

# Analysis of Profitability Determinants: Empirical Evidence of Commercial Banks in the New EU Member States

## Angela Roman

“Alexandru Ioan Cuza” University of Iași  
Faculty of Economics and Business Administration,  
Department of Finance, Money and Public Administration  
Iasi, 700505  
Romania  
E-mail: aboariu@uaic.ro

## Ioana-Iuliana Tomuleasa

Faculty of Economics and Business Administration,  
Department of Finance, Money and Public Administration  
Iasi, 700505  
Romania  
E-mail: iulianatomuleasa@yahoo.com

### Abstract

*For ensuring a healthy, solid and stable banking sector, the evaluation and analysis of bank profitability is crucial so that possible weak points and vulnerabilities can be corrected and disposed. The aim of our research is to empirically evaluate the impact of specific internal and external factors on bank profitability, for a sample of 86 commercial banks in the new EU member states, for the period 2003-2011. The results of our research show that bank profitability of most countries in the sample (expressed by ROAE) is significantly influenced by the four bank-specific factors, namely capital adequacy, the ratio of non-performing loans, cost-to-income ratio and bank size, but also by external factors, like banking concentration, annual GDP growth rate and inflation.*

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## 1. Introduction

In the recent years, that preceded the current global financial crisis, due to significant structural, legislative and institutional changes, which were linked to the process of European integration, the banking sector in the new EU member states grew extremely fast with impact on bank profitability and efficiency. Following a highly accelerated dynamic of banking loans, expressed by the two digit growth rate, banks have seen a significant upturn in income, with a positive and essential effect on profitability indicators. During the international financial crisis, the severe reduction of both supply and demand of bank loans, the major deterioration of bank portfolio quality, the enhancing of banking risks etc., have affected banks profitability in most of the countries studied.

In this context, the analysis of the main determinants of bank profitability is a topic of interest for researchers, policy makers and also customers.

By using a strongly balanced panel data, the objective of our research is to evaluate the impact of bank profitability main determinants for commercial banks that are operating in the new EU member countries (Bulgaria, the Czech Republic, Hungary, Latvia, Lithuania, Poland and Romania), for the period 2003-2011.

In order to achieve our goal, the paper is structured in five parts: *the first part* includes some introductory remarks regarding the importance and relevance of the theme, *the second part* is devoted to literature review, in *the third part* we described the data and methodology, namely the econometric tools used in order to satisfy our purpose and in *the fourth part* we have exposed the main results of the empirical analysis. The paper ends with a *summary conclusion*.

## 2. Review of existing literature

The analysis of the literature emphasizes the existence of a significant number of empirical studies which focused on investigating the factors that have an impact on bank profitability. In some studies, the analysis of bank profitability is focused on a single country (Kosmidou, Tanna and Pasiouras, 2005; Athanasoglou et al., 2008; Sufian, 2009; Sufian and Habibullah, 2010; Dietrich and Wanzenried, 2010; Alper and Anbar, 2011; Sufian and Noor, 2012; Trujillo-Ponce, 2013), while in other studies the investigation of bank profitability determinants targets a panel of countries (Bourke, 1989; Molyneux and Thornton, 1992; Demirgüç-Kunt and Huizinga, 1998; Mendes and Abreu, 2003; Goddard et al., 2004; Staikouras and Wood, 2004; Athanasoglou et al., 2006; Havrylchyk and Jurzyk, 2006; Staikouras et al., 2007; Pasiouras and Kosmidou, 2007; Naceur and Omran, 2011). Furthermore, it can be observed that the majority of the empirical studies focused on the developed economies and only to a lesser extent on emerging economies.

Molyneux and Thornton (1992) were the first who investigated bank profitability determinants for several countries. The study results show, for a sample of 18 European countries, between 1986 and 1989, the existence of a significant positive relationship between return on capital and concentration, nominal interest rates and government ownership.

The main determinants of bank profitability are also investigated by Goddard, Molyneux and Wilson (2004), who focuses the research on six main European banking sectors (Denmark, France, Germany, Italy, Spain and the UK), between 1992 and 1998. Based on the performed empirical analysis, the above mentioned authors conclude that although we assist to an increasing integration of the European banking markets, the national factors still continue to have a major role as banking performance determinants.

Interested in understanding the determinants of performance in EU banking sector, Staikouras and Wood (2004) evaluate the impact of internal and external factors on performance for a sample of 685 European banks from 13 countries, between 1994 and 1998. The results show that the profitability of European banks is not only influenced by management decision factors but also by changes in the external macroeconomic environment.

Havrylchyk and Jurzyk (2006) analyse differences in profitability between domestic and foreign banks and determinants of profitability for foreign banks, greenfield banks and domestic banks in 10 countries from Central and Eastern Europe (CEE), between 1995 and 2003. The results of the study show that profits of foreign banks are affected to a lesser degree by macroeconomic conditions of host countries, and domestic banks obtain higher profits on more concentrated banking markets. Also, another significant result of the study is that greenfield banks perform better, in terms of return on assets compared with domestic and takeover banks.

Beckmann (2007) investigates structural and cyclical determinants of banking profitability in 16 Western European countries. Empirical results show, in particular, that the diversification of banks' income has a positive effect, and the concentration of national banking systems does not significantly influence profitability, while the business cycle has a pro-cyclical impact on bank profits.

Pasiouras and Kosmidou (2007) evaluate the impact of bank's specific characteristics and the overall banking environment on the profitability of commercial domestic and foreign banks in 15 countries of the EU, between 1995 and 2001. The results of the empirical analysis show that the profitability of the EU commercial banks, regardless of their form of ownership, is influenced both by internal characteristics and by the changes in the global banking environment. Furthermore, the authors suggest that the ratio of equity to assets seems to be the most important determinant of profitability for domestic banks, while the cost to income ratio is the most important determinant of profitability for foreign banks.

The significant impact of the recent financial crisis has determined Dietrich and Wanzenried (2010) to focus their research interests on empirical assessment of the key factors impact on profitability for a sample of 453 commercial banks in Switzerland, between 1999 and 2008. The study reveals substantial differences between banks in terms of profitability and concludes that better capitalized banks are more profitable. In addition, the authors have shown that the cost-to-income ratio had a significant impact on the return on assets only for the period before the crisis, while during the crisis a major negative impact on profitability was exercised by the loan loss provisions relative to total loans.

More recently, Trujillo-Ponce (2013) has examined empirically the main determinants of banks profitability for Spain in the period 1999-2009. The study concludes that a higher level of capitalization of analysed banks had a positive impact on the return on average assets (ROAA), and negatively on the return on Average Equity (ROAE). The study also shows that the rate of growth of deposits, size and income diversification does not have an impact on banks profitability. In terms of external factors, market concentration, economic cycle, the inflation rate and the interest rate have influenced banks profitability.

On the whole, the above mentioned empirical studies reflect controversial results, following the particularities of the analysed countries, the different macroeconomic conditions, the used set of data, but also the covered period of time (Dietrich, Wanzenried, 2010). On the other hand, the existence of common elements is noticed, through the prism of the factors that influence bank profitability.

### **3. Data and methodology**

#### *3.1. Data and selecting the variables*

Bank specific data used in this study were obtained from unconsolidated financial and annual reports of the banks from our sample and from Bureau Van Dijk Bankscope database. The data regarding industry-specific variables were obtained from the World Bank and those referring to macroeconomic variables were extracted from Eurostat databases.

The analysis was performed using official statistics of Bureau Van Dijk Bankscope, being identified through annual values for the period 2003-2011. We focused on a sample of 86 commercial banks, which are operating in European Union non-euro countries, namely 11 banks from Bulgaria, 14 from Czech Republic, 8 from Hungary, 16 from Latvia, 7 from Lithuania, 15 from Poland and 15 from Romania, registering a total of 774 observations. We selected only a part of the commercial banks from each country due to data availability for the period studied (2003-2011) so we outline the fact that this panel dataset is a strongly balanced one.

According to the literature, bank profitability is currently expressed by three representative indicators, the Return on Average Assets (ROAA), Return on Average Equity (ROAE) and the Net Interest Margin (NIM). The first rate indicates the returns generated by the assets held by a bank and is calculated as a ratio between the net income and average total assets, as a percentage. The second rate shows the return on shareholder funds and is calculated as the net income to average equity expressed as a percentage. The net interest margin is defined as the net interest income (interest income minus interest expenses) expressed as a percentage of average earning assets and reflects the profit obtained by a bank from interest-earning activities.

In this study the dependent variable is represented by return on average equity, choice that can be explained through various reasons, but the most important one is that this variable allows us to obtain an increased efficiency and also a higher degree of significance regarding the statistical results of the regression analysis.

The set of the independent variables considered in our study includes several determinants of bank profitability, which refer to bank-specific factors, but also to factors specific to the banking industry and macroeconomic environment. In their selection we have been guided by the representativeness criterion, but we also took into consideration the data availability for our sample of banks.

In most of the above mentioned studies, the factors that determine bank profitability are structured in two main groups, the internal and external determinants respectively. The first group of factors is specific for each bank and usually represents the direct result of the managerial decisions (Trujillo-Ponce, 2013). In our opinion, bank-specific factors are selected according to the main segments of bank operations, respectively: capital adequacy, asset quality, management quality, earnings ability, liquidity and bank dimension. The second group of factors, the external determinants, represents uncontrollable variables by bank managers and reflects the economic and legal environment where the banks operate.

In our study we use the following ten proxies for bank-specific factors:

*Capital adequacy* that measures the capacity of the banking sector to absorb any losses generated by risk occurrence or certain significant macroeconomic imbalances. Most of the studies use as proxy for capital adequacy *the ratio of total equity to total asset* (CA), which shows what proportion of the total assets of the bank is financed by its shareholders. Regarding the relationship of this indicator with profitability, the results in the literature are mixed. According to the conventional risk-return hypothesis, a lower equity-to-asset ratio leads to a higher expected return. On the other side, a higher equity-to-asset ratio has a positive impact upon profitability because the bank's financing costs are reduced. Subsequently, the expected sign of the equity-to-asset ratio is unpredictable.

*The ratio of nonperforming loans to total loans* (NPL) is a variable proxy for credit risk and, at the same time, one of the most representative indicators that measure the quality of the bank assets and implicitly the soundness of the credit portfolio. A higher level of the ratio of nonperforming loans to total loans and implicitly a deterioration of the credit portfolio quality has a negative effect upon bank profitability.

*Deposits ratio* (DP) is measured by the amount of deposits held by a bank to total assets. This rate reflects in what measure the deposits attracted by the bank contribute to financing its assets. The deposits are the main funding and cheap source for a bank, thus a positive relation is expected between the deposit rates and bank profitability.

*The management quality* (MQ) is of major importance for the profitability and soundness of a bank. According to the literature, among the representative indicators of expressing the banking management quality, the *non-interest expense over total assets ratio* (NIEA) and *cost to income ratio* (CIR) are noticed. *The first rate* underlines the ability of the management to operate the daily activities of the banks at a lower cost. Thus, a reduced level of this indicator has a positive impact upon the bank's profitability. The second rate, *cost to income ratio*, reflects the capacity of the bank to cover its operating expenses from the income generated and is calculated as the operating costs over total income. Thus, we expect a negative relationship between cost to income ratio and bank profitability.

*The ratio of loans to total assets* (LA)

At a bank's level, the loans are assets with risk, and their large share in the bank assets means a growth of the bank's exposure to risks, especially the credit risk. Thus, a high value of the indicator could also mean a possible deterioration of the bank assets' quality with a negative effect upon profitability. On the other side, we consider the fact that the banking loans are the main income source for a bank, thus, a high level of this indicator is expected to have a positive impact upon profitability, since the bank registers a growth of interest income. The ratio of loans to total assets can be used as a proxy variable for liquidity risk. If this rate is very high, the liquidity is reduced and it will increase the number of marginal borrowers that default.

*Liquidity* (L): to measure the liquidity we use as a proxy variable *the ratio of liquid assets* (cash and due from banks + available for sale securities + government securities) *to total assets* (LIQA). Generally, the banks that hold a reduced level of liquid assets are confronted with the risk of not being able to finance daily operations. On the other side, liquid assets generate lower return, so a negative relationship to bank profitability is expected.

For *funding costs* (FC), we use as a proxy variable *the interest expenses to deposits ratio*, which is defined as the interest expense on customer deposits expressed as a percentage of average customer deposits. This rate reflects the ability of a bank to attract deposits at a low cost. Thus, a low level of this indicator has a positive effect upon the profitability of the bank.

*Income diversification of bank*

In order to measure the diversification of the non-traditional activities of a bank, we use as proxy variable the *non-interest income over total gross revenues* (NIIR). Non-interest income includes commission, services charges, fees, guarantee fees, net profits from sales of investment securities and foreign exchange profits. A growth of the non-interest income in total gross revenues, subsequent to the diversification of the bank's activities, is expected to have a positive effect upon bank profitability. Sufian (2010), Alper and Anbar (2011) showed a direct relationship between non-interest income and bank profitability.

*Bank size* (BS) is measured in our study by *the natural logarithm of the accounting value of the total assets of bank*. According to the literature, the relationship between the bank size and profitability is mixed (Sufian, 2009; Pasiouras and Kosmidou, 2007; Dietrich and Wanzenried, 2010).

Thus, on one side the bank size can have positive effects upon the probability where there are significant economies of scale. Also, in the case of the big banks with an increased degree of diversification of the banking products, a risk reduction is recorded, with positive impact upon profitability. Still, in the case of the banks that become extremely large, the size can have a negative effect upon profitability because of the agency costs, the overhead of bureaucratic processes and other costs related to the administration of very big firms.

Beside the above mentioned internal factors, our research targets the external determinants of bank profitability, of which we selected *banking concentration*, *annual real GDP growth rate (GDP)* and *inflation (INF)* expressed by annual inflation rate (consumer prices).

We measure banking concentration by the 5-bank concentration ratio (CR5) calculated as the assets of the five largest banks over total commercial banking assets (%). The majority of the empirical studies show mixed relations between banking concentration and profitability.

In our study, we use the annual real GDP growth rate as a proxy variable for the economic activity. If GDP growth is high, the loan request increases and thus the banks can obtain bigger profits. On the contrary, if the GDP growth slows, the banks are confronted with an increased credit risk, increasing provisions and subsequently the profitability is reduced. According to the literature, (Demirgüç-Kunt and Huizinga, 1998; Mendes and Abreu, 2003; Naceur, 2003; Pasiouras and Kosmidou, 2007) there is a positive relation between GDP growth and bank profitability.

Regarding the relationship between inflation and bank profitability, some authors (Pasiouras and Kosmidou, 2007) consider that this depends in so far as the inflation is anticipated or unanticipated. If the inflation is anticipated, the banks can rapidly adjust the interest rates, which leads to a faster increase of revenues compared to costs and thus, bank profitability is positively affected. If the inflation is unanticipated, the banks are slower in adjusting their interest rate and there is a possibility that the bank costs increase faster than the income. Thus, the profitability will be negatively affected.

### 3.2 Methodology

The scientific approach involves efforts sustained by modern and comprehensive research methods, which combines a rigorous documentary research with a quantitative research, having as a support representative econometric tool. In this regard we propose a panel regression approach.

Methodological design is described in the following.

The econometric estimation analysis used is ordinary least squares (OLS), the statistic test is t Student and the standard significance level is 0.05, but we also exposed the results for the level of 0.01 and 0.10.

In panel analysis it's noticed a considerable number of advantages, thus identifying low multicollinearity, an enhanced econometric estimates and higher accuracy results. The sample has two dimensions, namely time dimension (T) and cross-sectional dimension (N) and after comparing these two dimensions we can define the type of panel, being either micro panel or macro panel. We continue with model testing, through the combination of fixed effects and random effects, pointing out that random effects model is relevant in the case of isolated events that can generate implications. The consistency of the model is determined through Hausman test so in case null hypothesis is not accepted, the test has a Chi-square distribution, with the degrees of freedom equal to the controlled variable in the model.

Continuing we are applying stationary tests, namely Levin, Lin & Chu, Breitung t-sta, Im, Pesaran and Shin W-stat. The assumption of normality is tested with Jarque-Bera test, the test for heteroskedasticity is available for the fixed-effects model using Wald test and for serial correlation we can apply a Lagrangian-Multiplier test. Serial correlation causes the standard errors of the coefficients to be smaller than they actually are and also a higher R-square.

Our paper is based on the studies of Fang et al. (2013), Alper and Anbar (2011), Molyneux (2011), Hass, Lelyveld (2011), Beltratti (2011), Baltzer et. al. (2008), Pasiouras, Kosmidou (2007), Havrylychuk, Jurzyk (2006), Baltagi (2005) etc.

The general linear regression model is:

$$Y_{it} = \alpha_0 + \beta_{mit} X_{mit} + \beta_{djt} X_{dit} + \varepsilon \quad (1)$$

where  $i$  refers to an individual bank;  $t$  refers to year;  $j$  refers to the country in which bank  $i$  operates;  $Y_{it}$  the dependent variable that refers to the return on average equity (ROAE) and is the observation of a bank  $i$  in a particular year  $t$ ;  $X_m$  represents the internal factors/determinants of a bank;  $X_d$  represents the external factors/determinants of a bank;  $\varepsilon$  is an error term.

#### 4. Empirical Results

Preceding analysis itself, it shall be performed the descriptive statistics procedure for the variables taken into the study, with the purpose of describing the main feature of a data collection, using some commonly measures of central tendency, namely the *mean* and some measures of variability, which includes the *standard deviation* (see table 1).

After the delimitation of the sample, we continue by studying the type of panel regression, in this case noticing a micro panel. In what follows we have defined the mathematical model and after that we proceeded to test for the type of effects applicable, namely fixed or random, for this purpose using Hausman test. The result of Hausman, showed us that in the case of Bulgaria and Czech Republic are most suitable fixed effects, meanwhile for the other countries the results suggested that there are no significant differences between the two types of effects (see table 2).

Continuing, it had been tested the stationary of the dataset through Levin, Lin & Chu, Breitung t-stat, Im, Pesaran and Shin W-sat, noticing the fact that in just one country the variables were stationary at the first attempt, namely Latvia and in the other cases we have applied either first order difference (in some case the second) or logarithm. The normality assumption was tested with JB test, the test for heteroskedasticity for fixed-effects models was done by using Wald test and for serial correlation we applied LM test.

*Capital adequacy* (CA) standard for banks, especially for those that operates internationally is a major concern for bank regulators worldwide. In our case we can notice that capital adequacy has a positive impact on the profitability of Hungarian, Polish and Romanian banks, in line with our expectations and similar to the results obtained by Goddard et al. (2004), Athanoglou et al. (2008), Dietrich and Wanzenried, (2010) and Trujillo-Ponce (2013). However, in the context of the recent financial crisis, it can also be observed an inverse relationship between capital adequacy and banks profitability in four countries, namely Bulgaria, the Czech Republic, Latvia and Lithuania.

*Asset quality* is expressed in our model by non-performing loans variable (NPL), which, as it was expected, has a negative impact on banking profitability in all countries analysed, except for Latvia. The negative relationship indicates that banks with a high level of credit risk shows lower levels of profitability, in line with our expectations. In the case of Latvia, the variable coefficient is positive, contrary to our expectations and also statistically insignificant. Our result is explicable through the fact that in the years before the crisis, the increase in bank lending led to a growth in revenues, which offset losses from nonperforming loans so that, overall, the impact of the variable was positive but statistically insignificant. This indicator has proved to be significant in all countries for the level of 1% or 5% but it's essential to notice that the damage is not uniform between credit institutions, so the larger institutions recorded a higher level of this indicator. However it must be observed that arbitrage prudential measures taken by central banks and/or the relaxation of pro-cyclical prudential standards in order to maximize short-term profits influences on a medium-term the portfolio quality.

With respect to the impact of *deposits to total assets ratio* (DP), we can notice a positive and statistically significant coefficient only in Lithuania, in line with our expectations. However, the coefficient is negative and statistically significant for the banks in Hungary, Poland and Romania, contrary to our expectations. Nevertheless, our results are explicable through the fact that during the global financial crisis, due to a restricted financing on international markets, the banks in these countries have been obliged to focus on attracting deposits at a higher cost. This led to a reduction of the net internet margin, with a negative impact on bank profitability.

Between the two variables that reflects management quality it can be outlined that cost-to-income ratio is more important because it's statistically significant in all banking sectors studied, observing that an increase in the cost-to-income ratio will generate a decrease in profitability, in line with our expectations.

Table 1: Summary statistics

			<b>BG</b>	<b>CZ</b>	<b>HU</b>	<b>LV</b>	<b>LT</b>	<b>PL</b>	<b>RO</b>
<b>ROAE</b>	2003-2006	Mean	19.2	14.2	16.7	19.9	13.0	13.4	11.5
		Stdev	3.6	3.4	1.1	7.3	4.7	6.0	7.3
	2007-2011	Mean	12.2	14.3	1.1	-17.0	-4.4	12.1	-0.1
		Stdev	6.6	4.6	19.6	33.9	24.6	5.6	16.6
<b>CA</b>	2003-2006	Mean	13.5	12.5	8.4	10.5	10.2	9.9	13.0
		Stdev	1.7	1.1	0.8	2.7	1.9	0.8	3.4
	2007-2011	Mean	14.7	10.4	8.2	9.3	10.0	9.7	10.0
		Stdev	3.1	2.1	1.2	2.3	2.0	1.3	1.7
<b>NPL</b>	2003-2006	Mean	3.0	3.7	3.6	2.4	2.4	9.3	4.6
		Stdev	0.7	0.5	0.9	0.2	0.9	1.5	1.5
	2007-2011	Mean	5.2	4.9	11.4	16.1	13.7	7.8	9.2
		Stdev	4.0	2.0	5.9	12.3	8.7	2.2	6.9
<b>DP</b>	2003-2006	Mean	63.4	60.6	61.8	63.7	58.9	54.9	61.3
		Stdev	4.9	2.6	4.8	9.0	6.0	6.6	9.2
	2007-2011	Mean	61.3	64.1	51.1	62.7	55.7	52.9	59.4
		Stdev	5.6	3.9	8.0	9.4	9.5	6.1	8.2
<b>NIEA</b>	2003-2006	Mean	3.9	2.1	3.5	3.4	3.7	3.7	6.8
		Stdev	0.3	0.3	0.4	0.5	0.6	0.3	1.2
	2007-2011	Mean	2.9	1.7	2.8	3.0	2.4	3.3	4.6
		Stdev	0.2	0.2	0.4	0.5	0.3	1.0	0.6
<b>CIR</b>	2003-2006	Mean	56.6	56.2	58.5	60.1	72.6	69.9	75.8
		Stdev	5.3	6.5	5.3	8.8	9.8	7.3	10.7
	2007-2011	Mean	50.8	50.8	54.6	83.2	66.0	61.1	65.6
		Stdev	5.3	11.0	8.2	35.4	10.2	5.8	8.4
<b>LA</b>	2003-2006	Mean	58.6	45.7	63.4	49.2	59.5	50.2	51.1
		Stdev	7.1	7.6	2.5	10.1	6.5	3.7	6.6
	2007-2011	Mean	67	58.4	64.6	56.9	70.1	62.3	59.5
		Stdev	5.2	7.6	4.3	9.4	5.5	7.3	5.9
<b>LIQA</b>	2003-2006	Mean	10.6	19.9	14.0	15.3	19.4	31.8	30.7
		Stdev	8.0	4.7	3.8	5.0	4.5	8.0	9.8
	2007-2011	Mean	19.0	19.9	24.6	14.0	16.4	32.5	37.4
		Stdev	5.0	6.4	8.2	5.6	6.2	8.0	11.6
<b>FC</b>	2003-2006	Mean	6.2	4.2	6.0	2.9	2.6	10.6	7.5
		Stdev	0.5	1.0	1.1	1.2	0.4	0.45	2.3
	2007-2011	Mean	3.4	3.0	4.6	3.7	4.0	3.2	5.9
		Stdev	0.6	2.6	1.0	2.4	2.3	0.9	1.7
<b>NIR</b>	2003-2006	Mean	26.6	41.3	35.3	42.6	46.0	43.3	34.1
		Stdev	5.6	8.5	7.3	6.3	2.8	4.4	7.5
	2007-2011	Mean	26.1	27.6	35.5	49.3	38.2	39.6	38.3
		Stdev	3.2	8.0	7.4	20.0	7.8	7.8	7.9
<b>BS</b>	2003-2006	Mean	6.9	11.0	7.1	5.7	7.6	9.2	8.0
		Stdev	0.4	0.2	0.3	0.7	0.4	0.2	0.5
	2007-2011	Mean	8.0	11.6	7.7	6.3	8.5	9.7	9.2
		Stdev	0.2	0.2	0.1	0.3	0.1	0.2	0.2
<b>CR5</b>	2003-2006	Mean	71.9	78.8	83.6	70.5	89.9	74.8	79.2
		Stdev	5.4	2.6	1.8	4.0	1.6	6.9	2.9
	2007-2011	Mean	75.7	79.0	90.9	68.6	87.8	62.1	83.6
		Stdev	2.5	2.1	3.9	3.8	2.2	4.1	1.8
<b>GDPG</b>	2003-2006	Mean	6.3	5.6	4.2	9.5	8.3	4.8	6.5
		Stdev	0.5	1.6	0.4	1.6	1.3	1.2	2.1
	2007-2011	Mean	1.9	1.7	-0.6	-1.4	1.1	4.4	1.6
		Stdev	4.9	3.8	3.5	10.5	9.4	1.9	5.7
<b>INF</b>	2003-2006	Mean	5.5	1.6	4.8	5.7	1.7	2.0	10.7
		Stdev	2.2	1.2	1.5	1.9	2.1	1.3	3.7
	2007-2011	Mean	5.7	2.6	5.3	6.3	5.3	3.5	6.1
		Stdev	4.1	2.2	1.7	6.4	3.7	0.8	1.1
<b>Obs.</b>	774		99	126	72	144	63	135	135
<b>N*</b>	86		11	14	8	16	7	15	15

Note: \*N-number of cases (commercial banks), \*\*T-time interval, Stdev-standard deviation.

Source: authors' calculation.

In the case of *loans to total assets* (LA), as we mentioned in the theoretical part of our study, the impact of this variable on profitability is unpredictable. Our results reflect, in particular, a negative and statically significant coefficient for Bulgarian, Lithuanian and Polish banks. The results can be explained by the fact that the banks in those countries registered a high value of this indicator in the pre-crisis period, which caused an increase in banks income, with a positive impact on profitability. However, due to the financial crisis, these banks recorded a significant increase in the level of nonperforming loans and loan loss reserves, which had a negative impact on profitability. Overall, through the compensation of the two effects it results a negative and statistically significant impact.

In the case of *liquidity*, the coefficient for LIQA is negative in accordance with our expectations for the majority of the commercial banks studied, except for Bulgaria and Romania. This indicates that an increase in liquidity will lead to a decrease in profitability. On the other hand, for both variables the results obtained emphasize a significant relationship only in the case of Bulgaria, the Czech Republic, Lithuania and Poland. We can easily notice that both liquidity indicators are significant in the case of Bulgaria, result that can be supported also by the measures taken by the central banks among time, in order to increase the level of liquidity. For example National Bank of Bulgaria adopted in 2010 Ordinance no.11, which requires lenders to maintain buffers to make sure they can more easily handle liquidity difficulties cause by economic deterioration. We can outline the fact that our results are in line with those obtained by Hirigoyen (1985), which argues that on mid and long-term the relationship between liquidity and profitability could be positive, suggesting that a low liquidity would lead to a lower profitability due to a higher need for loans, so a lower profitability would not generate enough cash-flow to support the expansion of its needs and it ends up compromising liquidity (by this forming a vicious circle). On the whole, it has been noted that liquidity risk has been diminishing in some of the countries because of the Vienna Initiative, of the external financing agreements with EU, IMF and IFI, of the central bank liquidity provision and its efforts to increase government bonds portfolio, representing eligible assets for refinancing operations.

*Funding costs* (FC) had an important impact on the banks from Bulgaria, Hungary and Lithuania but the coefficient is negative as we expected just in the case of Hungary and Lithuania. In the recent period, Bulgarian banks have improved their funding structures by replacing volatile wholesale and parental funding with stable customer deposits. Bulgarian banks took some measures in order to reduce costs because initially wholesale funding came at a higher cost compared to retail but after the expenses were incorporated in a broad deposit-gathering branch network, the net cost of wholesale was actually lower. The wholesale funding approach reduces the asset-liability duration mismatch risk, which is one of the major concerns of Bulgarian banks and this is one of the reasons why these banks were oriented to the wholesale area. So, due to the changes that the Bulgarian banks had passed through we can say that these mutations were the reason why we registered a positive relationship between funding costs and profitability, although the economic theory says otherwise. We all know that funding costs in European Union have been gradually drifting apart, placing some of the banks in a weakened position to compete for international business against banks with access to cheaper funding, this being one of the reasons why this variable was found insignificant in some of the countries analysed.

In the case of *income diversification of a bank* (NIIR), the empirical results show a statistically significant relationship and also positive, in line with our expectations, just in the case of Czech Republic. In the Western European banking sector, the main source of revenue is non-interest income but in contrast with that the main source of revenue in the Hungarian, Latvian and Romanian banking system is a high interest income, resulting from high interest margins so we can say that profitability of the banking systems mentioned differs not only in terms of scale but also in term of composition. The negative relationship can be motivated also through the high level of foreign banks in the banking systems compared with domestic banks, which indicates that foreign banks enhances the level of competition in the banking sector, which leads to more strict lending policies of the local banks, by this affecting the performance of the whole banking system.

As we mentioned in the theoretical part of our study, the *bank size* (BS) impact on profitability is unpredictable. Empirical results show that this variable is statistically significant in most of the countries, but the coefficient indicates a negative relationship in Bulgaria, the Czech Republic, Latvia and Lithuania and a positive relationship in Poland and Romania.



Larger banks obtain a larger share of their income in the form of non-interest income such as trading income and fees so large banks appear to be relatively active on the capital markets on both the assets and liabilities sides of the balance sheet. In various studies we saw that banks with large absolute size tend to be more profitable, while they also have a higher bank risk (larger size should allow the bank to obtain economies of scale).

Table 2: Empirical results for panel data analysis

	BG	CZ	HU	LV	LT	PL	RO	ES
<b>ROAE (dependent variable)</b>								
<b>CA</b>	-0.0816** (0.0421)	-0.0583*** (0.0234)	3.2615** (1.4252)	-0.0027** (0.0012)	-0.0729** (0.0317)	0.9078* (0.5492)	0.0329* (0.0192)	+/-
<b>NPL</b>	-0.0306*** (0.0118)	-0.1414** (0.0640)	-0.8212** (0.4189)	0.0146 (0.0559)	-0.0330*** (0.0117)	- 0.3421*** (0.1316)	-0.1435* (0.0780)	-
<b>DP</b>	0.03521 (0.0419)		-0.5400*** (0.1737)		0.0387*** (0.0139)	-0.0158* (0.0085)	-0.5432** (0.2484)	+
<b>NIEA</b>	-0.05160 (0.04920)	0.1070*** (0.0422)	17.198*** (4.630)	0.0090* (0.0054)			-0.0822 (0.0807)	-
<b>CIR</b>	-0.0013* (0.0007)	-0.0266*** (0.0045)	-1.3574*** (0.3210)	0.1791** (0.0782)	-0.0373*** (0.0089)	- 0.0649*** (0.0109)	-0.2168* (0.1335)	-
<b>LA</b>	-0.1494*** (0.0543)	-0.1568 (0.1553)	0.3229 (0.2467)	-0.0034 (0.0035)	-0.0547*** (0.0159)	-0.0255** (0.0109)	0.0102 (0.0090)	+/-
<b>LIQA</b>	0.0425*** (0.0164)	-0.0732* (0.0440)		-0.0024 (0.0062)	-0.3662 (0.4271)	-0.3056 (0.2648)	0.0064 (0.0078)	-
<b>FC</b>	0.0463** (0.2221)		-1.6656*** (0.6814)		-0.1609** (0.0714)	0.0207 (0.0297)	-0.1082 (0.1639)	-
<b>NIR</b>		0.0058** (0.0024)	-0.3801** (0.1729)	-0.0047* (0.0027)			0.2943 (0.3001)	+
<b>BS</b>	-0.0697*** (0.0287)	-0.3874*** (0.1401)		-0.1079 (0.2323)	-0.7845*** (0.3064)	0.3283*** (0.1285)	0.4617** (0.2238)	+/-
<b>CR5</b>	0.1219 (0.1255)	0.0641*** (0.0174)	-3.0326*** (0.6529)	0.0882*** (0.0334)	-0.0718** (0.0361)	0.0176 (0.0168)	-0.1444*** (0.0408)	+/-
<b>GDP</b>	-0.0181*** (0.0070)	-0.0818* (0.0483)	-2.2984*** (0.6341)	0.1108*** (0.0259)	0.1525*** (0.0281)		1.0120*** (0.2036)	+
<b>INF</b>	0.0147*** (0.0059)	0.0505*** (0.0196)	0.9336 (1.2099)	0.0424 (0.0316)	0.2863*** (0.0596)	- 0.2476*** (0.0919)	0.1108 (0.1528)	+/-
<b>c</b>	1.1912*** (0.3748)	4.4981** (2.2673)	29.6270*** (5.8492)	2.2601** (0.9557)	12.4353*** (2.9489)	6.7949*** (2.4470)	8.7308*** (2.4214)	
<b>H test</b>	44.35 (0.0000)	46.66 (0.0000)	7.60 (0.8684)	15.32 (0.2877)	7.27 (0.8879)	1.37 (1.0000)	8.55 (0.7411)	
<b>R-sq.</b>	0.3155	0.4889	0.6966	0.4446	0.7955	0.3773	0.4817	
<b>Banks</b>	11	14	8	16	7	15	15	
<b>Obs.</b>	99	126	72	144	63	135	135	

Note: EF-expected sign; Absolute value of  $t$  statistics \* significant at 10percent; \*\* significant at 5percent; \*\*\* significant at 1percent. In ( ) we have standard deviations. In the case of Hausman test (H test) we have  $\chi^2$  and in parentheses we have the probability.

Source: author's calculations.

We can also notice in some studies that the effect of size could be non-linear, with profitability increasing in size at an initial level and after that declining for different reasons, in this respect noticing the paper of Athanasoglou et al. (2008). Although, Elsas et al. (2010) conclude with the fact that economies of scope, which may imply larger size, are pronounced in banking sector conducting to

a higher profitability, Barros et al. (2007) suggests that bigger and more diversified banks are more likely to perform poorly, so smaller and specialized banks can reduce asymmetric information problems associated with lending.

The consolidation process of CEE banking sectors had implications on the degree of banking sector concentration, measured by the market share of the first five credit institutions (CR5). It was found that a decrease in the degree of concentration along with an increase in the foreign banks market share may be perceived as a sign of growth in banking competition. Empirical results reveal a statistically significant connection for the majority of banks, except for Bulgaria and Poland. In addition, it has been noted that this variable has a positive influence on banking performance, except for Hungary, Lithuania and Romania, where the influence is negative, aspect that can be explained through the mutations occurred in banking markets during the global financial crisis. Some empirical evidence on the relationship between concentration and profitability suggests that structure-conduct-performance theory is very important (Claeys and Vennet, 2008, Goddard et al. 2004) meanwhile others find no relationship between the degree of concentration and profitability of a banking sector, or they find even an inverse relationship between the two, in the last case noticing the papers of Athanasoglou et al. (2008), Berger (1995), Pasiouras and Kosmidou (2007).

*GDPG* is an important external factor that influences banks profitability, although it's worth mentioning that the sign of the coefficient is different from one country to another. Several studies reflect the fact that it exists a significant relation between the business cycle and bank profitability, suggesting that each contraction of real GDP, especially during recessions are found to have a persistent negative effect on bank profitability. Contrary to our expectations, real GDP growth is found to have an opposite sign to the interaction terms of profitability in the case of Bulgaria, the Czech Republic and Hungary, findings that agree with theory and empirical evidence that the relationship between GDP and bank profitability could be sometimes pro-cyclical. There were noticed some reasons why the effect of growth in GDP can affect profitability in a negative or even positive manner, for example bank credit could decrease during economic down swings (such periods are associated with increased risk). In this regard we notice some studies that found the same results as our analysis, namely, Naceur et al. (2003), Athanasoglou et al. (2008) and Munyambonera (2009).

*Inflation* (INF) is often cited to be a significant determinant of bank profitability, so the effect of inflation depends on whether banks operating expenses are increasing faster than the inflation rate level (1979). Inflation implications on profitability of a bank depend on the capacity of bank's management to forecast inflation Perry (1992). Our results show a positive relationship between inflation and banks profitability in most of the countries, except Poland, these results being in line with those obtained by Molyneux and Thornton (1992) and also Bourke (1989). However it should be mentioned that in the case of Hungary, Latvia and Romania, this variable wasn't significant at any level. In most cases of this research inflation is positively related to bank profitability, which could suggest that during the period studied the level of inflation were anticipated by banks management and a correct predicting of it gave banks an opportunity to adjust the interest rates accordingly and consequently to earn higher profits.

## **5. Concluding remarks**

For ensuring a healthy, solid and stable banking sector the evaluation and analysis of banks profitability is crucial so that the possible weak points and vulnerabilities can be corrected and disposed. Therefore, our research aimed to assess the impact of major factors (bank-specific, industry-specific or macroeconomic) on bank profitability, for a sample of 86 commercial banks that operate in the new EU member countries, for the period 2003-2011.

The empirical results of our research, outlines the fact that the analysed variables had a rather heterogeneous impact on bank profitability, due to the particularities of each country and to different macroeconomic environments in which banks operate.

Among the bank-specific factors, our study shows that a significant impact on bank profitability in most of the countries analysed, had capital-adequacy, the ratio of non-performing loans, cost-to-income ratio and also bank size, in line with the results noticed in the speciality literature. Regarding external determinants, namely banking concentration, annual GDP growth rate and inflation we registered an essential influence of it in most countries, in line with our expectations.

The analysis has some limits, due to the fact that there weren't taken into account the new international pressures, namely the implications of the sovereign debt crisis (i.e. the case of Cyprus, Greece etc.), issues that will generate an increase in the level of risk present in banks, which will probably affect profitability.

Therefore, future research directions are following a well-defined path, targeting an extension of the time period studied (include data for 2012) and increasing the sample for all the 28 countries of the EU, focusing on corroboration with other econometric models in order to enhance the accuracy of the study.

Overall, we consider that after many successful years, the international banking systems are facing historical changes, so the mechanism previously applied is found to be exceeded in the current economic conditions. In this respect, there are some pressures on the banking market, which are requesting some transformations, a reconfiguration viewed at three levels: economic, business model and financial education.

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