Profitability Determinants and the Impact of Global Financial Crisis

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Abstract

The global financial crisis (2007-2009) had a significant impact on the performance of banking industry worldwide. This paper is conducted to examine economic effects of the global financial crisis on the banking sector in Visegrad countries (V4 countries). In order to examine the determinants of V4 banks´ performance panel data multiple regression has been applied to find out the relationship between depended variable (banks profitability) and independent variables (banks specific variables and macroeconomic variables). Our results showed that there exist large differences in profitability among banks in our sample and that a significant amount of this variation can be explained by the factors included in our analysis. In particular, bank profitability was mainly explained by the capitalisation, liquidity, quality of credit portfolio, operational efficiency, and market structure.

Key words: Global financial crisis; Bank profitability; Banking sector in V4 countries

JEL Classification: E44, G21, C2

1 Introduction

Financial systems can contribute to economic development by providing people with useful knowledge for risk management, but when they fail, they can cause severe financial crises with devastating social and economic effects. Crises can hit hard the weakest members of society, particularly poor, elderly, young and women. The global financial crisis that hit the world economy during the years 2007-2009 has transformed lives of many individuals and families, even in advanced countries such as those in V4. This paper aims to analyse how the global financial crisis since 2007 has been associated with deteriorating indicators in banking sector. The main aim of paper is to carry out the research in area of economic impact of financial crisis in the banking sectors´ of V4 countries.

When assessing the impact of the global financial crisis in the Visegrad countries, it is important to recall two important aspects that distinguish this region. First, these countries went through a deep and historically unprecedented transformation process from planned to market economies. This implied the need to undertake significant investments in physical and human capital within a short time period. Second, these countries went through a reorientation of regional trade. The regional reorientation of trade flows towards the EU was associated with structural changes involving a shift from resource-based low-tech export to medium- and high-tech exports. This shift helped V4 countries to successfully cope with the negative terms-of-trade shock resulting from the global commodity price boom before the global financial crisis.

Over the past decade the financial markets in Visegrad countries have also undergone several changes that have significantly affected performance of their banks. Performance of banks and other financial institutions is very frequently discussed topic in literature as performance of banks can affect the stability of the banking industry and thus the effectiveness of whole monetary system. Banking sectors are still the primary form of financial intermediation in V4 countries, being the major channel for mobilization of domestic savings and their transformation into a major source of external capital to firms. Also banking sectors are still the key players in the payment systems. Therefore, the development of banking sectors´ performance is crucial for economies growth in V4 countries.

According Resti (1996) at the macroeconomic level, bank performance represents a socially optimal target, since it reduces the costs of financial intermediation, driving down to a physiological level the drainage of real resources due to transfer of funds from savers to producers. Consequently, central banks are seriously interested in the accomplishment of operating practices and market equilibrium that grant the maximum productive efficiency, provided that this doesn't bring in a monopoly which would expropriate the consumers from the advantages due to the reduction in average costs. Of course, given some crisis situations, it may be optimal to postpone the search for efficiency, concentrating on the defence of the system stability and preventing the dangerous "domino effects" that can arise when the less productive institutions are forced to leave the market in a dramatic way. Nevertheless, the illusory dilemma between efficiency and stability exists only in the short term: when things are put in a wider perspective, then efficiency appears as the only endogenous force which can ensure solidity of a banking system.

One of the consequences of the global financial crisis which has affected performance of banks in all countries of the world was the growth of non-performing loans and growth of their share on total gross loans. The theme of non-performing loans has attracted more attention in recent years. Several studies examined bank failures and found that assets quality is an indicator of insolvency (Demirgüç-Kunt 1989; Barr and Siems 1994), since banks still have a high level of non-performing loans before the bankruptcy. These authors found out that if the volume of non-performing loans increased, the possibility to increase the performance of banks continues to decline.

The performance of banks is also related to changes in environment and economic conditions in the country. Therefore the aim of this paper is to examine the determinants of V4 banks´ performance and to find out the relationship between banks profitability and banks specific variables and macroeconomic variables.

The structure of the paper is following. Section 2 presents review of literature on bank performance; section 3 describes dependent and independent variables; while section 4 explains the research methodology and results of analysis. The last section concludes the paper with summary of key findings.

2 Literature Review

The existing literature on bank performance is quite large and provides a comprehensive examination of the effects of bank specific and macroeconomic determinants on bank performance. Early work goes back to Short (1979) and Bourke (1989), who were followed by a series of papers which attempted to identify major determinants of bank performance.

Most of the papers study this topic within a single-country setup. Berger (1995), Athanasoglou (2008), Sufian (2009), Dietrich and Wanzenried (2011), Ramadan et al. (2011) focused their analyses on single countries. On the other hand the studies of Molyneux and Thorton (1992), Staikouras and Wood (2004), Pasiouras and Kosmidou (2007), Flamini et al. (2009) investigated panel data set. In condition of Slovak and Czech Republic, the impact of financial crisis on the banking sector is discussed in the works of authors such as Klacso and Rychtárik (2010), Urbanovičová (2011), Lungová (2011), Vodová (2013) and Belás (2013).

The empirical results of these studies vary, given the differences in their datasets, time periods, investigated environments, and countries. However there was found some mutual elements.
Bank performance is usually measured by the return on average assets (ROAA) and is expressed as a function of internal and external determinants. The internal determinants include bank specific variables and external determinants reflect environmental variables that are expected to affect the performance of financial institutions.

In most studies variables like bank size, capital ratio, cost-to-income ratio, loan-to-deposit ratio are used as internal determinants of bank performance. For example Pasiouras and Kosmidou (2007) and Sufian (2009) find a positive and significant relationship between the bank size and bank profitability. According Dietrich and Wanzenried (2011) this is because larger banks are likely to have a higher degree of product and loan diversification than smaller banks, and because they should benefit from economies of scale. Bourke (1989) and Molyneux and Thorton (1992) find a negative and significant relationship between the level of risk and profitability. This result can reflect the fact that financial institutions that are exposed to high-risk loans also have a higher accumulation of unpaid loans, which lower the returns and this way also profitability of affected banks. Bourke (1989) also find out that the best performing banks are those who maintain a high level of equity relative to their assets. The author explained that banks with higher capital ratios tend to face lower costs of funding due to lower perspective bankruptcy costs. This finding is consistent with the results in Ramadan et al. (2011). Furthermore, in papers of Athanasoglou (2008), Sufian (2009) and Ramadan et al. (2011) there is also empirical evidence that the level of operational efficiency positively affects bank profitability.

The external determinants of bank performance, as presented in literature, include factors like as the inflation rate, GDP development, GDP per capita, interest rates and variables representing market characteristics (e.g. market concentration). For example Athanasoglou (2008) has shown a positive relationship between inflation, GDP growth and bank profitability. The positive relationship between economic growth and profitability is evident also in work of Sufian (2009). Staikouras and Wood (2004) reviewed the performance of European banking industry and find out that interest rate had a significant positive impact on ROA. The results of Bourke (1989), Molyneux and Thorton (1992) and Sufian (2009) provide empirical evidence for a positive and

statistically significant relationship between the bank concentration ratio and the profitability of the bank, which is in line with the traditional structure-conduct-performance paradigm.

The impact of financial crisis on the determinants of bank profitability is examined for example in work of Dietrich and Wanzenried (2011). In their paper they analysed the profitability of 372 commercial banks in Switzerland over the period from 1999 to 2009. They evaluated the impact of financial crisis, they separately considered the pre-crisis period (1999-2006) and the crisis years (2007-2009). The results outlined in their paper provide some evidence that the financial crisis did indeed have a significant impact on the Swiss banking industry and on bank profitability in particular.

To conclude, the existing literature provides a comprehensive examination of the effects of bank specific and macroeconomic determinants on bank performance. However the impact of the crisis on the determinants of bank performance has not yet been analysed in V4 countries. Furthermore, our study fills an important gap in the literature because we analyse the performance determinants of commercial banks in Visegrad countries.

3 Determinants of Bank Profitability and Variable Selection

In this section we describe dependent and independent variables which were selected for our analysis of bank performance.
As the dependent variable was used return on average assets (ROAA) as main measure of bank profitability. The ROAA is defined as the ratio of net profits to average total assets expressed as a percentage. According Dietrich and Wanzenried (2011) this variable reflects the ability of the bank´s management to generate profits from the bank´s assets and it indicates how effectively the bank´s assets are managed to generate revenues.

The independent variables can be divided into two groups: bank specific variables and macroeconomic variables. As a bank specific determinants of bank performance were used the following variables: bank size, equity over the total assets, loan-to-deposit ratio, non-performing loans over the total loans and cost-to-income ratio.

Bank size was measured by the logarithm of total assets because it was necessary to eliminate size effects. There are two theories regarding the size of the banks. Generally, the effect of growing size on performance has been proved to be positive to a certain extent. For banks that become extremely large the effect of size could be negative due to bureaucratic and other reasons.

To measure capital strength of bank there was used the ratio of equity to assets. In general, we assume that banks with higher capital ratio are safer. To determine a relationship in case of this variable is not entirely clear. One point of view is that capital ratio is expected to have a positive sign, since it is assumed that banks are predicted to be rewarded with additional revenues for holding the optimal amount of capital. The second point of view says that capital ratio is expected to have a negative sign, since it is assumed that banks which hold higher value of

capital cannot provide these funds in form of loans and this way reduce the value of potential interest income.

Third independent variable was indicator of liabilities structure measured as a ratio of total loans to total deposits. Loan-to-deposit ratio captures the credit creation by banks. Loans of bank are expected to generate profit and to be main source of income; therefore we expected a positive impact on bank performance.

Fourth explanatory variable is share of non-performing loans on total loans. According Berger and DeYoung (1997) we expected negative relationship to bank performance which confirms so called bad management hypothesis. According this hypothesis, bad managers don't control adequately operating expenses and poorly manage loan portfolio, so this can cause low performance and greater amount of problematic loans.

The last independent variable was indicator of operating efficiency measured by so-called cost-to-income ratio. Cost-to-income ratio represents share of operating costs to operating income. This indicator tells us what percentage of the operating income the banks use for its operation. Decreasing value of this indicator suggests that banks use their resources rationally and effectively, therefore we expect negative relationship between the performance and the cost-to-income ratio.

In addition to the bank specific variables the analysis included a set of macroeconomic variables like: inflation rate, real gross domestic product growth and indicator of market structure.
According Dietrich and Wanzenried (2011) the effect of inflation on the bank performance depends on whether wages and other operating expenses increase at a faster rate than the inflation. Most studies (e.g. Bourke (1989), Molyneux and Thorton (1992)) have found a positive relationship between inflation and profitability. However, if inflation is not anticipated and banks don't adjust their interest rates correctly, there is the possibility that costs may increase faster than revenues and hence affect bank profitability negatively.

Gross domestic product growth rate reflects the conditions of the economy. We assume that the growing economy will provide a growing demand for banking services and lower risk; therefore it is expected positive relation with bank performance.

The last variable was indicator of market structure. The market structure in the banking industry is usually measured by concentration ratio. The concentration ratio (CR5) is the proportion of industry´s total assets controlled by its five largest banks. Increasing value of CR5 index indicates that the level of competition in banking sector decreases and the market power is concentrated in hand of low number of banks. In our study there is expected positive relationship between the bank concentration ratio and the banks´ performance, which is in line with the traditional structure-conduct-performance paradigm. According this paradigm banks in highly concentrated markets tend to collude and therefore earn monopoly profits as they tend to charge higher rates on loans and less interest rates being paid on deposits.

The global financial crisis, which began in August 2007, had impact on the economies around the world, and this way banks around the world were also affected. In order to take into account the impact of the global financial crisis on bank performance we build a dummy variable (DUM

crisis) which takes the value of one for years 2007-2009, and zero for years after 2009. In accordance with Dietrich and Wanzenried (2011) we expect a negative impact of the financial crisis on bank performance.

4 Data, Methodology and Empirical Results

This section identifies the sources of data, presents the data itself, describes the regression model we use to investigate the effects of selected variables on bank performance and summarizes empirical results.

Our main data source for bank specific variables was Bankscope database. The missing data were supplemented from banks´ annual reports. We used banks´ end-of-year consolidated balance sheets and income statements based on international accounting standards. All data were reported in EUR as the reference currency. The data in national currencies were converted by official exchange rates.

The data for macroeconomic variables were taken from web site of Eurostat and the data for CR5 index, measuring the market structure were taken from web site of European central bank (ECB). Our sample is a balanced panel dataset of 34 largest commercial banks in Visegrad countries over the period 2007-2012 consisting of 204 observations.

Table 1 reports the descriptive statistics for the variables used in our analyses, separately according countries and also in whole sample. Let us briefly highlight a few interesting facts. On average, the banks in our sample had a ROAA of 0.82% over the entire period from 2007 to 2012. The difference between the average and median (1.01%) indicates that there exist large profitability differences among the banks in our sample. The highest level of variability was observed in case of Czech as evidence by the highest value of standard deviation. On average, the capitalisation of banks was 9.39%. The best capitalised bank in our sample had a capital ratio of 28%, whereas, for the least capitalised bank, total equity covered only 2.86% of total assets. The value of loan-to-deposit ratio reached the average value 105.80%. This indicates that the banks on average provided higher volume of loans than was the value of received deposits. This indicator of liquidity in banking sector further suggests, that the liquidity risk was highest for Hungarian banks, and lowest in case of Slovak banks. The non-performing loans relative to total loans, which is an indicator of the quality of credit portfolio, amounted 7.77% on average, but there exist again large differences among the banks in sample. The bank with highest level of credit risk reached value of non-performing loans ratio over 40%. On the other hand, the bank with lowest credit risk reached value around 0.43%. As the indicator of operating efficiency was used cost-to-income ratio. On average, banks in our sample used 58.69% of their operating income for its operations. According the values of macroeconomic variables can be seen, that he lowest average inflation rate during the whole observed period was reached in case of Slovak economy and the highest average GDP growth reached the Polish economy. Finally, note that the CR5 index as our measure of bank concentration was on average 56.51%. The most concentrated can be regarded Slovak banking sector, the least concentrated was Polish banking sector.

Tab. 1 Sample characteristics: variables average (and standard deviations)

	Slovak Republic	Czech Republic	Hungary	Poland	V4
ROAA (%)	0.58 (1.0441)	0.86 (2.4501)	0.17 (2.0340)	1.27 (0.8295)	0.82 (1.7033)
Bank size (logTA)	6.64 (0.3838)	6.78 (0.5853)	7.04 (0.2464)	7.06 (0.3171)	6.90 (0.4407)
Equity to assets ratio (%)	7.68 (2.4521)	9.04 (3.8047)	8.61 (2.5792)	11.04 (4.2139)	9.39 (3.7491)
Loan-to-deposit ratio (%)	91.16 (15.2333)	93.20 (33.4792)	132.37 (25.6217)	110.49 (52.4607)	105.80 (40.4336)
Non-performing loans on total loans (%)	5.53 (2.2223)	7.79 (7.4276)	11.29 (8.3870)	7.30 (6.2676)	7.77 (6.6772)
Cost-to-income ratio (%)	65.45 (14.5297)	55.17 (23.5542)	55.93 (11.1739)	58.78 (12.5085)	58.69 (16.6686)
Inflation rate (%)	2.53 (1.4381)	2.78 (1.8734)	5.37 (1.3975)	3.52 (0.6353)	3.45 (1.6604)
GDP growth rate (%)	3.50 (4.6748)	1.23 (3.3165)	-0.77 (2.9473)	3.97 (1.8142)	2.31 (3.6315)
CR5 index (%)	71.13 (1.4402)	62.65 (1.4225)	54.50 (0.3958)	44.37 (1.0618)	56.51 (10.4230)

Source: Author´s calculations

In order to examine the internal and external factors that affect the performance (profitability) of banks in V4 countries, the following model has been developed:

$$PERF_{it} = c + \sum_{j=1}^{J} \beta_j X_{j,it} + \sum_{l=1}^{L} \delta_l Y_{l,it} + \varepsilon_{it} \qquad (1)$$

$PERF_{it}$ is profitability of bank i at time t, with $i = 1,…,N$; and $t = 1,…,T$; c is a constant term; $X_{j,it}$ are the bank specific variables of bank i at time t, with $j = 1,…,J$; and $Y_{j,it}$ are the macroeconomic variables with $l = 1,…,L$; and ε_{it} is the disturbance.

In order to examine the determinants of V4 banks´ performance panel data multiple regression has been applied. Model (1) was estimated through a fixed effects regression taking each bank´s ROAA as the dependent variable. The opportunity to use a fixed effects rather than random effects model was tested with the Hausman test. If the p-value of the Hausman test is higher than the chosen significance level, then the random effects model is appropriate choice. Precondition for the use of a linear model is stationarity of time series. In the literature, there are several tests of stationarity of time series. To verify the stationarity in case of our sample we used augmented Dickey-Fuller test (ADF test). Based on the results of ADF test it was found that all the data series were stationary. It allows us to analyse the relationship between variables through a linear model. Basic and most used method for estimating the parameters of a linear model (regression coefficients) is ordinary least squares method (OLS). To verify possibility of use OLS method there was used the Breusch-Pagan Lagrange multiplier (LM) test. On the basis of p-value in LM test it was found that the data can be analysed by the OLS method. Autocorrelation was tested through the Durbin-Watson (DW) test for serial correlation in panel models. According the p-value in DW test presence of autocorrelation was not detected. To verify the correlation between the independent variables was used VIF test. The results of VIF test confirmed that between the independent variables the multi-collinearity was not detected. The results of model testing and the estimated regression coefficients are shown in Table 2.

Tab. 2 Determinants of bank profitability for all years

	Coefficient	t-statistics	p-value
Intercept	6.0276070	3.2942	0.001173 ***
Bank size (logTA)	-0.1330436	-0.6706	0.503285
Equity to assets ratio (%)	0.1012457	4.6194	7e-06 ***
Loan-to-deposit ratio (%)	-0.0036132	-1.8869	0.060662 *
Non-performing loans on total loans (%)	-0.1147330	-9.5867	< 2.2e-16 ***
Cost-to-income ratio (%)	-0.0514436	-9.7118	< 2.2e-16 ***
Inflation rate (%)	-0.0703377	-1.5105	0.132531
GDP growth rate (%)	0.0248410	1.2207	0.223689
CR5 index (%)	-0.0158002	-1.9088	0.057764 *
DUM crisis	0.2677229	1.8047	0.072666 *
Sample size	Balanced Panel: n=34, T=6, N=204		
R^2	0.67292		
F-statistics	F-statistic: 44.3479 on 9 and 194 DF, p-value: < 2.22e-16		
Hausman Test	chisq = 116.6071, df = 9, p-value < 2.2e-16		
ADF test	stationary		
LM test	chisq = 0.3984, df = 1, p-value = 0.5279		
DW test	DW = 1.9014, p-value = 0.762		
VIF test	LOGTA (1.563037); ETA (1.380312); LD (1.225415); NPL (1.305480); CI (1.593692); INF (1.222084); GDP (1.116482); CR5 (1.521711); DUM (1.130209)		

'***' 0,01 '**' 0,05 '*' 0,1

Source: Author´s calculations

Table 2 reports the regression results. As can be seen in the Table 2 as the statistically significant variables were identified: capitalisation, loan-to-deposit ratio, quality of credit portfolio, operating efficiency, market structure and dummy variable representing crisis period.

The relation between the size and bank´s performance was negative, but not statistically significant. This result is in line with Pasiouras and Kosmidou (2007) which says that negative coefficient indicates that larger (smaller) banks tend to earn lower (higher) profits and provides support to the studies that found either economies of scale and scope for smaller banks or diseconomies for larger financial institutions.

The capital ratio, which is defined as equity over total assets, had a positive and significant effect on bank profitability. It signalises, that better capitalised banks were safer compared to those with lower capital ratios and might face lower costs of funding due to lower prospective bankruptcy costs. In concrete terms, an increase of the capital ratio by 1% led to an average increase of the ROAA of 0.1012%. Even though these changes were not large, this result has a great importance when considered in the context of capital adequacy ratios defined by Basel III.

Referring to liquidity, the loan-to-deposit ratio was statistically significant and negatively related to the profitability of banks in V4 countries. This indicates a positive relationship between bank profitability and the level of liquid assets held by banks. In times of crisis and in the years thereafter banks focused on reducing the share of illiquid assets in the form of loans, which was due to an increased risk of loan repayment in observed period. This result is in line with study of Bourke (1989).

The ratio of non-performing loans on total loans is a measure for credit quality. As we can see from our estimation results, this variable had a statistically significant negative and rather strong

effect on the commercial banks profitability. The control of credit quality remains a current issue particularly in the face of the recent financial crisis. This can be seen by looking at concrete figures. In case of banks in V4 countries, the reduction of non-performing loans to total loans by 1% can bring positive effect on the mean of the ROAA of 0.1147%.

The coefficient of operating efficiency, cost-to-income ratio, was significantly negative, which confirms to our expectation. The more efficient banks (banks with lower cost-to-income ratio) were also more profitable. This result clearly shows that an efficient cost management was a prerequisite to improve the profitability of banks in V4 countries. The regression coefficient can be interpreted as follows, a decrease of cost-to-income ratio by 1% led to an average increase of the ROAA of 0.0514%.

Considering the external factors related to the macroeconomic environment and the market structure of the countries in which the banks were operating, we find that inflation negatively and GDP growth positively affected bank profitability in V4 countries, but this impact wasn't significant.

The impact of market structure, as approximated by the five-bank concentration ratio in the banking industry, on bank profitability brings another interesting issue. According the value of coefficient we can say, that the market concentration was negatively related to profitability. Higher bank concentration should be the result of a stronger competition in the banking industry, which was reflected in the decline of bank performance. In concrete terms, an increase of the CR5 index by 1% led to an average decrease of the ROAA of 0.01582%. This study finds no support structure-conduct-performance paradigm. Our outcome is in accordance with for example Berger (1995), which claims that concentration is usually negatively related to profitability. This fact can be interpreted so that decline in value of CR5 index indicates that industry was moving to a more competitive structure and hence profitability should have increased.

Our dummy variable for the financial crisis (DUM crisis) showed that the impact of the global financial crisis on banks´ profitability was positive. The average ROAA for analysed banks acting in V4 countries during the crisis (2007-2009) was 0.99%, but dropped down after the crisis (2010-2012) to only 0.66%. Banks acting in V4 countries seem to be able to withstand the international macroeconomic challenges created by the downturn in developed economies fairly well as they were also not so exposed to "toxic assets" and securitization issues. During the crisis period, when dummy variable takes value equal to one, the profitability of banks was higher than in the post-crisis period. So we can say, that the negative impact of the crisis was reflected in banks´ profitability at a later date.

5 Conclusions

This paper has examined how bank specific characteristics and macroeconomic factors affected the profitability of 34 commercial banks is V4 countries over the period from 2007 to 2012. Our results showed that there exist large differences in profitability among banks in our sample and that a significant amount of this variation can be explained by the factors included in our analysis. In particular, bank profitability was mainly explained by the capitalisation, liquidity, quality of credit portfolio, operational efficiency and market structure.

The equity to assets was statistically significant and positively related to ROAA, which confirmed that the capital was important in explaining bank profitability. The loan-to-deposit ratio was statistically significant and negatively related to the profitability of banks in V4 countries indicating that in times of crisis and in the years thereafter banks focused on reducing the share of illiquid assets in the form of loans, which was due to an increased risk of loan repayment in observed period. The credit quality had a statistically significant negative and rather strong effect on the commercial banks profitability, suggesting that the control of credit quality remains a current issue, particularly in the face of the recent financial crisis. The cost-to-income ratio was also statistically significant although negatively, showing that cost decisions of bank management were instrumental in influencing bank performance. Together with quality of loan portfolio appeared to be the most significant determinant of banks´ profitability. The impact of bank size, GDP growth and inflation, on ROAA wasn't significant. Also the structure-conduct-performance hypothesis wasn't verified, as the effect of industry concentration on bank profitability was significant, but negatively related to profitability.

Our results are relevant from several points of view. First, the variables included in our analysis confirm and complement findings from former studies of bank profitability. Second, we provide evidence for a more recent time period, including period of the latest global financial crisis. Third, the analysis of a sample of banks allows us to better understand which determinants influenced banks´ profitability in V4 countries. This way our study filled an important gap in the literature because we analyse the performance determinants of commercial banks in Visegrad countries.

Future research could focus on impacts of the governmental and legal environment on bank profitability, while taking into account differences in the countries´ income level as well as the different regions of the world. In addition, it could focus on impacts of specific information on bank management, such as education, skill level, experience, and other factors which are important to understand bank profitability.

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