Krisztina Füzesi[1]

Factors of return on equity in the Hungarian banking sector

This research aims to identify and measure the impact of selected internal factors to the banking profitability measured as the Return on Equity (ROE). In order to investigate the correlation between the indicators, internal factors of banking profitability were selected and tested with multilinear regression analysis. The sample of data contains 309 observations for 27 Hungarian commercial banks for ten years period of time, between 2006 and 2016. Empirical results are in line with previous research results; they show 15% average ROE and stress the correlation between operating cost level, loan to deposit ratio and ROE ratio for the research period. However, the role of the costs may be overrepresented and ROE ratio shows high volatility due to the financial crisis. Further analysis may be realized by using other profitability ratio such as Return on Total Assets (ROA) and extending the analysis to external factors of banking profitability, like market concentration level, GDP growth, inflation, or base rate level.

Introduction

Easy access to credits has generated a considerable amount of non-performing loans and affected the bank's profitability before the financial crisis and after the financial distress. In addition, the need for an increased capitalization may also have a negative influence on the profitability in the short-run. This problem is even more relevant in emerging countries, such as Hungary, because their financial sector is highly vulnerable due to international interdependencies. Research results shows the determinant role of foreign capital in the CEE region, which opens indirect channel of financial contagion and at the same time may soften and prevent the mass failure of CEE banking sectors [Kutasi, 2015]. The stable and profitable banking sector is the building block of the economic development, therefore economists need to understand how banks adopt the new economic and regulatory environment. The aim of this paper is to estimate the banking profitability determinants of the Hungarian commercial banks during the period 2006-2016. The research is focused on the internal conditions of the banks and does not investigate the role of external factors, such as the GDP. First, the performance of the Hungarian commercial banks is estimated. Performance refers to Return on Equity (ROE) indicator as the financial firm meets the needs of its stockholders, employees, depositors and other creditors, and borrowing customers [Rose-Hudgins, 2013]. The determinants of the performance are variables referring to the bank size, working efficiency,

[1] PhD Student, International Relations Multidisciplinary Doctoral School, Institute of International Relations, Corvinus University of Budapest

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asset quality and business activity. For estimation of profitability determinants panel data analysis is used. The sample of data consists of 27 Hungarian commercial banks, excluding monetary financial institutions and home saving banks. The first section of the paper presents the empirical literature regarding profitability determinants in the banking sector. The second section describes the methodology and data used during the analysis, focused on the selected variables. The last two sections show empirical analysis and the discussion of findings.

Literature review

In general, the main functions and advantages of a well-functioning banking sector are the following: operation of the payment system, money allocation activity to investors, channels of monetary policy and mitigation of market risk [Mishkin, 2009]. If banking activity shrinks, capital costs may increase, shadow banking system expands to replace banking functions and provides capital [Mishkin, 2009, Rose-Hudgins, 2013, Bouwman, 2014, Boot-Thakor, 2014]. The bank's profitability also mitigates the negative effects of financial crisis because a profitable banking sector is better able to absorb financial distress. That is why the identification of determinants of banking profitability remains a well-researched topic among bank management researchers.

The general literature of the bank management mentions the banking profitability as the bank's ability to generate profit and it may be defined with several profitability ratios in line with national and international accounting rules [Sulyok-Pap-Ligeti, 2006]. As far as the banking profitability indicators concern the Return of Equity (ROE) and the Return of Total Assets (ROA) are the most frequently used ways to measure banking profitability. Return on Equity (ROE) indicator measures the percentage return on each currency unit of shareholder's equity. It is the aggregate return to shareholders before dividends. The higher the return the better, as banks can add more to retained earnings and pay more in cash dividends when profits are higher. ROA is determined as the profit ratio in terms of total assets, which shows the bank's ability to produce profit depending on the asset volume [Rose-Hudgins, 2013]. Each of the ratios highlight a slightly different aspect of banking profitability. Return on Equity is a quality indicator, which also estimates operational efficiency. It measures the rate of return flowing to shareholders and approximates the net benefit that the stockholders have received from investing their capital in the financial firm, while ROA is a quantity indicator [Rose-Hudgins, 2013].

The previous research papers aim to determine the most important determinants of banking profitability and the correlation between them. The determinants of the banking profitability may be divided into three categories: the internal, external and macroeconomic determinants. Internal categories are bank specific factors such as the cost to income ratio, capital adequacy ratio, level of total assets, provision and other source of profit. These factors are evaluated as the determinants given by the business operation, indicating the performance of business activity and are influenced by the board of management. The external factors are usually determinants of the whole banking sector, they measure banking sector concentration with Herfindhal index, or market structure and share of institutions. The third group of determinants is macroeconomic determinants, measured mostly by the GDP growth or the level of interest rate. The management has no influence on these factors, but need to adopt them to a profitable banking operation.

Researchers use panel data regression analysis to investigate the correlation between these indicators. The sample of data usually contains regional or national data of commercial banks for 10 years period of time. As far as the results concern, several research suggest that the most important

factors affecting banking profitability are capitalization, bank size, volume of non-performing loans and interest income [Basci-Sakinc, 2012, Albulescu, 2014]. The negative determinant of banking business performance is mostly identified as the volume of non-performing loans and the cost on the non-performing loan portfolio. The role of non-performing loan accumulation is also demonstrated on the basis of practical experience of the financial crisis and based on research result on financial contagion effect [Kutasi, 2015]. Variables in regression analysis are determined as the risk taking activity and cost of risk, namely the level of provision, operating cost and cost to income ratio [Manueke, 2018]. Among the external determinants of banking profitability, variables of the banking sector were analyzed and market share and concentration variables are identified as significant indicators of banking profitability [Paleckova, 2016, Petria-Capraru-Ihnatov, 2015]. While after the global financial crisis the discussion of the relationship between macroeconomics and the commercial bank's performances expanded and identifies strong correlation between GDP growth, inflation and banking performance [Sigmund- Guntner-Krenn, 2017]. Some research also suggest that European banks recovered from the financial crisis harder/ lengthier than USA's banks, because of the challenging economic environment, namely low interest rate level and stringent capital requirements [Vasilev-Mrsik, 2017]. This study aims to investigate the relationship between banking profitability, determined as the Return of Equity ratio and other internal factors of banking profitability. The analysis is focused on Hungary, and uses panel data on national commercial banks.

Methodology and Data

Banking balance sheet and profit statement has changed significantly from 2017 due to the introduction of the International Financial Reporting Standards (IFRS). That is why empirical results for return on equity shows data for 2017, but this data is not included to the regression analysis. A panel data set is formulated from a sample of 309 observations of the Hungarian commercial banks for 10 years period of time, between 2006 and 2016. For this sample of data a multiple linear regression model with one explanatory variable was given as follows:

$$Y = \beta X + e, \tag{1}$$

where Y is the independent variable and X are the dependent variables, which may have an impact on banking profitability. The equation was tested and evaluated for all dependent variable, based on Paleczková [2016]. Sample of data tested includes 27 Hungarian commercial banks, excluding monetary financial institution, other financial institutions, home savings institutions and banks operating less than one year period of time. The data set used in this paper was obtained from the report of the Hungarian National Bank during the period 2006-2016. All the data is reported on a consolidated basis. In total the dataset contains 309 bank-year observations, to investigate Return on Equity (ROE) level and their determinants. ROE, as the dependent variable, is the most frequently used indicator to estimate banking profitability. This indicator measures the percentage return on each currency unit of shareholder's equity. It is the aggregate return to shareholders before dividends. The higher the return the better, as banks can add more to retained earnings and pay more in cash dividends when profits are higher [Rose-Hudgins, 2013].

$$\text{ROE=Net Income/Equity} \tag{2}$$

Each of the ratios highlights a slightly different aspect of banking profitability. Return on Equity is a measure of the rate of return flowing to shareholders. It estimates the net benefit that the stockholders have received from investing their capital in the financial firm [Rose-Hudgins, 2013]. Regarding independent variables several bank specific indicators were selected and tested, which have an influence on the profitability of the Hungarian banking sector. We distinguish four different indicators:

- efficiency: cost to income ratio (CIR),
- the bank size: logarithm of total assets (TA),
- asset quality and credit risk indicator: ratio of impaired loans/total loans (AQ),
- loan to deposit ratio (LD)
- level of capitalization: equity to total assets ratio (CA).

The expected effect of the variables is ambiguous, operational and risk costs may affect negatively the business profitability, while the level of equity and the volume of total assets may increase the profit.

1. Table: expected impact os the variables on ROE

Variable	Definition	Expected impact
Efficiency (CIR)	Cost to income ratio	-
Bank size (TA)	Logarithm of total assets	+
Asset quality (AQ)	Ratio of impaired loans/total loans	-
Loan to deposit ratio (LD)	Total loan/total deposit	+
Capitalization (CA)	Equity to total assets ratio	+

Result of the data review is detailed in the next chapter, while table 2 shows the descriptive statistics of these variables.

2. Table: Summary Statistics, using 309 observations

Variable	Mean	Median	Min	Max	St.Dev.
ROE	-0,0337	0,0415	-4,06	0,749	0,396
ROA	-0,00268	0,00419	-0,291	0,149	0,0374
Cost to income ratio	0,0837	0,172	-4,38	6,70	1,02
Logarithm of total assets	5,36	5,36	3,34	6,86	0,769
Impaired loan ratio	0,601	0,146	-155,	123,	11,7
Loan to deposit ratio	32,0	1,10	0,00	5,56e+003	349,
Equity to Total asset	0,112	0,0852	0,0134	0,980	0,0992

Hungarian banking landscape and results

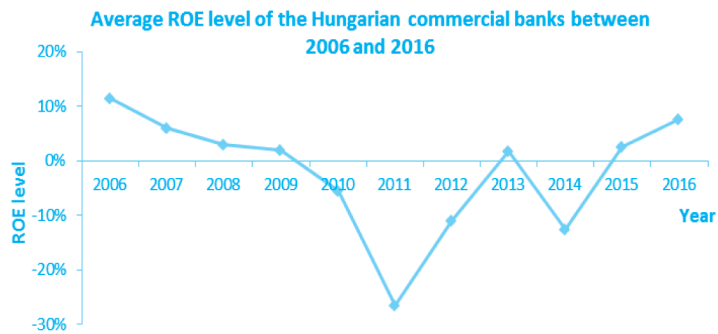
The aggregated balance sheet of the Hungarian banking sector from 2017 reflects traditional banking activity with high market concentration. As the banks concentrate on lending activity, loan's outstanding amount has the highest share of the total assets. Securities represent the second large asset group, which is because of government bonds. Among the liabilities the deposits have an average share of 70%. As far as the concentration concern, the big sized banks own the mayor part (45%) of the outstanding loan on the Hungarian market. Profitability ratios are the highest in case of big banks due to the advantages of economies of scale.

3. Table: ROA and ROE ratios for the Hungarian banking sector in 2017

ROE	17%	10%	9%
ROA	5%	1%	1%
Operational cost/interest and non-interest income	62%	74%	104%

ROE level for the research period, between 2006 and 2016 is slightly lower, due to financial turbulence. Average ROE is around 15% in the research period, which shows high dispersion. The period of the crisis, between 2010 and 2013 have a sharply descending value of ROE ratios due the financial turbulence.

Figure 1. Average ROE level of Hungarian commercial banks between 2006 and 2016



Multivariable regression analysis is used for determine the impact of dependent variables to the ROE ratio in order to determine the most important variables of banking profitability. Result shows high importance of cost to income ratio with 50,9% variance level, while the other variables have a very low explanatory level in ROE change. The explanatory level of the model increases to 69% in case of applying heteroscedasticity filter. In addition, based on p-value the variable loan to deposit ratio also have high significance in estimating ROE changes. The next table shows the results of the regression analysis with coefficient level results and adjusted R-squared value.

4. table: Model 1: OLS, Dependent variable: ROE

	Coefficient
const	−0,125655*
Cost to income ratio	0,251411***
Logarithm of total assets	0,0174665
Impaired loan ratio	0,000333881
Loan to deposit ratio	−3,20877e-05***
Equity to total asset	0,0680044
Number of observations	309
Adjusted R-squared	0,686214

***: level of significance based on p-value is 0,0597**
*****: high level of significance, variables <0,0001 p-value**

Discussion

The banking profitability has always been in the focus of economists and researchers, because it is vitally important for the economic system. However the factors influencing the operation and profitability of the banking sector are not clearly defined. Based on previous research results internal and also external variables would have an impact on banking profitability.

This research aims to identify the internal factors of banking profitability. The research uses the Return of Equity (ROE) as the common method to measure banking profitability, and also defines five dependent variables as influencing factors based on previous researches. These variables are operational efficiency, bank size, asset quality and credit risk indicator, loan to deposit ratio and level of capitalization. The correlation between the variables was tested with multivariable regression analysis on a sample of data. The sample contains 309 observations on the balance sheet records of the Hungarian commercial banks (excluding governmental and savings institutions) between 2006 and 2016. The expected results - based on previous research results - suggest that cost, credit risk and interest income are the variables with the highest explanatory level. Paleczkova [2016] found that the significant ROE indicators in the Czech banking sector are the following: efficiency with variable return to scale (variable estimated using the Data Envelopment Analysis based on the research methodology of Stavárek- Repková, [2012]), number of branches and ownership structure. Abulescu [2014] proved that capitalization and the interest rate margins affect positively ROE ratios while the level of non-interest expenses has a negative impact on banking profitability. Basci-Sakinc [2012] stresses the importance of level and source of interest income in ROE ratio, with a special focus on the ratio of consumer loans in the portfolio. Manueke [2018] and Petria-Capraru-Ihnatov [2015] also prove the significance of efficiency in banking profitability, measured by the mix effect of cost to income ratio, determined as the net interest margin and operating expenses to operating income and non-performing loan and loan to deposit ratio.

Main indicators of the ROE ratio in the Hungarian banking industry are the cost to income ratio and the loan to deposit ratio, with 70% significance level after filtering effects of heterosce-

dasticity. This result approves the previous research results, which stress the importance of operational efficiency and the level of non-interest expenses Paleczková [2015], Abulescu, [2014], Petria-Capraru-Ihnatov [2015]. However, cost variable may be overrepresented on the Hungarian banking market due to high market concentration. Hungarian banks may face strong market competition and narrowing interest margin due to the actual macroeconomic environment. Under this condition the importance of saving methods is highly valued. Results are different in case of asset quality and volume indicators. Based on previous research results these factors are proven profitability indicators [Manueke, 2015], however asset volume and quality, determined as the logarithm of total assets and the impaired loan ratio shows no effect on banking profitability in this research. This outcome may be explained in two ways. By definition return on asset (ROA) ratio is correlated with asset volume, therefore indicates more precisely the level of profitability measured by ROA. On the other hand the cumulated number of impaired loans represented in the banking books.

To sum up results are in line with previous research results on the topic. Further research may be realized by using other profitability ratio such as Return on Total Assets (ROA) and also include external factors of banking profitability, like GDP growth, inflation or base rate level. Furthermore the regression analysis may be completed with a cluster analysis based on the volume of banking operations, which shows the difference between business volumes.

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