beta_{12} EU + u_i + e_{it}$$

Return on equity (ROE) is a linear stochastic function of explanatory variables, where  $u_i$  represent individual effects and  $e_{it}$  are residuals.

Three static models (POLS, FE and RE) were estimated on strongly balanced panel data.

Table 3 presents the results obtained by analysing static models in which the ROE profitability indicator was used as a dependent variable.

**Table 3: Results of panel regression models with dependent variable ROE**

Variable	POLS	FE	RE
BS	0.105 (0.121)	0.219 (0.310)	0.113 (0.174)
BC	-0.937 (2.712)	11.176 (8.532)	2.150 (4.042)
CONC	0.007 (0.019)	0.281* (0.154)	0.018 (0.031)
LA	3.703 (4.252)	0.752 (8.794)	3.529 (5.680)
CAR	0.089 (0.150)	0.230 (0.195)	0.139 (0.158)
V	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)
R	1.505 (1.529)	0.415 (2.832)	1.358 (1.886)
BC5	0.168** (0.076)	0.086 (0.136)	0.092 (0.090)
GGR	1.402*** (0.505)	0.283 (0.485)	0.724 (0.450)
IR	1.117*** (0.377)	-0.423 (0.461)	0.257 (0.386)
HHI	0.003* (0.001)	0.003 (0.005)	0.003 (0.002)
EU	-2.979* (1.702)		-4.201 (2.724)
_cons	-15.905** (7.343)	-29.190* (16.187)	-9.914 (9.365)
Mean dependent var.	5.715	5.715	5.715
R-squared	0.154	0.054	0.127 Overall R-squared
F-test	3.372	0.920	14.936 Chi-square
Akaike crit. (AIC)	1677.130	1506.177	0.022 R-squared within
SD dependent var.	8.846	8.846	8.846
Number of obs.	235	235	235
Prob > F	0.000	0.635	0.245 Prob > Chi2
Bayesian crit. (BIC)	1722.104	1547.692	0.210 R-squared between

Standard errors are given in parentheses \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

Source: Authors' calculation

The coefficient of determination of the POLS model indicates that 15.4% of the ROE variations are explained by this model. Based on the F test of statistical significance of the model, it is concluded that the POLS model is statistically significant.

The fixed effects (FE) model explains only 5.4% of the variations in profitability (ROE), and the F test shows that this model is not statistically significant, so we do not use it in further analysis.

It is similar with the random effects (RE) model. Because this model is not statistically significant and because no variable in it is statistically significant, this model is not used in further analysis either.

The results obtained by estimating static panel models indicated that the POLS model is the best for ROE modelling. Prior to interpreting the POLS results, diagnostic tests were conducted to check whether the model's assumptions had been met.

The normality of the residuals was tested with a Shapiro-Wilk test. The results of this test are shown in Table 4.

**Table 4: Shapiro-Wilk W test**

H0: residuals have normal distribution					
Variable	Obs	W	V	z	Prob>z
r1	235	0.78422	37.064	8.380	0.00000

Source: Authors' calculation

It is concluded that the residues do not have a normal distribution, at a significance level of 5%.

The following tables show the diagnostic tests used to test the quality of the POLS model.

A Ramsey RESET test was performed to check whether any significant variable was omitted from the model. The results of this test are shown in Table 5.

**Table 5: RESET Ramsey test**

H0: model has no omitted variables	
F (3, 219)	0.88
Prob>F	0.4503

Source: Authors' calculation

The probability of F statistics obtained by the Ramsey test is higher than the risk of error  $\alpha$  ( $\alpha = 5\%$ ), so the null hypothesis that there are no omitted variables cannot be rejected. The model is well specified.

The results of the VIF test to check for the presence of harmful multicollinearity are shown in Table 6.

**Table 6: VIF test**

Variable	VIF	1/VIF
LA	3.09	0.323692
R	2.99	0.333959
BC5	2.19	0.457478
IR	1.71	0.583404
HHI	1.66	0.603629
CAR	1.38	0.723295
GGR	1.26	0.793444
EU	1.24	0.808907
BC	1.23	0.811913
CONC	1.19	0.838916
BS	1.17	0.855081
V	1.13	0.884645
Mean VIF	1.69	

Source: Authors' calculation

In the results of this test there is no variable with a VIF coefficient greater than 10 or 1/VIF less than 0.1. Hence, there is no problem of harmful multicollinearity in the model.

With the White test, we check whether the variance of the random error is constant on the whole sample, i.e. whether the errors in the model are homoscedastic. The results of this test are presented in Table 7.

**Table 7: White's test**

H0: homoscedasticity	
Chi2 (8)	93.21
Prob>chi2	0.3593

Source: Authors' calculation

The probability of the Chi square of the statistics obtained by the White test is higher than the risk of error  $\alpha$  ( $\alpha = 5\%$ ), so we cannot reject the null hypothesis, which confirms that the errors in the model are homoscedastic.

The POLS model does not take into account the temporal, but only the spatial dimension and therefore the Wooldridge test was not conducted to check for the existence of autocorrelation of random errors.

After static panel models the analysis of profitability determinants was also done by applying a dynamic panel model estimated by the method of generalized moments (GMM). For this purpose, a model was specified in which, in addition to the already used internal and external profitability factors, the variable  $L.ROE_{it}$  was included representing the first lag of  $ROE_{it}$  value.

$$ROE_{it} = \alpha + \beta_1 L.ROE + \beta_2 BS + \beta_3 BC + \beta_4 CONC + \beta_5 LA + \beta_6 CAR + \beta_7 V + \beta_8 R + \beta_9 BC5 + \beta_{10} GGR + \beta_{11} IR + \beta_{12} HHI + u_i + e_{it}$$

By applying the Arellano-Bond/Blundell-Bond model with robust standard errors and Hackman correction, the following results were obtained:

**Table 8: Results of the Arellano-Bond / Blundell-Bond dynamic regression model**

ROE	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
L.ROE	0.320	0.115	2.77	0.006	0.094	0.546	***
BS	0.495	0.523	0.95	0.344	-0.530	1.520	
BC	25.704	14.834	1.73	0.083	-3.369	54.778	*
CONC	0.340	0.124	2.75	0.006	0.097	0.582	***
LA	-14.451	13.510	-1.07	0.285	-40.930	12.027	
CAR	0.914	0.328	2.79	0.005	0.271	1.557	***
V	0.000	0.000	-0.29	0.774	0.000	0.000	
R	-4.281	4.189	-1.02	0.307	-12.492	3.930	
BC5	0.108	0.190	0.57	0.571	-0.265	0.480	
GGR	1.312	1.012	1.30	0.195	-0.671	3.296	
IR	0.387	0.543	0.71	0.476	-0.677	1.450	
HHI	0.003	0.006	0.56	0.576	-0.008	0.015	
Constant	-54.201	23.407	-2.32	0.021	-100.079	-8.324	**
Mean dependent var		5.849		SD dependent var		9.102	
Number of obs		188.000		Chi-square		32.570	

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Source: Authors' calculation

Validation of instruments is performed using the Sargan – Hansen J test, in which the null hypothesis implies that the instrumental variables are uncorrelated with the residuals, in which case they represent acceptable instruments.

Table 9 shows the results of the Sargan-Hansen J test.

**Table 9: Sargan-Hansen J test**

H0: overidentifying restrictions are valid	
J stat.	29.16523
Prob (J stat.)	0.0003

Source: Authors' calculation

The Sargan-Hansen J test for over-identification restrictions shows that instruments are not valid. By applying the GMM model in this analysis, we did not get significant results and therefore we could not use this model.

The results of econometric tests showed that it is best to use the POLS model for our analysis. The results obtained with this model show that from the set of selected variables, five out of a total of 12 variables have a statistically significant impact on profitability. The GDP growth rate has a very strong and positive impact on banks' profitability. This indicates that there is a strong link between economic growth and bank profitability. Also, there is a strong and positive link between banks' profitability and the inflation rate, so we conclude that inflation forecasts were accurate and that banks took certain measures to adjust their policies to inflation and thus achieve higher profits. In addition to these two factors, market concentration factors BC5 and HHI have a positive impact on profitability, while a dummy variable representing affiliation with the European Union has a negative impact. The statistical significance of market concentration indicators shows that larger banks make higher profits. The negative sign of the factor that represents membership to the European Union shows that banks with headquarters outside the EU make higher profits. Therefore, we conclude that the profitability of banks is affected by all macroeconomic factors used in the model.

The results of the research are in contradiction with the results obtained by Bucevska and Hadzi Misheva (2017). According to these authors, the variable that shows the significance of market concentration is not statistically significant, so they conclude that business efficiency (comparative advantages) has a greater impact on profitability. Also, they concluded that neither the inflation rate nor the GDP growth rate proved to be significant for bank profitability. The differences in the conclusions can be attributed to the difference in the size of the banks that were included in the analysis as well as the different methodological frameworks used in the analysis because the authors used a dynamic GMM model. Unlike Bucevska and Hadzi Misheva, Flamini, Mc Donald and Schumacher (2009) analysing the profitability of banks in sub-Saharan Africa in the period from 1995 to 2006, note that low inflation and stable GDP growth positively boost bank

profitability. These results are confirmed by the analysis conducted in this paper. In addition to macroeconomic factors, they found that credit risk, bank size, and private ownership of the bank also had a positive effect on return on total assets. Internal factors that have proven to be significant in the analysis of the profitability of sub-Saharan African banks are not included in the model used in the analysis of the profitability of large European banks. The results of the conducted research are also in contradiction with the conclusions reached by Iacobelli (2017). In his analysis of the world's largest banks, he concludes that internal factors have a stronger impact on bank profitability than macroeconomic factors. However, the impact of macroeconomic variables is not negligible either because in his research it has been proven that the GDP growth rate and inflation encourage the profitability of banks. The biggest impact on profitability, according to this author, has credit risk, the growth of which negatively affects the profitability of the bank. Staikouras and Wood (2004) investigate the determinants of bank profitability in the European Union. They note that profitability depends not only on the decisions of the bank's management but also on external factors. The authors find a positive effect of market concentration on the profitability of banks in the EU countries. As in the research of Staikouras and Wood, the importance of market concentration for the profitability of banks in the European Union is confirmed in this paper as well.

## 5. Conclusion

Profitability, being a key aspect of business efficiency, is especially important when observed in the context of banks because they, as financial intermediaries, play a very important role in the economic system. The analysis of banks' profitability is important, not only for banks' management in monitoring the results and setting goals at the bank level, but also to the regulatory authorities whose activities keep the banking sector stable.

In this paper, hypotheses on the significance of the impact of macroeconomic and internal factors on the profitability of the largest banks in Europe were tested, using econometric models with the dependent variable return on equity (ROE) as a measure of profitability. Unlike other relevant papers, this paper designed an econometric model in which a combination of internal and external profitability factors of large banks was performed. Also, factors that stimulate the profitability of big banks and thus ensure the stability of the credit and monetary system of the European Union have been identified. So far, the profitability of large banks has been tested mainly on small samples, while in this paper the profitability of large European banks has been tested on a large sample of 47 banks.

The estimated model confirmed that all macroeconomic factors are relevant, i.e. they have a statistically significant impact on the profitability of large banks, while the impact of internal factors, which are under the control of the bank's management, is statistically insignificant. It has been shown that membership to the European Union has a negative and significant impact on profitability, which means that banks headquartered outside the EU are more profitable. All other external factors have a positive impact on profitability.

Big banks, unlike small ones, are of special importance for economic research because they are too large to allow the so-called “too-big-to-fail” effect. Due to their size, they have a critical impact on the financial and monetary stability of a country. Practice has shown that large banks, in case of illiquidity, are most often bailed out by budget funds, i.e. taxpayers' funds. Any spending out of the budget to bail out big banks can have serious socioeconomic consequences. It is in this fact that the importance of continuous research on the determinants and sustainability of the profitability of big banks lies.

This research provided answers to some questions related to the profitability of large banks, and recommendations for further research are numerous. Such an analysis could be conducted in different countries individually or in a specific group of countries. An analysis of the determinants of bank profitability in Central and Eastern European countries, for example, would be important because these are developing countries that have been experiencing visible economic progress.

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