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Determinants of banks' profitability: evidence from EU 27 banking systems

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Abstract

In this study we assess the main determinants of banks' profitability in EU27 over the period 2004-2011. We split the factors that influence bank profitability in two large groups: bank-specific (internal) factors and industry specific and macroeconomic (external) factors. We consider as proxy for banks profitability the return on average assets (ROAA) and the return on average equity (ROAE). The empirical findings are consistent with the expected results. Credit and liquidity risk, management efficiency, the diversification of business, the market concentration/competition and the economic growth have influence on bank profitability, both on ROAA and ROAE. An interesting and valuable result is the positive influence of competition on bank profitability in EU27.

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1. Introduction

Over the last two decades, European banking systems have encountered major changes. The European integration and the recent financial crisis had important influence on the structure and the performance of banks. The first step of European integration was made in 1957, when the Treaty of Rome set out the main principles for a single banking

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market in the European Union. The main steps in the process of European integration was marked by the adoption of the First Directive on the Co-ordination of Laws, Regulations and Administrative Provisions Relating to the Taking up and Pursuit of Credit Institutions in 1977, followed by the Second Banking Directive, established in 1989, which introduced the single banking license; the 1992 Maastricht Treaty, which consolidated the single-market program; the introduction of the euro in 1999; the Financial Services Action Plan (FSAP) launched in 1999 to be implemented in 2005. In 2007 the European banking systems was confronting with an international financial crisis. This crisis had substantial implication on banks' performances.

In this paper we try to identify the main factors that affected the profitability of EU commercial banks (27 member states) over the period from 2004 to 2011. The contribution of this paper is to investigate the main determinants of commercial banks profitability in European Union along eight years period. In the literature, the factors influencing bank 'profitability are generally split into two groups: internal (bank-specific) factors and external (industry specific and macroeconomic) factors. Even if the results of the studies differ significantly upon sample and data included in the analysis, we can identify some common factors influencing profitability, namely bank size, credit risk, liquidity risk, management efficiency, capital adequacy, business mix (internal), banking system concentration, inflation, economic growth (external) etc.

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

2. Literature Review

There is a large literature dealing with factors that influence the profitability of banks. There are some early investigations on bank profitability (Short, 1979; Bourke, 1989). Some empirical studies on the bank profitability are country specific, while others have focused on a panel of countries. Examples of single country studies are those for US (Berger, 1995; Angbazo, 1997), Colombia (Barajas et al., 1999), Brazil (AfanasiEFF et al., 2002), Croatia (Kundid et al., 2011), Greece (MamatzakIs, 2003; Kosmidou, 2008; Alexiou and Sofoklis, 2009), Tunisia (Naceur, 2003; Naceur and Goaid, 2001), India (Badola and Verma, 2006), China (Heffernan and Fu, 2008), Taiwan (Ramlall, 2009; Chen and Yeh, 1998), Philippines (Sufian and Chong, 2008), Malaysia (Guru et al., 1999), Pakistan (Javaid, 2011; Burki, 2006), Japan (Lui and Wilson, 2010), Korea (Sufian, 2011), Turkey (Alper and Anbar, 2011; Kaya, 2002; Tunay and Silpar, 2006; Sayilgan and Yildirim, 2009), Czech Republic (Horvath, 2009), Romania (Andries and Cocris, 2010), Switzerland (Dietrich and Wanzenried, 2009) and Spain (Vivas, 1997).

There are other important studies which assess bank profitability by groups of countries (Molyneux and Thornton, 1992; Molyneux and Forbes, 1995; DemerguÇ-Kunt and Huizinga, 2001, 1999; Goddard et al., 2004; Bashir, 2000; Hassan and Bashir, 2003; Athanasoglou et al., 2005; Athanasoglou et al., 2006). Some of these papers investigated bank profitability determinants for European banks. Molyneux and Thornton (1992) examine the profitability of banks in 18 European countries during the period from 1986 to 1989, finding that there is a significant positive association between the return on equity and the level of interest rates, bank concentration and government ownership. Molyneux and Forbes (1995) also assess 18 European countries' bank profitability for 1986-1989. Goddard et.al (2004), analyzing the profitability of European banks from 6 countries during the period from 1992 to 1998, found that there exists a positive relationship between bank profitability and risk, whereas bank size has insignificant impact on profitability. Athanasoglou et al (2005) found that concentration is positively correlated with bank profitability and that inflation has a strong effect on profitability, while banks' profits are not significantly affected by the real GDP per capita fluctuations. Their study is on South Eastern European region over the period from 1998 to 2002.

There are no other studies that assess bank profitability for all EU 27 countries for the period considered.

3. Methodology, Variables and Data

The literature in the field uses more approaches regarding bank performance, from profitability ratios to more complex composite indexes. Performance proxies commonly used are: the return on equity (ROE), computed as a ratio of the net profit to equity and the return on assets (ROA), computed as a ratio of the net profit to the total assets

of the bank. While the former expresses the net return of the capital invested by the shareholders, the latter shows the net relative profit generated by the bank total assets and is considered a measure of management efficiency. Comparing to ROE, the use of ROA takes into account the risks derived from the leverage and is the key bank profitability ratio (Athanasoglou et al., 2005). A possible drawback of ROA is the existence of the off-balance-sheet assets, which represent an important source of profit for European banks, but are not considered in computing this measure. Thus, Goddard et al (2004) argue that the use of ROE is more appropriate. The use of average yearly values of equity and assets expresses the performance more accurate than the end year values. Thus we use the return on average assets (ROAA) and return on average equity (ROAE) as performance measures.

The literature splits the factors that influence banks' profitability in two large groups: bank-specific (internal) factors and industry specific and macroeconomic (external) factors. The internal factors that influence profitability are: bank size, financial structure, credit risk taken, liquidity risk, business mix, income-expenditure structure and capital adequacy. An industry specific factor is the market concentration, while macroeconomic factors revealed by the literature are economic growth and inflation.

Various studies identify the bank size as an internal factor that influences the performance. The effect is not clear. On one hand, greater size may generate economies of scale, thus an increase of performance, but in the same time, the large organizations are often affected by rigidities, inertia, bureaucracy, that may decrease the performance (Kosmidou, 2008; Athanasoglou et al., 2006). This factor is proxied by the natural logarithm of total bank assets.

Another internal factor is the financial structure, which shows the way the bank's assets are financed and the capacity of the bank to cover losses (Hassan and Bashir, 2003). It may be expressed by the solvency ratio or capital adequacy ratio (the ratio of equity to total assets). A higher solvency may have a positive effect on performance as it reduces the risks taken by the bank (Athanasoglou et al, 2006). On the other hand, higher solvency will reduce the leverage effect, thus it may increase the financing costs (Akbas, 2012).

The credit risk is one of the main variables that affect the bank performance, as it exhibits the loss probability because of the failure of the debtor to fulfill its obligations to the bank. The literature usually expresses it by the ratio of loan loss reserves to gross or net loans granted by banks. We expect a negative effect on performance of the potential losses from bad quality loans (Mansur et al., 1993).

In our research we also considered the loans to customer deposits ratio as a proxy for the liquidity risk. A bank with a proper liquidity level will have the possibility to meet its obligations, even in difficult situations as bank runs. From this perspective, a "comfortable" ratio decreases the risks of failure which may reduce the financing costs and enhance the profitability (Alexiou and Sofoklis, 2009). On the other hand, liquid assets bring low returns, which lower the profitability.

We use the cost to income ratio as a proxy for management efficiency. Higher are the operating costs relatively to bank incomes, lower the bank profitability is, so a negative relationship is expected (Akbas, 2012).

The bank performance depends not only on the balance sheet assets. We can find important off-balance sheet assets in the European Banks that generate operating income, which positively influences the net gains, thus the profitability. The proxy used in our research is the ratio of other operating income to the average bank assets (Alexiou and Sofoklis, 2009).

The market concentration, an industry specific factor, is proxied by the Herfindhal-Hirschman Index (HHI) (Sufian and Chong, 2008). HHI is computed as the sum of the squares of the market share of banks. HHI is the proper concentration index because it accounts for the share of each bank in the market and gives greater weight to the firms with larger market shares. The relation to bank profitability is uncertain. There are many studies that test hypotheses regarding the effects of local market structure on various measures of bank performance, especially on ROA and ROE (Rhoades, 1995; Moore, 1998; Berger, 1995; Pilloff and Rhoades, 2002). Many of these market structure studies do not provide consistent support for the approach that there is a direct relation between concentration and profitability.

As external factors, the macroeconomic conditions influence the bank profitability. The economic growth, expressed by the GDP (per capita) growth, has multiple consequences among which is the increase of bank activity. Both the increase of customer deposits and loans granted and of the interest margins have a positive impact on bank profitability. When the economic activity decreases, the demand for loans and deposits decreases and negatively affects the profit margins (Sufian and Chong, 2008). The inflation rate is another macroeconomic factor positively related to the bank performance. Higher (anticipated) inflation rates determine the increase of the loan interest rates,

thus the increase of bank profitability. We have to note that if the inflation rate is not anticipated it may increase the financing costs and affect the bank profitability.

Table 1 summarizes the variables used in this paper and their expected effect on bank performance.

Table 1: Variables description

Symbol	Variables	Proxy	Expected relation (+/-)
<i>Dependent Variables</i>			
ROAA	Return on Average Assets	Net profit/ Average Asset	
ROAE	Return on Average Equity	Net profit/ Average Common Stock Equity	
<i>Independent Variables</i>			
<i>Bank specific factors (internal):</i>			
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	+
<i>Banking system specific factors (external):</i>			
hhi	Market Concentration	Herfindhal-Hirschman Index	+/-
<i>Macroeconomic factors (external):</i>			
inflation	Inflation	Inflation, GDP deflator (annual %)	+/-
growth	Economic Growth	GDP per capita growth (annual %)	+

We estimate the following equation:

$$y = \alpha + X_1\beta_1 + X_2\beta_2 + X_3\beta_3 + year\beta_4 + \varepsilon \tag{1}$$

where

- Y stands for the dependent variables ROAA or ROAE;
- X₁ is a vector of bank internal factors;
- X₂ is a vector of banking sector factors;
- X₃ is a vector of macroeconomic variables;
- ε is the error term;
- year are the year dummies;
- β_i is the matrix of variable coefficients.

We use the Hausman test to select the appropriate estimation method – fixed effects or random effects. By rejecting the null hypothesis (prob=0.000) for both dependent variables), it results that the correct method is

estimating the model with fixed effects. Simultaneously with the panel level fixed effects, the year dummies extract the time effect. They highlight the consequences on performance of different events that commonly affect all banks in the same moment in time. We also estimate robust standard errors to ensure that the covariance estimator handles heteroscedasticity of unknown form.

In the current paper we use yearly data for 1098 banks from EU27 countries for the period from 2004 to 2011. We haven't excluded any bank, contrary to other research in the field that uses different criteria to eliminate banks from the sample (size, type, data availability for longer periods of time etc.). The bank specific variables, including the performance data series, were downloaded from the Bankscope database. The data for HHI are supplied by ECB Statistical Data Warehouse. We used growth and inflation series from the World Bank database, which offers public access to a very large number of yearly macroeconomic variables.

4. Results

The results are exhibited in Table 2. It seems that the size of the bank does not influence the return on equity, namely the return of the shareholders investment. On the other hand, the return on assets depends on the total assets of the bank, but the estimated coefficient has a weak statistical significance (0.0228, $p < 0.10$). For the latter case, the coefficient has the expected sign, thus the bank size enhances the management efficiency.

The cost to income ratio has the expected (negative) sign and, in this case, it is significant for both dependent variables, although the relative effect of the operating costs is about ten times bigger for ROAE than for ROAA (0.171 versus 0.0183).

Credit risk has a negative, statistically significant impact on bank performance. Again the impact on ROAE is much stronger (-1.005) than on ROAA (-0.0726).

The liquidity risk is measured as the ratio of loans to customer deposits. If this ratio increases, e.g. banks use less deposits to grant loans or grant more loans without increasing the deposits, then bank performance deteriorates.

The capital adequacy ratio has not a statistically significant impact on shareholders return. This may be explained by the fact that a high capital adequacy may reduce the risks of the bank, but, in the same time, the shareholders do not benefit from the leverage effect. The effect of the solvency on ROAA is positive, statistically significant, but pretty weak (about 0.04). Both ROAA and ROAE are influenced by the operating income generated by the off-balance sheet operations. It seems that about 0.75% of the other operating income movements are reflected on the return on equity variable, while only 0.09% has an effect on the return on assets.

Regarding the external factors, the industry characteristics, namely the market concentration, diminish the bank profitability. In this case, we can consider that competition has a positive impact on bank profitability. The GDP growth has, as expected, a positive effect on bank profitability, while the inflation seems not to influence the performance. It may happen that the bank management couldn't adequately forecast future inflation, even though, the monetary policy in the EU countries is usually predictable (Alexiou and Sofoklis, 2009).

Tabel 2. Regression Statistics

Determinant variables	(1)	(2)
	ROAE	ROAA
size	-0.457 (0.582)	0.0228* (0.0102)
adequacy	0.0191 (0.330)	0.0401*** (0.00420)
crisk	-1.005*** (0.254)	-0.0726*** (0.0146)
efficiency	-0.171** (0.0527)	-0.0183*** (0.00301)
lrisk	-0.0153*** (0.00389)	-0.000907*** (0.000180)

busmix	0.755*** (0.142)	0.0924*** (0.0135)
HHI	-49.12* (21.44)	-2.303** (0.688)
inflation	-0.00391 (0.288)	0.0192 (0.0268)
growth	1.737*** (0.447)	0.0995*** (0.00605)
constant	33.29** (11.71)	1.419*** (0.231)
Observations	2514	2515
Adjusted R^2	0.116	0.376
Hausman Test: χ^2 (prob)	37.58 (0.000)	36.62 (0.000)

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

5. Conclusions

After analyzing the main determinants of banks' profitability in EU27 we can conclude that the empirical findings are consistent with the expected results. Thus, credit and liquidity risk, management efficiency, the diversification of business, the market concentration/competition and the economic growth have influence on bank profitability, both on ROAA and ROAE. An interesting and valuable result is that of the positive influence of competition on bank profitability in EU27. This validates the objective of European integrations to improve competition on markets. In line with the competition impact on bank profitability, the size of banks doesn't matter in the case of ROAE and has a small and week significant effect in the case of ROAA.

As a policy recommendation for authorities we suggest a better supervision for credit and liquidity risk of banks and the encouraging of banking competition. For banks' decision makers we also recommend to monitor the credit and liquidity risk indicators, to diversify the sources of revenues and to optimize costs.

As a future direction of research, we intend to deepen the analysis by extending the period and by splitting the sample in groups of countries.

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