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PROFITABILITY OF POLISH BANKS AND ITS DETERMINANTS

DETERMINANTY RENTOWNOŚCI BANKÓW POLSKICH

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Summary. Since bank profitability is a very important issue, it is worth to analyze it comprehensively. The aim of this paper is to investigate the determinants of profitability of Polish commercial banks during the period 2000–2013. With the use of panel data regression analysis, we tested five bank-specific factors and five macroeconomic factors. Although the development trend of return on assets, return on equity and net interest margin is slightly different, bank profitability measured by these three ratios is influenced by the same factor. The most profitable banks are banks that have lower capital adequacy because they focus more on lending activity. At the same time, they pay significant attention to the quality of their loan portfolio. Bank profitability also increases with the size of the bank. Among the macroeconomic factors, the phase of economic cycle, connected with the rate of unemployment, interest rate on loans and exchange rate are of the biggest importance.

Key words: return on assets, return on equity, interest margin, commercial banks, panel data analysis.
Słowa kluczowe: rentowność aktywów, rentowność kapitału własnego, marża odsetkowa, banki komercyjne, analiza danych panelowych.

INTRODUCTION

Traditionally, banks are companies which take deposits and provide loans, and profit by the difference between the costs of deposits and the earnings from loans. In recent years, the profitability of these traditional banking activities has diminished. As a result, to maintain their position of financial intermediaries, banks have increasingly turned to new non-
-traditional financial activities. However, such changes are very important for financial stability. The more unstable is a bank´s profit, the more risky the bank is.

Banking sectors in the world have experienced substantial changes in recent years. Changes in the competition, mergers and acquisitions in the banking sector, overall macroeconomic development, recent financial crisis, together with globalization trends and changes in legislation posed great challenges to banks; Polish banks are no exceptions.

Economies with profitable banking sector are better able to withstand negative shocks and contribute to the stability of the financial system (Alper and Anbar 2011). Bank profitability is strongly linked to the economic cycle as the efficiency of financial intermediation of banks affects economic growth, and bank insolvency may result in systemic crisis which would have very negative impact on the entire economy. However, the link between the business

cycle and bank profitability is neither simple nor straightforward. As Vennet et al. (2004) showed, banks adopted different risk strategies before and during the downturn, and moreover, bank profitability and the types of risks differ across countries and institutional forms. Diversified banks were hit harder than their specialized peers. Banks with a focus on local lending and banks with relatively high interest margins seem to have benefited from their focus. Banks with higher capital adequacy appear to have better profitability even during a period of downturn.

It is obvious that bank profitability is a very important issue and should be analysed comprehensively. The aim of this paper is therefore to investigate the determinants of profitability of Polish commercial banks during the period 2000–2013. We focus only on commercial banks. To ensure homogeneity of data, branches of foreign banks, mortgage banks, building societies and special purpose state banks were not covered by the study. Our sample includes a substantial part of the Polish banking sector; its share on total assets of the banking sector ranges around 70% in particular years.

The paper is structured as follows. The section following the introduction provides definitions of bank profitability and characterizes methods of measuring thereof. In the subsequent section, trends in profitability of Polish banks are described. Next sections focus on the model and present the results of the regression analysis conducted. Finally, concluding remarks are presented.

BANK PROFITABILITY AND ITS MEASUREMENT

Profitability means a situation in which revenues exceed expenses and the bank realizes a profit. To make a profit is a prerequisite for the very existence of every bank.

Profits accumulated by banks constitute one of their sources of capital. They increase banks' capital adequacy which is meant to protect them against unfavourable shocks and thus increase their stability. The level of bank profitability influences the bank´s competitiveness and credibility. Moreover, the level of a bank's capital adequacy determines the possibilities for financing the real estate sector by the banking sector and thus influences economic growth (Chmielewski and Krzesniak 2003).

As the aim of this paper is to investigate the determinants of profitability of Polish commercial banks, appropriate profitability measures are of the utmost importance. Although there is a large number of various profitability ratios, the following three are the most commonly used: (i) return on assets, (ii) return on equity, and (iii) interest margin.

Return on assets (ROA) is the share of net income in total assets. ROA reflects how well the bank management uses the bank´s real investment resources to generate profit. Value of the ROA around 1% is considered as good. When evaluating the results of this ratio, it is possible to use also the following recommended values (Table 1).

Table 1. The values of the ROA and the level of bank profitability

Vales of the ROA [%]	Bank profitability
< 0.75	weak
0.75–1.00	below the standard
1.00–1.25	good
1.25–1.75	very good
> 1.75	excellent

Source: Ziegler et al. (1997).

Return on equity (ROE) can be calculated as a share of net income in own equity of the bank. ROE measures the rate of return on the ownership interest and its value reflects the bank´s efficiency at generating profits from every unit of shareholders´ equity. So ROE also shows how well the bank uses investment funds to generate earnings growth. ROEs between 15% and 20% are considered desirable (Gul et al. 2011).

Finally, interest margin (NIM) is the share of net interest income in total assets. NIM is therefore a measure of the difference between the interest income generated by banks and the amount of interest paid out to their lenders, relative to the amount of their assets. NIM is focused on the profit earned on interest activities (Gul et al. 2011).

TRENDS IN BANK PROFITABILITY OF POLISH BANKS

We will focus on the development of profitability of Polish banks, measured by the three above-mentioned profitability ratios. We have used unconsolidated balance sheets and annual profit and loss accounts for the period from 2000 to 2013, obtained from the BankScope database. The data set covers a significant part of the Polish banking sector, which is reflected by the share of assets of all the included banks in total banking assets (Table 2). The panel is unbalanced as some of the banks did not cover the entire study period in their reports. To ensure homogeneity of the data set, only data from commercial banks were included in the study, whereas branches of foreign banks, mortgage banks, building societies and special purpose state banks were abstracted (such as Bank Gospodarstwa Krajowego).

Table 2. Data availability

Indicator	00	01	02	03	04	05	06	07	08	09	10	11	12	13
Number of banks	21	23	26	26	28	28	26	27	30	35	35	34	33	24
Share on total assets [%]	65	75	80	71	77	78	75	73	73	73	73	72	72	73

Source: Author's calculations based on data from the BankScope and from the European Banking Federation.

For these banks, we have calculated return on assets, return on equity and interest margin. As higher values of these three ratios means higher profitability, it is evident that bank profitability in Poland fluctuated quite significantly (Fig. 1). As we can see from median values, although bank profitability measured by return on assets is quite volatile, the values of this ratio remained higher than 0.5% even in the crisis years. However, even these quite positive values are in fact "below standard" or "weak" (Table 1). Getin Noble Bank, DNB Bank Polska, HSBC Bank Polska or Fm Bank belongs to the group of banks with minimum values of ROA; the group of banks with the highest values of ROA includes Plus Bank, RCI Bank and Santander Consumer Bank. All these banks have excellent profitability, at least in particular years.

Figure 1 also shows median values of the return on equity. The development trend of ROE ratio differs significantly from that for ROA. Return on equity of Polish banks fluctuates significantly. As we know, recommended value for ROE is 15–20%. It is evident that in the banking sector as a whole this value was not met. It is not surprising: if the values of ROA

are with the exception of the period 2004–2007 below standard or even weak, we should not expect excellent return on equity. Again, substantial differences can be identified among individual banks in the study. As it comes to ROE values, the same banks as in the previous case have to be mentioned. Recommended values of ROE occurred for example in PKO, Pekao or Bank Zachodni.
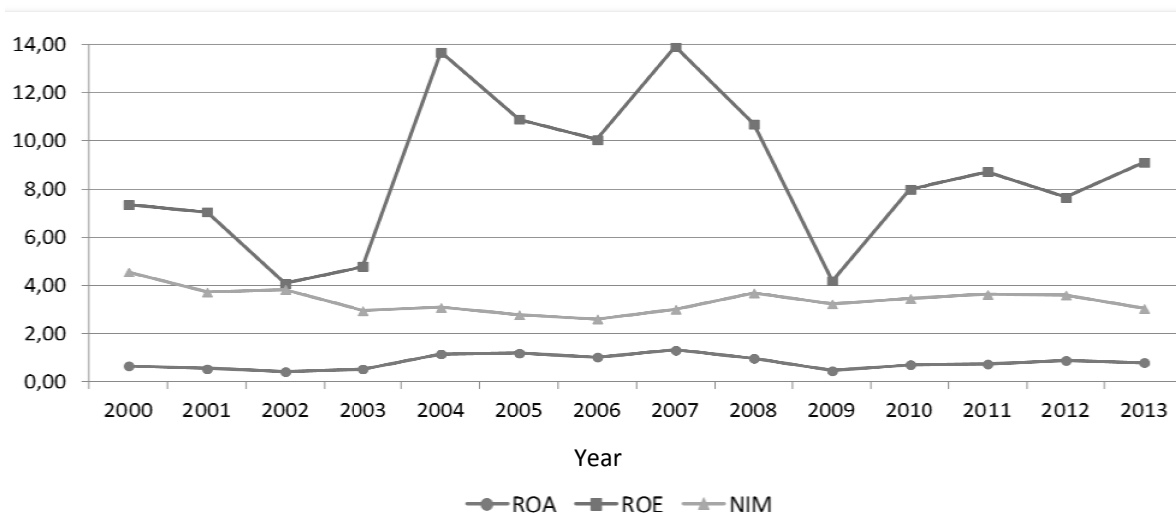

Fig. 1. Median values of the ROA, ROE and NIM [%]
Source: Author's calculations based on data from the BankScope database.

Net interest margin measures the ability of a bank to earn profit on interest activities. As evident from Fig. 1, both the values and the development trend are completely different from the two previous indicators. Also descriptive statistics reveals significant differences. We can find banks with high NIM and low ROA, such as FM Bank. Of course there are also banks with high values of both ratios. As we can see, the NIM ratio only reflects the profitability of basic banking activities: accepting deposits and providing loans. However, total profitability of banks, measured by ROA or ROE, is strongly influenced also by other items of costs and revenues, such as fees, commissions, creation of loan loss provisions, personal costs and other.

THE MODEL

As long as we know the level of bank profitability, it is possible to examine its determinants. In order to identify which factors affect individual profitability ratio of Polish banks, we use the panel data regression analysis (Equation 1).

$$R_{it} = \alpha + \beta' \cdot X_{it} + \delta_i + \varepsilon_{it} \tag{1}$$

where:

R_{it} – the chosen profitability ratio (ROE, ROA or NIM) for bank *i* in time *t*,

X_{it} – the vector of explanatory variables for bank *i* in time *t*,

α – constant,

β' – coefficient which represents the slope of variables,

δ_i – represents fixed effects in bank i,

ε_i – means the error term.

It is evident that the selection of appropriate explanatory variables is the crucial issue here. Our selection will be based mainly on variables used in studies focusing on determinants of individual profitability ratio. First of all, we shall refer to a study on factors influencing the profitability of Polish banks. Chmielewski and Krzesniak (2003) aimed to identify the crucial factors that affect the profitability of 28 largest banks in Poland during the period from Q1 of 1997 to Q4 of 2003. They used the return on assets as a dependent variable. The list of tested explanatory variables included a number of measures reflecting the size of the bank, its capital structure and risk, the quality of the bank´s loan portfolio, the structure of earnings, and activity profile. Among macroeconomic variables, they tested only the impact of gross domestic product. The result of a panel data regression analysis showed that bank profitability is negatively influenced by foreign capital share in bank´s equity. On the contrary, a higher market share has a positive effect on profitability of Polish banks. The same is true for the coverage of bad loans by loan loss provisions (banks that created provisions much in advance have higher profitability than banks which make allowances for bad debts as they appear), for bank´s involvement in retail activities (banks that are more involved in lending to individuals have a higher ROA), bank´s capital adequacy (a greater capital involvement of owners increases bank's profitability), and for the economic progress (banks are managed better in times of economic downturn).

In the absence of other studies on the subject of bank profitability in Poland, we will refer to studies that investigate determinants of bank profitability in various banking sectors around the world. It might also be illuminating to look into studies on the impact of different factors on other profitability ratios, such as return on equity or interest margin.

Determinants of bank profitability can be categorized into internal and external factors. They may also be classified into the following groups: macroeconomic and regulatory variables (such as inflation rate, unemployment rate, exchange rate, real gross domestic product growth, stock market capitalization, real interest rate, dummy variables for changes in legislation or for the existence of any crisis), bank specific variables (such as market share of the bank, its operating costs, capital adequacy ratio, cost to income ratio, liquid asset ratio, loan to asset ratio, loan to deposit ratio, ratio of loan reserves to gross loans, ratio of nonperforming loans to total loans) and financial structure variables (such as level of concentration or competition in the banking sector). The impact of individual variables on bank profitability in selected countries is described e.g. by Short (1979), Smirlock (1985), Bourke (1989), Molyneux and Thorton (1992), Demirgüc-Kunt and Huizinga (1999), Abreu and Mendes (2002), Havrylchyk and Jurzyk (2006), Kosmidou et al. (2008), Bordeleau and Graham (2010), Davydenko (2010), Alper and Anbar (2011), Fungacova and Poghosyan (2011), Gul et al. (2011), Scott and Arias (2011).

The selection of variables was based on the above-cited studies. Moreover, the author considered also whether the use of a particular variable makes economic sense in the Polish banking sector. Moreover, other factors that may affect bank profitability have also been considered. The limiting factor was the availability of some data. The list of the variables applied is provided in Table 3.

Table 3. Definition of variables

Design	Variable	Source
ROA	dependent variable: the share of net income in total assets	BankScope
ROE	dependent variable: the share of net income in total equity	BankScope
NIM	dependent variable: the share of net interest income in total assets	BankScope
CAP	share of equity to total assets ratio of the bank	BankScope
LIA	share of liquid assets (i.e. cash, government bonds, short-term claims on other banks including certificates of deposit) in total assets	BankScope
LOA	share of loans provided to non-financial clients in total assets	BankScope
NPL	share of non-performing loans in total volume of loans	BankScope
TOA	logarithm of total assets of the bank	BankScope
EUR	exchange rate PLN/EUR (yearly average)	NBP
GDP	growth rate of gross domestic product (GDP volume % change)	World Bank
INF	inflation rate (CPI % change)	World Bank
IRL	lending interest rate	World Bank
UNE	unemployment rate	World Bank

Source: author´s own processing.

Five bank-specific factors and five macroeconomic factors have been considered. The author had no prior expectations as to the impact of these factors on the three selected profitability ratios since their impact was different in the above-cited studies. The macroeconomic data were provided by the World Bank. The data on average exchange rate were provided by the National Bank of Poland (NBP). The bank-specific data were obtained from the unconsolidated balance sheets and profit and loss accounts recorded in the BankScope database.

EMPIRICAL RESULTS AND DISCUSSION

An econometric package EViews 7 was used for the analysis. After tests of stationarity, normality and multicollinearity were conducted, we proceeded with regression estimation. Equation 1 was estimated for all three dependent variables, i.e. for all three profitability ratios: return on assets, return on equity and net interest margin. First, all explanatory variables that might affect the dependent variable were considered. To reduce the number of explanatory variables, information criteria were applied (Akaike, Schwarz and Hannan-Quinn). The aim was to find a regression model with a high value of the adjusted coefficient of determination in which all the variables involved are statistically significant. The estimated coefficients that fit best the regression model for the ROA ratio are presented in Table 4.

The explanatory power of the model is quite high. The return on assets of Polish commercial banks is determined mainly by three bank-specific and three macroeconomic factors. Among bank-specific factors, capital adequacy (CAP), quality of the loan portfolio (NPL) and size of the bank (TOA) matter most. First two factors have negative impact on the ROA ratio: decrease in capital adequacy ratio in the previous period and decrease in non-performing loans two years ago lead to increased bank profitability. These two dependencies are quite logical. Lower capital adequacy means that bank employs capital in a more risky way. The greater the risk, the higher the revenue should be and thus the profitability increases. Also the impact of the second bank-specific factor can be explained in a very simple way: if the quality of the loan portfolio of the bank increases, the bank does not have

to create so much loan loss provisions which in turn increases the bank´s profit. Moreover, a bank with good-quality loan portfolio can provide more loans and thus benefit from increased lending activity in the future.

The positive sign of the regression coefficient for the variable TOA means that bank profitability (in terms of the ROA ratio) increases with the size of the bank.

Table 4. Determinants of the ROA ratio

Variable	Coefficient	Standard deviation
C	−10.12371*	2.151666
CAP(-1)	−0.027738***	0.014729
NPL(-2)	−0.012983***	0.014827
TOA	1.080477*	0.183142
GDP(-1)	0.212320*	0.052259
IRL	−0.114566**	0.052380
UNE	−0.128849*	0.029411
Adjusted R^2	0.518614	
Durbin-Watson statistic	1.928557	
Total observation	312	

Source: author´s own estimations based on data from the BankScope, World Bank and NBP.
The starred coefficient estimates are significant at the 1% (*), 5% (**) or 10% (***) level.

In case of Polish commercial banks, the link between the business cycle and bank profitability is positive, with one year lag (GDP). During expansionary phases, companies (which have higher profits) and households (which have higher incomes) are in better financial positions, and so their ability and willingness to repay loans according to the agreed schedule increases. Moreover, companies and households may be more optimistic about their future finances and may therefore wish to take more loans. And again, the higher lending activity of a bank will increase its profitability in the future. These linkages are confirmed also by the negative value of the regression coefficient for the unemployment rate (UNE) which may be perceived as a proxy variable for overall economic conditions. Generaly, bank profitability increases in a more stable economic environment.

Finally, return on assets is influenced also by the development of interest rate on loans. Although the negative influence of this variable may be quite surprising, it is consistent with the issue of credit crunch and credit rationing. According to Stiglitz and Weiss (1981), an increase in the interest rate produces two effects. The incentive effect boosts interest incomes and thus the bank´s profit. On the contrary, the risk of the bank´s loan portfolio can increase due to adverse selection effect and so the profit will decrease. Thus increased interest rate on loans does not have to encourage banks to lend more. As a result, instead of the lending activity, banks focus more on other aspects of the banking business (most often either interbank transactions or trading with securities).

Return on equity of Polish banks is determined by the net interest margin (NIM), quality of loan portfolio of the bank (NPL), size of the bank (TOA), growth rate of gross domestic product (GDP) and the unemployment rate (UNE). The explanatory power of the model is slightly lower than in the case of the ROA ratio (Table 5).

Table 5. Determinants of the ROE ratio

Variable	Coefficient	Standard deviation
C	−132.2265*	17.36374
NIM	1.225490**	0.565651
NPL	−0.454460*	0.156113
TOA	11.95666*	1.589724
GDP(-1)	2.234369*	0.550892
UNE	−1.626686*	0.267526
Adjusted R^2	0.496882	
Durbin-Watson statistic	1.894427	
Total observation	354	

Source: author´s own estimations based on data from the BankScope, World Bank and NBP.
The starred coefficient estimates are significant at the 1% (*), 5% (**) or 10% (***) level.

As we can see, return on equity is influenced almost by the same factors as return on assets, which should not be a surprising finding. The link between bank profitability and four determinants (NPL, TOA, GDP and UNE) was discussed above. The positive impact of net interest margin on the ROE ratio is in line with the fact that interest income is a very important part of the bank´s profit. Banks that are able to earn more from their lending activity are more profitable than banks whose benefits from loans are lower.

It is evident that net interest margin is one of the key elements of bank profitability. For this reason, it could be very useful to identify the determinants of this particular ratio. The list of determinants presented in Table 6 includes share of liquid assets in total assets (LIA), share of loans in total assets (LOA), size of the bank (TOA), exchange rate (EUR) and growth rate of GDP. The explanatory power of the model is relatively high.

Table 6. Determinants of the NIM ratio

Variable	Coefficient	Standard deviation
C	8.998060*	1.750672
LIA	−0.027979*	0.006755
LOA	0.007552**	0.003115
TOA	0.529347*	0.132467
EUR	−0.166753***	0.326462
GDP(-1)	0.087500***	0.054822
Adjusted R^2	0.679129	
Durbin-Watson statistic	1.960780	
Total observation	354	

Source: author´s own estimations based on data from the BankScope, World Bank and NBP.
The starred coefficient estimates are significant at the 1% (*), 5% (**) or 10% (***) level.

The link between net interest margin and the business cycle is the same as in case of the two previous profitability ratios: during expansionary phases, companies and households are willing to pay higher costs of borrowing since their financial position is good. The one year lag is in accordance with the philosophy that companies must first make a profit (and households must first have a sustainable income) to be sufficiently creditworthy and eligible for a loan.

Also the impact of the bank's size, measured by its total assets, on bank profitability is the same as in case of the ROA and ROE ratios. The larger the bank is, the more stable is its market position and the higher net interest margin can be achieved.

The net interest margin is determined also by two bank-specific factors that were not statistically significant for the two profitability ratios. The involvement of the bank in lending activity and in other types of banking operations is the key factor behind the profit earned on interest activities, i.e. the net interest margin. Banks that strongly focus on providing loans to non-bank customers (i.e. banks with high share of loans in total assets) have a higher net interest margin. On the other hand, banks that prefer other types of banking business, mainly interbank transactions or trading with government securities (i.e. banks with high share of liquid assets in total assets), have a lower net interest margin.

The last statistically significant variable is the development of the exchange rate of the Polish zloty. The negative coefficient of the exchange rate PLN/EUR signals that the appreciation of the Polish zloty leads to a higher net interest margin. A significant part of loans in the Polish banking sector is provided in foreign currency. As it was proved by Vodová (2013), banks hold more liquidity in periods of depreciation of the domestic currency. If the exchange rate appreciates, banks focus less on liquidity and start to provide more loans which leads to an increase of their net interest margin.

CONCLUSION

The aim of this paper was to investigate the determinants of profitability of Polish commercial banks during the period 2000–2013.

Firstly, we have calculated three profitability ratios (return on assets, return on equity and net interest margin) for all banks in the sample. The values of all ratios are quite volatile and even if they remained quite positive in crisis years, Polish banks' profitability was not very high. Of course, there have been instances of banks with excellent profitability, at least in some of the study years.

In order to identify which factors influence individual profitability ratios of Polish banks, the panel data regression analysis was applied. Five bank-specific factors and five macroeconomic factors were considered. The results for all three ratios were very similar. The most profitable banks are those which have lower capital adequacy because they focus more on the lending activity. At the same time, they pay significant attention to the quality of their loan portfolio. Bank profitability also increases with size of the bank.

Among macroeconomic factors, the phase of the economic cycle, connected to the unemployment rate, along with the development of interest rate on loans and exchange rate play a significant role. During expansionary phases, companies and households are in better financial positions which increase their ability and willingness to repay loans. Moreover, they are more optimistic about their future financial standing and may therefore wish to take more loans. This results in higher lending activity and thus higher profitability. Bank profitability increases in a more stable economic environment, is reflected in such factors as the unemployment rate and exchange rate of Polish zloty. Finally, although it may be quite surprising, bank profitability is negatively linked with interest rate on loans. Banks perceive increase of interest rate on loans as a sign of higher risk of lending activity which in turn decreases their interest income.

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Streszczenie. Rentowność banków jest bardzo ważną kwestią, a jego analiza uwzględniać powinna wiele czynników na nią wpływających. Celem tego artykułu jest zbadanie wyznaczników zyskowności polskich komercyjnych banków w latach 2000–2013. Korzystając z analizy regresji danych panelowych przeanalizowano pięć specyficznych i pięć makroekonomicznych czynników. Mimo że trend rozwojowy wskaźnika rentowności aktywów, rentowności kapitału własnego i marży odsetkowej nieco się różnią, rentowność banku, mierzona za pomocą tych wskaźników, zależna jest od tego samego wyznacznika. Najbardziej rentowne banki to banki z niską adekwatnością kapitałową, ponieważ skupiają się one bardziej na działalności kredytowej. Jednocześnie zwracają baczną uwagę na jakość portfela kredytowego. Rentowność banku wzrasta również wraz z jego wielkością. Oprócz czynników makroekonomicznych ważna jest także faza cyklu ekonomicznego wiążącego się z bezrobociem oraz oprocentowanie pożyczek i kurs walut.