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Banks Profitability Indicators in CEE Countries

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***Abstract*—**The aim of the present article is to determine the impact of the external and internal factors of bank performance on the profitability indicators of the CEE countries banks in the period from 2006 to 2012.

On the basis of research conducted abroad on bank and macroeconomic profitability indicators, in order to obtain research results, the authors evaluated return on average assets (ROAA) and return on average equity (ROAE) indicators of the CEE countries banks. The authors analyzed profitability indicators of banks using descriptive methods, SPSS data analysis methods, as well as data correlation and linear regression analysis.

The authors concluded that most internal and external indicators of bank performance have no direct influence the profitability of the banks in the CEE countries. The only exceptions are credit risk and bank size, which affect one of the measures of bank profitability – return on average equity.

***Keywords*—**Banks, CEE countries, Profitability ROAA, ROAE.

I. Introduction

THE banking system is an important area influencing economic development of any country. Its practical importance is determined by the way in which payments and settlements function in the national system. Banks, operating in accordance with the national monetary policy, exert control over cash flow, which affects their turnover, emission, including ready cash amounts in circulation.

The issue of bank profitability and performance efficiency has been widely discussed in the scientific literature, it has also been considered in a number of theoretical and empirical researches of different kind. Return on average assets (ROAA) and return on average equity (ROAE) have always been mentioned among the main indicators characterizing bank performance and profitability.

Scientists from many countries have used linear regression models in order to determine bank profitability and the indicators affecting profitability, as well as mean values of the indicators for the periods of research [1]–[4].

The aim of the present article is to determine the impact of the external and internal factors of bank performance on the profitability indicators of the CEE countries banks in the period from 2006 to 20112.

To achieve the goal the following research methods were used: quantitative and qualitative methods, including correlation and regression analysis results, monographic and descriptive method.

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II. Literature Review

Bourke (1989) was one of the first who discovered that exactly the internal factors of bank performance, such as net income before and after tax against total assets and capital and reserves factors, have the greatest impact on profitability indicators [5]. Bourke (1989) also stressed that profitability indicators are influenced by internal and external factors [5]. Kosmidou et al. (2006) and Goddard et al. (2004), hold similar opinion [6], [7]. For example, Rasiah et al. (2010) in his research list the following internal factors influencing profitability: asset portfolio mix, loans and interest income, investments, non-interest income earning assets, total expenses, operating expenses, personnel expenses, liability composition, deposit composition, liquidity ratios, capital structure. External factors comprise regulations, inflation, interest rates, short and long terms effects of interest rates on assets, market share, market growth, firm size [8]. In their turn, Gul et al. (2011) mention size, capital, loans, and deposits as internal factors influencing profitability of the bank, and GDP and inflation as external factors [9].

The studies conducted in the USA and Europe demonstrate that a great concentration of banks and financial institutions surpass profitability [10], [11]. Ramlall (2009) has discovered a positive correlation between bank size and profitability: the bigger is the bank, the more profitable it is in comparison with a smaller bank due to economies of scale [12]. In contrast, Kosmidou (2008) states that large size of the banks may leave a negative impact on bank profitability [13], and Luo (2003), Hannan and Prager (2009) note that small banks can earn higher profit because they have lower expenses and better performance efficiency [14], [15]. At the same time, Sayilgan and Yildirim (2009) maintain that bank liquidity declines along with the growth of the number of debtors and interest rate increase [16]. Other studies, which address profitability, discuss positive operational efficiency. Kosmidou (2008) states that profitability grows along with the increase of the operational efficiency [13], in their turn, Berger et al. (2000) correlate it with routine practical activities of an enterprise [17].

III. Methodology

Determining the indicators affecting bank profitability, the authors have analyzed and summarized the findings made by numerous foreign scientists. The results are presented in Table I.

TABLE I
STUDIES CONDUCTED BY FOREIGN AUTHORS ON BANK PROFITABILITY

Author(s)	Information on the study
Pasiouras and Kosmidou (2007) [18]	The study was conducted at 584 commercial banks, which operated in the EU countries in the period from 1995 to 2001. Indicators used – return on average total assets of the bank; internal – capital adequacy, cost to income ratio, loans to customers and short term funding, accounting value of the bank's total assets; external – annual inflation rate, real gross domestic product growth, C5 concentration, total assets of the deposit money banks divided by the GDP, ratio stock market capitalization to total assets of the deposit money banks, ratio stock market capitalization to GDP [18].
Athanasoglou et al. (2008) [1]	The study was conducted on the banking sector of Greece in the period from 1985 to 2001. Indicators used – return on average assets, return on average equity, capital, credit risk, productivity growth, operating expenses management sizes, ownership, concentration; macroeconomic – inflation expectations, cyclical output. [1].
Kanas et al. (2012) [19]	The study was conducted at commercial banks in the USA in the period from the first quarter of 1988 to the first quarter of 2011. Indicators used – return on average assets, return on average equity, business cycle, monetary policy, inflationary expectations, bank loan portfolio, diversification, credit risk, inflation, capital, financial structure [19].
Bolt et al. (2012) [20]	The study was conducted at 17 commercial banks operating in Europe, New Zealand, and the USA in the period from 1979 to 2007. In order to determine profitability indicators such aggregate and individual bank indices as profit before tax, net interest income, other income, loan losses and costs, loans, deposits, other net interest bearing liabilities were used [20].
Lee and Hsieh (2013) [21]	The study was conducted at 42 banks in the Asian countries in the period from 1994 to 2008. Indicators used – return on average assets, return on average equity, net interest margin, net interest revenue against average assets, variance of ROAA, variance of ROAE, loan loss reserves, equity to total assets, loan loss reserve to gross loans, net loans to total assets, liquid assets to customer and short-term deposits, inflation, GDP growth rate, domestic credit to private sector, real interest rate, capital requirements [21].

Based on the studies abroad [1], [18]-[21], in order to determine bank profitability indicators, namely, ROAE and ROAA of the banks in the CEE countries, the authors used internal indicators of bank performance such as capital, credit risk, total loans, net interest margin, bank size, and external indicators such as GDP and annual inflation. The listed bank performance indicators and their abbreviations are given in Table II.

TABLE II
BANK PROFITABLITY INDICATORS

Indicator used	Calculation method	Expected result
Return on average assets (ROAA)	Net profits before tax/ assets	-
Return on average equity (ROAE)	Net profits before tax/ equity	-
	Internal indicators	
Capital (CA)	Equity / total assets	Positive
Credit risk (CR)	Loan loss provisions/ net interest revenue	Negative
Total loans (TL)	Net loans/ total assets	Positive
Net interest margin (NIM)	Net interest revenue/ total assets	Positive
Size (S)	By total assets % from all banks in each country	Positive
	(External indicators)	
Gross Domestic Product (GDP)	GDP in comparable prices	Positive
Annual inflation (INF)	Changes in consumer prices in 12 months on average compared to the previous 12 months period	Positive

The authors study Bulgaria, Czech Republic, Cyprus, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Romania, Slovakia and Slovenia as representative countries of Central and Eastern Europe. All countries mentioned joined the European Union in 2004, except Bulgaria and Romania, which joined in 2007. The number of banks operating in the respective CEE countries in the period analyzed is presented in Table III.

TABLE III
CEE COUNTRIES BANKS, OBSERVATIONS

	Observations by year						
Country	2006	2007	2008	2009	2010	2011	2012
Bulgaria	22	19	23	23	25	26	24
Czech Republic	27	30	33	37	36	37	33
Cyprus	20	24	24	21	21	18	10
Estonia	8	8	7	7	9	9	8
Hungary	36	37	36	36	34	29	27
Latvia	20	20	19	20	21	20	21
Lithuania	10	10	10	11	11	11	9
Malta	12	13	14	14	16	17	15
Poland	38	39	47	50	50	50	41
Romania	26	26	27	29	29	28	22
Slovakia	15	19	21	19	18	16	15
Slovenia	20	21	21	25	23	23	20

To calculate bank performance profitability indicators of the CEE countries banks, the authors used the data from the data bases Bankscope and Eurostat for the time period from 2006 to 2012.

The data considered in the present research have been analyzed using such research methods as descriptive statistic, SPSS data analysis methods, data correlation and linear regression analysis.

IV. RESEARCH DATA

Descriptive statistical variables are summarized and presented in Table IV, which shows the mean, minimum and maximum values for each variable, as well as the standard deviation. As shown by the data, the return on average equity (ROAE) at the CEE countries banks in the period from 2006 to 2012 increased by 6.71%, while return on average assets (ROAA) was 0.25%, which can be explained by the fact that the crisis in the European Union had an impact on the financial system starting from 2008. The capital was 12.32%, credit risk 35.56%, total loans 57.25%, net interest margin 3.45%, bank size 4.38%, inflation 0.45 and gross domestic product (-) 0.61%. Considering the descriptive statistic data it can be noticed that despite the experienced financial crisis in

Europe, the CEE countries banks managed to sustain internal bank performance indicators at a sufficiently high level.

TABLE IV
INDICATORS OF CEE BANKS ACCORDING TO DESCRIPTIVE STATISTICS

Indicators	Mean	Min	Max	Std. dev.
ROAA	6.71	-4.25	16.72	7.56
ROAE	0.25	-0.73	1.69	0.87
CA	12.32	11.49	12.91	0.50
CR	35.56	11.08	66.07	19.36
TL	57.25	53.65	60.52	2.13
NIM	3.45	2.97	4.03	0.42
S	4.38	0.01	80.57	7.54
INF	0.45	-4.50	12.50	2.17
GDP	-0.61	-8.5	8.00	2.16

The authors conducted correlation analysis to determine the factors that affect bank profitability in the CEE countries. The correlation data summarized in Tables V and VI show that there is a strong negative correlation among ROAA, ROAE and CR, and a moderate correlation between ROAA and CA, ROAA and NIM, ROAA and S, ROAA and GDP, ROAE and NIM, ROAE and S, ROAE and GDP.

TABLE V
CORRELATION DATA ON INTERRELATIONSHIPS BETWEEN ROAA IN CEE COUNTRIES BANKS

	ROAA	CA	CR	TL	NIM	S	GDP	INF
ROAA	1							
CA	0.41	1						
CR	-0.83	-0.44	1					
TL	-0.60	-0.05	0.45	1				
NIM	0.51	0.08	-0.72	-0.21	1			
S	0.67	0.34	-0.51	-0.69	0.19	1		
GDP	0.54	0.73	-0.79	-0.08	0.56	0.09	1	
INF	-0.40	-0.26	-0.18	0.26	0.49	-0.41	0.26	1

TABLE VI
CORRELATION DATA ON INTERRELATIONSHIPS BETWEEN ROAE IN CEE COUNTRIES BANKS

	ROAA	CA	CR	TL	NIM	S	GDP	INF
ROAA	1							
CA	0.03	1						
CR	-0.80	-0.44	1					
TL	-0.44	-0.05	0.45	1				
NIM	0.63	0.08	-0.72	-0.21	1			
S	0.42	0.34	-0.51	-0.69	0.19	1		
GDP	0.43	0.73	-0.79	-0.08	0.56	0.09	1	
INF	-0.09	-0.26	-0.18	0.26	0.49	-0.41	0.26	1

As it can be concluded analyzing the data in Tables V and VI, NIM, S and GDP can affect both bank profitability indicators, however, CA may influence only one profitability indicator – ROAA. The authors have also concluded that the correlation among the variable bank performance indicators is not strong, which indicates that there is either multicollinearity amid these indicators or there is no data correlation at all. Kennedy (2008) in his study on indicator correlation has discovered that the multicollinearity problem is observed only when the correlation is over 0.80 [22]. Based on the findings by [22], the authors have concluded that there are linear correlations among profitability and internal and external indicators of bank performance in the CEE countries banks.

On the basis of the previously described statistics and correlation data, the authors have developed four types of multifactor linear regression analysis models, which comprise all internal and external bank performance indicators as variables, and ROAA and ROAE as resultant variables.

Table VII features a liner regression among ROAA and internal indicators of bank performance, the Durbin-Watson test index is 2.138

TABLE VII
RETURN ON AVERAGE ASSETS (INTERNAL INDICATORS) –LINEAR REGRESSION ANALYSIS

	Non-standardized coefficients		Standardized coefficients		
Model	B	Std. Error	Beta	t	Sig.
(Constant)	-5.115	5.634		-.908	.399
CA	.104	.206	.467	.504	.632
CR	-.044	.043	-.681	-1.033	.342
TL	.088	.054	.839	1.632	.154
NIM	-.047	.149	-.091	-.318	.761
S	.154	.197	.461	.780	.465

Table VIII shows the linear regression analysis of return on average assets as an external indicator. The Durbin-Watson test index is 2.158.

TABLE VIII
RETURN ON AVERAGE ASSETS (EXTERNAL INDICATORS) –LINEAR REGRESSION ANALYSIS

	Non-standardized coefficients		Standardized coefficients		
Model	B	Std. Error	Beta	t	Sig.
(Constant)	-0.121	0.922		-1.230	0.322
INF	0.198	0.191	0.212	0.452	0.230
GDP	0.331	0.014	0.690	1.012	0.121

Table IX shows the linear regression analysis of return on average equity as an internal indicator. Durbin-Watson test was also used on the obtained data, the index is 2.237.

TABLE IX
RETURN ON AVERAGE EQUITY (INTERNAL INDICATORS) –LINEAR REGRESSION ANALYSIS

	Non-standardized coefficients		Standardized coefficients		
Model	B	Std. Error	Beta	t	Sig.
(Constant)	68.422	56.631		1.208	.272
CA	-4.014	2.074	-1.705	-1.935	.101
CR	-1.067	.429	-1.556	-2.485	.048
TL	-.018	.544	-.016	-.033	.975
NIM	.837	1.495	.153	.560	.596
S	5.233	1.979	1.486	2.645	.038

Table X shows the linear regression analysis of return on average equity as an external indicator. The Durbin-Watson test index is 2.483.

TABLE X
RETURN ON AVERAGE EQUITY (EXTERNAL INDICATORS) –LINEAR REGRESSION ANALYSIS

Model	Non-standardized coefficients		Standardized coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	9.102	13.446		.677	.515
CA	.286	2.962	.033	.097	.925
CR	-.833	2.509	-.113	-.332	.748

The coefficients summarized in Tables VII to X demonstrate that p-values of coefficients of the variables included in the linear regression equations (CR and S) are smaller than 0.05, thus with a 95% probability the given coefficients are different from 0. Therefore, the authors conclude that CR and S may positively affect such bank profitability indicator as ROAE. In turn, using the Durbin-Watson statistic with the number of observations – 12, the number of factors – 7, the lower bound for the critical value $D_L = 0.17$ and the upper bound $D_U = 3.15$, it can be concluded that there is autocorrelation in all models.

Having analyzed the obtained data and having reviewed the scientific literature, studying bank profitability it is necessary to establish data correlations. For example, Alexiou and Sofoklis (2009) found the correlation between ROAE and GDP and also discovered when both these indicators can ensure profitability [23]. The same can be said about ROAA and external indicators of bank performance. In the literature on the subject the cases when internal indicators such as credit risk can influence ROAE have also been discussed. Researchers from Tunisia suggest that when there is a positive autocorrelation between ROAA and internal and external indicators, there is the same correlation with ROAE, and they can influence profitability.

V. CONCLUSION

Profitability is an important criterion for assessing operational efficiency of banks in the changing financial environment. In the present research the authors have found interconnection between bank profitability and internal and external indicators in the CEE countries banks in the period from 2006 to 2012.

On the basis of the obtained results, the authors conclude that internal and external bank performance indicators may not affect the profitability of CEE countries banks directly, except such indicators as credit risk and bank size, which influence one of the bank profitability indexes – return on average equity.

Considering the changes in macroeconomic indicators, the banks should be able to anticipate potential crises in order to avoid negative consequences on the bank profitability indicators. This issue is topical not only for researchers but also for the bankers themselves, including bank management and shareholders. In future research the author intends to perform comparison of profitability of the banks in the entire European Union to find the links that exist between the foreign financial systems.

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