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Scientific Annals of the "Alexandru Ioan Cuza" University of Iaşi Economic Sciences 62 (1), 2015, 93-101 DOI 10.1515/aicue-2015-0007

DETERMINANTS OF BANK'S PROFITABILITY IN EU15

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Abstract

In this paper we analyse determinants of bank profitability of EU15 banking systems for the period 2001-2011. We use as proxy for banks profitability the return on average assets (ROAA), the return on average equity (ROAE) and net interest margin (NIM). We also measure the impact of the first and the largest wave of enlargement (10 new members in 2004) on EU15 bank profitability, introducing a dummy variable. The contribution of this paper for the empirical literature is that there are no other studies that deal bank profitability for all EU 15 countries for the period considered (2001-2011). The literature splits the factors that influence banks' profitability in two large groups: bank-specific (internal) factors and industry specific and macroeconomic (external) factors. Our results are in line with the economic theory. Cost to Income Ratio, credit risk and market concentration had a negative influence in case of all measures of banks' profitability, while bank liquidity only for ROAE and NIM. The size of banks had a negative impact on NIM, suggesting that bigger the bank is, smaller the net interest margin ratio is, but, on the contrary, in case of ROAA, had a direct effect. The market concentration had a negative influence, meaning that the increasing competition, as a structural point of view, increases banks' profitability. The results show us that the process of European Union enlargement from 2004 does not have significant impact on EU15 banking systems' profitability. It has a week and negative effect only in case of net interest margin. As policy recommendations, we suggest for authorities a better supervision for credit risk and liquidity and maintaining a competitive banking environment. For banks' management we also recommend to monitor the credit risk indicators, optimizing costs and diversifying the sources of income.

Keywords: determinants of banks' profitability, EU enlargement, EU15

JEL classification: G21, C14

1. INTRODUCTION

During the integration process, the European banking systems have encountered major changes, especially in terms of bank performance. At the beginning, the European Union was formed by 15 countries. After three successive wave of enlargement (2004, 2007, 2013) it has

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currently 28 members. The new member accession had influenced the bank performances of EU15 though many ways. For example, some EU15 banks took advantage of single market passport and opened branches and/or subsidiaries on the new members' markets.

The aim of this paper is to extent earlier work on the determinants of profitability of banks in the EU and examine to what extent the performance of commercial banks operating in EU15 markets was influenced by the first wave of enlargement. Thus, we can see if the enlargement process was opportune or not for the banks of old EU members.

In this paper we assess determinants of bank profitability measured by three proxies, namely return on equity, return on assets and net interest margin for EU15 banking systems for the period 2001-2011. We also try to measure the impact of the first and the largest wave of enlargement (10 new members in 2004) on EU15 bank profitability.

The rest of the paper is organized as follows: section 2 shortly reviews the literature regarding the determinants of banks profitability in EU, section 3 presents the methodological approach adopted, while section 4 the results and the discussion. In section 5, the conclusions are drawn.

2. LITERATURE REVIEW

The literature on the determinants of bank profitability is large. Studies that investigate bank performance determinants are country specific, while others have focused on a panel of countries. Some of these papers assessed bank profitability determinants for European banks. Molyneux and Thorton (1992), being the first that examined the determinants of banks profitability, demonstrate that there is a significant positive association between the return on equity and the level of interest rates, bank concentration and government ownership. They examine the profitability of banks in 18 European countries during the period from 1986 to 1989. Saunders and Schumacher (2000) analyze the bank interest rate margins in six European countries, finding that bank market structure, interest rate volatility and bank capitalization matter for the spreads. Goddard *et al.* (2004) assess the profitability of European banks from 6 countries during the period from 1992 to 1998. Their results demonstrate a positive relationship between bank profitability and risk and, in the same time, an insignificant impact of the bank size on profitability. Staikouras and Wood (2003) investigate the performance of a sample of banks operating in thirteen EU banking markets over the period 1994–1998. Their results indicate that return on assets is inversely related to loans to assets ratio and the proportion of loan loss provisions, as well as that banks with greater levels of equity and funds gap ratio are relatively more profitable. Abreu and Mendes (2011) examine Portugal, Spain, France and Germany and find that loan to assets and equity to assets ratios positively determine interest margins and profitability. Pasiouras Pasiouras and Kosmidou (2007) split the investigation of determinants of banks' profitability in commercial domestic and foreign banks operating in the 15 EU countries over the period 1995–2001. They found that profitability of both domestic and foreign banks is affected not only by bank's specific characteristics but also by financial market structure and macroeconomic conditions. Mamatzakis and Remoundos (2003) examine the determinants of the performance of Greek commercial banks over the period 1989-2000. They found that profits are mainly explained by the financial ratios. They also observed that economies of scale and money supply significantly influence profitability. Kosmidou (2008) also examines the determinants of performance of Greek banks, but during the period from 1990 to 2002. He assesses an unbalanced pooled time series dataset of 23 banks. Their

results show that money supply growth has no significant impact on profits. On the other hand, bank assets to GDP ratio, stock market capitalization to bank assets ratio and concentration are all statistically significant and have negative impact on ROAA.

There are some papers that investigate determinants' of bank profitability in Europe during the present financial crisis. Beltratti and Stulz (2012) investigate the determinants of the relative stock return performance of large banks across the world during the period from the beginning of July 2007 to the end of December 2008. In their sample there are 16 European banks. They found the better-performing banks had less leverage and lower returns immediately before the crisis and no correlation between differences in banking regulations across countries are generally and the performance of banks during the crisis, with the exception of those large banks from countries with more restrictions on bank activities performed better and decreased loans less. Bolt *et al.* (2012) study the relation between bank profitability and economic activity in 17 OECD countries (14 of them European countries). They found larger impact of output growth on bank profitability than commonly found in the literature during the crises. Also, the loan losses are the main factor of influencing the banks' profits. Dietrich and Wanzenried (2011) analyze the profitability of 372 commercial banks in Switzerland over the period from 1999 to 2009 in order to evaluate the impact of the recent financial crisis. Their estimation results confirm findings from former studies on bank profitability in case of Swiss banking system. Also, the paper shows some evidence that the financial crisis did indeed have a significant impact on the Swiss banking industry and on bank profitability in particular. Berger and Bouwman (2013) show that capital enhances the performance of medium and large banks primarily during banking crises.

The present study attempts to provide additional and more recent evidence on the determinants of banks profitability in the EU15, including more recent years in the analysis by examining the period 2001–2011 and estimating the implication of the first wave of enlargement (2004) on banks' profitability of EU old members.

3. METHODOLOGY AND DATA

In this study we estimate the impact of determinants of bank performance on bank profitability of EU15 banking systems. In this order, we measure the impact of the first wave of enlargement on bank profitability. We use as proxy for bank profitability three ratios: the return on average equity (ROAE), computed as a ratio of the net profit to equity and the return on average assets (ROAA), computed as a ratio of the net profit to the bank's average assets and the net interest margin (NIM), computed as a ratio of the difference between interest income and interest expense to the total assets of the bank.

We consider three categories of independent variables: bank-specific (internal) variables (bank size, financial structure, credit risk taken, liquidity risk, business mix, income-expenditure structure and capital adequacy); industry specific (market concentration, financial intermediation etc.) and macroeconomic (external) variables (e.g. economic growth and inflation). After we estimate the influences of variables described, we introduce a "first wave of enlargement" dummy variable for the period from 2004 to 2011.

The bank specific variables are from the Bankscope database, the data for HHI were supplied by ECB Statistical Data Warehouse and growth and inflation series were downloaded from the World Bank database.

Table 1 describes the variables used in this paper.

Table no. 1 – Variables description

Symbol	Variables	Proxy
Dependent Variables		
ROAA	Return on Average Assets	Net profit/ Average Asset
ROAE	Return on Average Equity	Net profit/ Average Common Stock Equity
NIM	Net interest margin	Difference between interest income and interest expense/Total assets of the bank
Independent Variables		
Bank specific factors (internal):		
size	Bank Size	Logarithm of Total Assets (log)
adequacy	Capital Adequacy	Equity / Total Assets
crisk	Credit Risk	Impaired Loans(NPLs)/ Gross Loans
efficiency	Management Efficiency	Cost to Income Ratio
lrisk	Liquidity Risk	Loans/ Customer Deposits
busmix	Business Mix indicator	Oth Op Inc / Avg Assets
Banking system specific factors (external):		
hhi	Market Concentration	Herfindhal-Hirschman Index
Macroeconomic factors (external):		
inflation	Inflation	Inflation, GDP deflator (annual %)
growth	Economic Growth	GDP per capita growth (annual %)

In order to avoid the selection bias, we included all the available data in our dataset for the UE15 countries in the selected period. The panel consists of 386 banks. We presented the descriptive statistics of all the data series in Table 2. The sample means are greater than zero for all variables. In terms of standard deviations the volatility is very high in the case of ROAE and much smaller in the case of ROAA and NIM. Regarding the regressors, the volatility is high in the case of efficiency, credit risk, liquidity risk, adequacy and business mix proxies. The volatility description is enhanced by the minimum and maximum values. In the case of very volatile variables, there is a very large difference between the extreme values (e.g., for the ROAE varies between -992.29% and 924.56%).

Table no. 2 – Descriptive statistics of data series

Variable	Observations	Mean	Std. Dev.	Min	Max
ROAE	6259	6.124216	29.70486	-992.29	924.56
ROAA	6281	0.6266317	4.653217	-116.578	185.572
NIM	6248	2.369951	2.744409	-36.272	80
size	6304	14.23854	2.297257	3.396988	21.51282
efficiency	6162	68.04987	44.01312	0	831.111
crisk	2163	4.99902	6.571192	0	100
lrisk	5490	126.4765	137.3773	-641.96	994.6
hhi	9482	0.0643184	0.0508247	0.0158	0.37
inflation	9119	2.098526	1.301417	-4.064806	7.629707
growth	9119	0.7881813	2.333636	-8.974979	5.652283
adequacy	6281	12.89105	16.54977	-44.444	100
busmix	6242	2.738473	13.69453	-6.911	912.343

We estimate the following equation:

$$Y = X_1\beta_1 + X_2\beta_2 + X_3\beta_3 + \alpha + \varepsilon \quad (1)$$

where:

- Y stands for the dependent variables ROAA, ROAE or NIM;
- X_1 is a vector of bank internal factors;
- X_2 is a vector of banking sector factors;
- X_3 is a vector of macroeconomic variables;
- α is the bank-specific intercept;
- ε is the error term;
- β_i is the matrix of variable coefficients.

Considering that this study focuses on 15 countries for 11 years, there is highly probable that bank specificity plays an important role in the estimations. Thus, we compute the estimations with bank - fixed effects and robust estimators to heteroskedasticity and autocorrelation.

After the introduction of the dummy variable for first wave of enlargement in 2004, the equation becomes:

$$Y = X_1\beta_1 + X_2\beta_2 + X_3\beta_3 + \beta_4 enlyear + \alpha + \varepsilon \quad (2)$$

where:

- "enlyear" is the dummy variable for first wave of enlargement in 2004

4. RESULTS AND DISCUSSIONS

The results of estimations (excluding the influences of first wave of EU enlargement) are exhibited in Table 3 and synthesized in Table 4.

Cost to income ratio, credit risk and market concentration had a negative influence in case of all measures of banks' profitability, while bank liquidity only for ROAE and NIM (in case of ROAA the results are statistically insignificant). The effect seems to be stronger in case of ROAE. The coefficient of cost to income ratio has the expected sign, as the efficiency of the bank enhances the profitability (Dietrich and Wanzenried, 2011). The bank size matters only in case of ROAA (positive impact) and NIM (negative impact). The literature is ambiguous regarding the impact of this variable. On one hand, economies of scale and reduced risk due to investment diversification may increase performance, but on the other hand very large banks are bureaucratic organizations with increased costs that affect performance (Pasiouras and Kosmidou, 2007). The business mix had direct relationship with ROAA and ROAE, but an inverse one with NIM. Also, the profitability is larger as the bank activity is more diversified. The liquidity proxy, Loans/ Customer Deposits, negatively impacts on bank profitability, except ROAA, where the results are statistically irrelevant. The liquidity-profitability relation is inverse: a high liquidity means the resources have been invested with low risk, that is low profitability. The effect of the macroeconomic variables is positive and statistically significant, but only for ROAE and ROAA. The impact is stronger in case of ROAE.

Table no. 3 – Regression statistics

	(1)	(2)	(3)
	ROE	**ROA**	**NIM**
Total Assets (log)	0.921 (5.617)	**0.522***** **(0.194)**	**-0.677***** **(0.152)**
Cost to Income Ratio	**-0.210***** **(0.0400)**	**-0.0100**** **(0.00509)**	**-0.00345**** **(0.00165)**
Impaired Loans(NPLs)/ Gross Loans	**-1.312*** **(0.681)**	**-0.109***** **(0.0314)**	**-0.0129**** **(0.00548)**
Loans/ Customer Deposits	**-0.0366**** **(0.0178)**	-0.000891 (0.000756)	**-0.000834*** **(0.000479)**
Equity / Total Assets	0.0644 (1.423)	0.0569 (0.0362)	-0.0213 (0.0273)
Oth Op Inc / Avg Assets	**3.303**** **(1.422)**	**0.227***** **(0.0666)**	**-0.0667**** **(0.0287)**
HHI	**-311.1**** **(141.7)**	**-12.71***** **(4.111)**	**-3.991*** **(2.330)**
Inflation, GDP deflator (annual %)	**2.561***** **(0.673)**	**0.121***** **(0.0335)**	0.0185 (0.0191)
GDP per capita growth (annual %)	**1.236**** **(0.521)**	**0.0616***** **(0.0131)**	-0.00684 (0.00787)
Observations	*1971*	*1971*	*1971*
Adjusted R^2	*0.096*	*0.324*	*0.060*

*Robust standard errors in parentheses; * p < 0.10, ** p < 0.05, *** p < 0.01*

Table no. 4 – Determinants of banks' profitability influences (excluding the influences of first wave of EU enlargement)

	(1)	(2)	(3)
	ROAE	**ROAA**	**NIM**
Total Assets (log)	Statistically insignificant	**Positive influence**	**Negative influence**
Cost to Income Ratio	**Negative influence**	**Negative influence**	**Negative influence**
Impaired Loans(NPLs)/ Gross Loans	**Negative influence**	**Negative influence**	**Negative influence**
Loans/ Customer Deposits	**Negative influence**	Statistically insignificant	**Negative influence**
Equity / Total Assets	Statistically insignificant	Statistically insignificant	Statistically insignificant
Oth Op Inc / Avg Assets	**Positive influence**	**Positive influence**	**Negative influence**
HHI	**Negative influence**	**Negative influence**	**Negative influence**
Inflation, GDP deflator (annual %)	**Positive influence**	**Positive influence**	Statistically insignificant
GDP per capita growth (annual %)	**Positive influence**	**Positive influence**	Statistically insignificant

Table no. 5 – Regression statistics with the enlargement dummy variable

	(1) ROAE	(2) ROAA	(3) NIM
Total Assets (log)	1.288 (6.274)	**0.592***** **(0.200)**	**-0.538***** **(0.131)**
Cost to Income Ratio	**-0.210***** **(0.0400)**	**-0.0100**** **(0.00509)**	**-0.00347**** **(0.00164)**
Impaired Loans(NPLs)/ Gross Loans	**-1.314*** **(0.684)**	**-0.109***** **(0.0315)**	**-0.0138**** **(0.00579)**
Loans/ Customer Deposits	**-0.0367**** **(0.0179)**	-0.000912 (0.000757)	**-0.000875*** **(0.000472)**
Equity / Total Assets	0.0807 (1.450)	0.0600 (0.0378)	-0.0152 (0.0252)
Oth Op Inc / Avg Assets	**3.298**** **(1.424)**	**0.226***** **(0.0662)**	**-0.0687**** **(0.0283)**
HHI	**-309.5**** **(141.2)**	**-12.41***** **(4.051)**	-3.405 (2.126)
Inflation, GDP deflator (annual %)	**2.572***** **(0.684)**	**0.123***** **(0.0334)**	0.0229 (0.0178)
GDP per capita growth (annual %)	**1.235**** **(0.521)**	**0.0616***** **(0.0131)**	-0.00697 (0.00780)
enlyear	-1.405 (3.231)	-0.272 (0.189)	**-0.531***** **(0.148)**
Observations	*1971*	*1971*	*1971*
Adjusted R^2	*0.095*	*0.325*	*0.077*

*Robust standard errors in parentheses; * p < 0.10, ** p < 0.05, *** p < 0.01*

Table no. 6 – Regression statistics with the enlargement dummy variable

	(1) ROAE	(2) ROAA	(3) NIM
Total Assets (log)	Statistically insignificant	**Positive influence**	**Negative influence**
Cost to Income Ratio	**Negative influence**	**Negative influence**	**Negative influence**
Impaired Loans(NPLs)/ Gross Loans	**Negative influence**	**Negative influence**	**Negative influence**
Loans/ Customer Deposits	**Negative influence**	Statistically insignificant	**Negative influence**
Equity / Total Assets	Statistically insignificant	Statistically insignificant	Statistically insignificant
Oth Op Inc / Avg Assets	**Positive influence**	**Positive influence**	**Negative influence**
HHI	**Negative influence**	**Negative influence**	Statistically insignificant
Inflation, GDP deflator (annual %)	**Positive influence**	**Positive influence**	Statistically insignificant
GDP per capita growth (annual %)	**Positive influence**	**Positive influence**	Statistically insignificant
enlyear	Statistically insignificant	Statistically insignificant	**Negative influence**

The results after including the "enlargement" dummy are exhibited in Table 5 and Table 6. We notice that the results are very close to the previous ones. The main difference regards the market concentration, where there is no statistical significance for NIM. The "enlargement" dummy coefficient is statistically significant only in the case of NIM and it shows a negative effect of first wave of enlargement on net interest rate. This could be due to increased competition that determined a reduction of interest margins.

5. CONCLUSIONS

Our results are in line with the economic theory. The size of banks had a negative impact on NIM, suggesting that the bigger the bank is, the smaller the net interest margin ratio is, but, on the contrary, in case of ROAA, had a direct effect. The market concentration had a negative influence, meaning that the increasing competition, as a structural point of view, increases banks' profitability. This result validates one of European integration objective: the stimulation of competition. The inflation and economic growth, as macroeconomic factors, improve banks' profitability.

The process of European Union enlargement from 2004 does not have significant impact on EU15 banking systems' profitability. It has a week and negative effect only in case of net interest margin.

Considering the results obtained, we suggest for authorities a better supervision for credit risk and liquidity and marinating a competitive banking environment. For banks' management we also recommend to monitor the credit risk indicators, optimizing costs and diversifying the sources of income.

Acknowledgements

This work was cofinanced from the European Social Fund through Sectoral Operational Programme Human Resources Development 2007-2013, project number POSDRU/159/1.5/S/134197 „Performance and excellence in doctoral and postdoctoral research in Romanian economics science domain".

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