

The Impact of Market Structure and the Business Cycle on Bank's Profitability: Does the SCP Paradigm Work? A Case Study in Poland prior to and during the financial crisis

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Abstract

The aim of this study is to examine the impact of banking-sector structure and macroeconomic changes on bank profitability in the Polish banking sector over the past fifteen years (i.e., prior to and during the global financial crisis of 2008). The model developed in this paper incorporates the Structure-Conduct-Performance (SCP) hypothesis, as well as the Relative Market Power Hypothesis (RMP) created by Smirlock (1985). Furthermore, this paper also examines the overall effect of financial structure and macroeconomic conditions to determine whether financial development and business cycles affect the profit of Polish banks. Finally, this paper tests the impact of foreign capital on the profitability of Polish banks and attempts to determine if there is a link between the context of the parent banks and the profitability of their affiliates.

Empirical results based on two panel data sets describing both micro-level and the macro-level data are ambiguous, and find evidence of RMP hypothesis, as well as the traditional SCP, in the Polish banking sector. This paper also finds that increased foreign ownership and intermediation (i.e., greater loans in total assets) have a positive effect on bank profitability. Furthermore, this paper finds a positive correlation between the context of parent banks and the profitability of their affiliates. As in other countries, the profitability of commercial banks in Poland are contingent upon the business cycle.

JEL: F36; G2; G21; G34; L1.

Keywords: bank profitability, , concentration, market power, market structure, Lerner index, Polish banks, business cycle, foreign banks.

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Introduction

The profitability of banks is a subject of great interest in bank management, financial markets, bank supervisions, and academics. This interest is driven by increasing consolidation within the banking sector, changes in production technology and macroprudential policy. Identifying the determinants of bank performance is an important predictor of unstable economic conditions. Profitable banking systems are likely to absorb negative shocks, thus maintaining the stability of the financial system.

The aim of this study is to estimate the impact of market structure on the performance of banks in the Polish sector throughout the past fifteen years (i.e., prior to and during the financial crisis of 2008). In order to test the traditional Structure-Conduct-Performance (SCP) hypothesis, this paper empirically investigates the effect of market structure as it relates to profitability with a particular focus on whether banks that are operating in concentrated markets generate more profit or not. This paper, besides the traditional SCP hypothesis, tests the Relative Market Power (RMP) hypothesis created by Smirlock (1985). He posited that there is no relationship between concentration and profitability but rather between a bank's market share and its profitability. This paper also examines whether financial development and business cycles affect the profit of Polish banks. Furthermore, due to that fact that the consolidation processes are correlated with the changing ownership structure in the Polish banking sector, this paper also tests the impact of foreign capital on the profitability of Polish banks. Finally, this paper attempts to determine if there was a link between the context of parent banks and the profitability of their affiliates.

In order to carry out a quantitative assessment this study is divided into two investigations that were conducted on two different panels - panels A and B. Both panel data sets combine micro- and macro-statistical data sets for Polish commercial banks as well as macroeconomic data covering cyclical factors and macroeconomic environment. Panel A consists of yearly data combining a statistical data set for Polish commercial banks as well as information about the macroeconomic environment for the period 1997–2012. Panel B consists of quarterly data combining a data for Polish commercial banks and their parent banks as well as information about the macroeconomic environment for the period 2007Q1–2013Q2. Micro - level data for Polish commercial banks was received from the National Bank of Poland (balance sheets and profit and loss accounts) and micro - level data for their parent banks was received from the Bankscope database². For two of the panel data sets - panels A and B respectively, macroeconomic data was received from Polish Central Statistical Office (CSO) and

² The Bankscope database was created by Bureau van Dijk-Electronic Publishing.

Eurostat. The degree of competition within the Polish banking sector was estimated using the Lerner indices for yearly data, and the change of concentration within the Polish banking industry was analysed using the Herfindahl-Hirschman indices (HHI). Profitability in the Polish banking sector was analysed using the return on assets ratios (ROA).

This study consists of two parts and a summary. The first part is a broad literature review concerning the relationship between bank profit, market structure, and the degree of competition. The second part consists of three parts: the first part describes the structural and technological changes within the Polish banking sector that lead to changes in profitability. The second part presents the results of the analysis of panel A data and the third part presents the results of the analysis of panel B data. The summary provides an overview of the empirical results and the conclusions that were drawn.

1. Relationship between Bank Profitability, Market Structure and Degree of Competition

In recent years there have been ongoing debates concerning the economic role of market structure and competition within the banking industry. Accordingly, the competition between banks and profitability of the banking sector is of interest not just at the individual bank level; rather, it is crucial at a broader macroeconomic level. The SCP model developed by Bain (1951) describing the relationship between the market structure, company conduct and performance. The SCP model assumed that in a more concentrated system leads to less competition and hence to higher profitability (cf. Berger (1995). Smirlock (1985) tested an alternative explanation for these results, and he posited that there is no relationship between concentration and profitability, but rather between bank market share and bank profitability and created the relative market power hypothesis (RMP). The other one theory is the Efficiency Structure Hypothesis (ESH) that was developed by Demsetz (1973). The ESH theory states that if banks enjoy a higher degree of efficiency than their competitors, they can increase shareholder value or gain market share by reducing their prices. According to the ESH, concentrated markets are those where highly effective firms (banks) operate. Higher bank profitability with high market shares do not result from their power (size) but from higher X-efficiency, which creates their power. In SCP paradigm and a theory based on ESH, concentration ratios (i.e., Herfindahl-Hirschman (HHI)) indices³) are used to explain competitive performance in the banking industry. However, subsequent results of analyses based on the SCP paradigm have shown that the relationship between the structure of the market and conduct is even more complex.

³ The HHI is calculated as the sum of the squared market shares of each firm in a market in terms of assets. It ranges from 0 to 1.

The Industrial Organization Approach to Banking (IOAB) is a theory concerned with the issue of measuring competition in the banking sector and defines the following measures of competition: the Lerner index,⁴ the H-statistic,⁵ and the Boone-indicator⁶ (cf., Degryse et al., 2009, Van Hoose D. (2010), Bikker and Leuvensteijn, 2014). The Lerner index was used in this paper for evaluating competition within the Polish banking sector.

A large number of studies have already dealt with the determinants of bank profitability on the banking structure level and broader macroeconomic level. The analyses focus primarily on microeconomic or bank-specific drivers of profitability, based on mainly variables like size and cost management (efficiency). Number of studies examined the influence of the market structure based on SCP paradigm. A positive relationship between concentration and profitability was reported i.a. by Demirguc-Kunt and Huizinga (2000), Molyneux and Thornton (1992), Goddard et al. (2004), which confirm the traditional SCP hypothesis. However, Mirzaei et al. (2011) and Maudos and Guevara, (2004) confirmed the relative market-power hypotheses (RMP). ESH hypothesis by contrast, was confirmed by i.a. Claeys and Vander Vennet, (2008).

Most of the studies focusing on macroeconomic influences on profitability of banks find that the business cycle has a positive influence on the development of bank profitability and also find a positive correlation between bank profitability and inflation (i. a. Albertazzi and Gambacorta, 2009; Bikker and Hu, 2002; Demirgüç-Kunt and Huizinga, 2000, Rumler and Waschiczek 2010). However, there is not a lot of work taking into account the relationship between the profitability of the parent banks and situation of their affiliates, and this paper fills this gap.

2. Banking Structure, Business Cycle and Profitability of Banks – panel data analysis

2.1. Structural and Technological Changes in the Polish Banking Sector

The profitability of commercial banks in Poland in the fifteen years (prior to and during the financial crisis) was influenced by a large number of internal and external factors: consolidation, technological processes, Poland's accession to the European Union and the real economy. The consolidation in the Polish banking sector led to changes in concentration measured with the HHI ratios (see figure 1 in the Appendix 1). After a significant decrease in the profitability of commercial

⁴ The Lerner Index measures the so-called monopoly mark-up. According to the Lerner index, the market power of a monopoly depends on the price elasticity of market demand. The increasing value of the Lerner Index indicates a decrease in competition.

⁵ Panzar and Rosse defined the measure of competition, known in the literature as the H-statistic. The increasing value of the H-statistic indicates an increase in competition.

⁶ The Boone method is based on the so-called efficient structure (i.e., hypothesis ESH) (cf., Pawłowska (2011)).

banks between 2001 and 2003 (related to the economic slowdown), there was a clear improvement in profitability. The improvement in banks' profitability ratios return on assets (ROA) and return on equity (ROE) was facilitated by, among others, a decrease in the share of non-performing loans⁷. The slight decrease in profitability indicators within the period of 2008–2009 was caused by the global financial crisis. The period of 2010–2012 was the sovereign debt crisis in the Eurozone. However, in this period profitability of Polish commercial banks improved again (see figure 4 in the Appendix 1). Furthermore, in comparison to the other EU countries Polish banks performed very well.

When analyzing the processes that took place in the Polish banking sector over the past 15 years it should be noted that privatization led to an increase in the share of foreign capital in the Polish banking sector. As of the end of 2012, the share of banks with predominantly foreign capital was approximately 65% whereas at the end of 1997 it was approximately 15%. However the share of foreign capital between 2008–2014 decreased slightly. The fact that some of banks being on the list of G-SIFIs⁸ are parent-banks of banks operating in Poland is of significance for profitability of Polish banking sector (e.g., Unicredit Group and Crédit Agricole Group).

Currently, the Polish banking sector is relatively small in comparison to the other EU worth 85% of the country's GDP⁹ and has relatively simple traditional business models.

2.2 Empirical Results

In order to test the traditional SCP hypothesis and RMP hypothesis, and impact of the macroeconomic changes on Profitability of Banks in Poland, this study consists of two investigations.

The first investigation is based on yearly data from 1997 to 2012 (panel A) and the second investigation is based on quarterly data (panel B) covering the period of the financial crises and debt crisis 1997Q4–2013Q2. This data was obtained for all commercial banks operating in Poland (i.e., Polish banks, subsidiaries of foreign institutions, and branches of foreign banking institutions). Both of the panel data sets combine micro-level data for Polish commercial banks and macro-level statistical data covering cyclical factors. This study uses a variety of microeconomic indicators stemming from the bank data to capture changes in the economic framework, including balance sheet and income statement figures from the National Bank of Poland balance sheet statistics¹⁰. Additionally, panel B data consists of quarterly data from the Bankscope database, which is a source of valuable information

⁷ Since Poland's accession to the EU the classification of non-performing loans changed to a less restrictive classification, for instance for sub-standard receivables from 1 to 3 months into from 3 to 6 months, for doubtful receivables from 3 to 6 months into from 6 to 12 months, for lost receivables from above 6 months to above 12 months. See NBP (2004).

⁸ List of G-SIFIs is updated each year in November by the Financial Stability Board.

⁹ Polish Financial Supervision Authority, 2013.

¹⁰ Panel data sets take into account mergers and acquisitions in the Polish banking sector. The numbers of banks are presented after accounting for mergers and acquisitions, with the acquiring institution treated as a new entity.

about foreign parent institutions of the Polish affiliates. The micro-level data from Bankscope was merged with data on the Polish banking institutions.

Macroeconomic data on the growth of GDP and inflation in Poland come from the Polish Central Statistical Office (CSO). Panel B also includes macro-level data from Eurostat concerning GDP growth in the parent banks' country.

In order to test the traditional SCP hypothesis and RMP hypothesis, model estimation was performed separately to avoid any alignment of variables in both panels A and B.

2.2.1 Panel A (yearly data set, prior to and during the financial crisis) - the baseline model

In order to carry out a quantitative assessment of the impact of market structure on the banking profitability in the Polish banking sector, GMM¹¹ estimator was used based panel A. In the model, as profit indicator return on assets was used (ROA). Also the model distinguish between market structure and relative market power.

The following regression with ROA as the dependent variable was calculated as follows:

$$ROA_{it} = \alpha_1 + (1 + CRI)(a_1 market\ structure_{it} + a_2 market\ power_{it}) + a_3 business\ cycle_t + \sum_{j=1}^N b_j oth_{it} + \varepsilon_{it} \quad (1)$$

where ROA_{it} denotes the return on assets ratio for each bank i for each year t .

Market structure measures are determined by taking the competition measure from the Lerner index average (LAV_t) for each year t and the variable indicating concentration ratio, the Herfindahl-Hirschman index for assets (HHI_t) for each year t . Additionally, as a proxy of market structure the regression also estimated the variable indicating the share of banks with majority of foreign equity (FC_t) for each year t .

Market power measures were calculated as:

- the share of bank assets in the total assets (MP_{it}) for each banks i for each year t ,
- the Lerner Index (LI_{it})¹² for each banks i for each year t .

The model also tests the impact of the size on the banking sector profitability, as the relative market power measure:

- the size is calculated as the log of the total assets (LA_{it}) for each banks i for each year t .

Also, model control the impact of financial crisis on relation between profitability and market structure and market power, therefore in regression was used control dummy variable (CRI) that takes the values of 1 if $t > 2007$ and zero elsewhere.

The model also tests the impact of *business cycle* on banks profitability define as:

- CPI index (CPI_t) and GDP growth yoy (GDP_t) and for each year t .

¹¹ Dynamic panel data model, based on the first difference.

¹² See: Pawłowska (2014).

In regression were used control variables (oth_{it}) such as:

- the ratio of total deposit to total assets (DTA_{it}), for each banks i for each year t ,
- the ratio of total loans to total assets, as a measures of the magnitude of disintermediation tendencies (LTA_{it}), for each banks i for each year t ,
- the variable indicating efficiency of banks define as interest cost divided by total interest income (CTI_{it}) for each banks i for each year t .

The variable α is a constant term, ε_{it} denotes the error, and a_1 , a_2 , a_3 and b_j are the regression coefficients.

In table 3 in the Appendix 2, for the whole analysing period, the positive coefficients (a_1 and a_2) are find in regressions 2-4. It means that traditional SCP paradigm may exists. However, based on Panel A, this paper find that during the crisis, the size and relative market power have greater impact of profitability of Polish commercial banks then market structure. Prior to and during the crisis, in regression 1 and 4 coefficients a_1 for HHI as a measure of market structure is insignificant.

This paper find positive impact of the share of foreign capital on profitability of Polish banks, also during the crisis (estimation 5). What is important, that in each estimation based on Panel A, this paper find, negative and significant impact on cost to income ratio on profitability. It means that better cost management load to better profitability of banks, which may also support efficiency structure hypothesis. Also, based on Panel A, this paper find, positive and significant impact on the ratio of total loans to total assets on profitability (estimations 4 and 5). This means intermediation (i.e., grater loans in total assets) have a positive effect on bank profitability.

Generally crisis had negative impact of bank profitability, but during the crises the most important factor was the relative market power. It should be noted that, for the whole analysing period this paper find that profitability of banks is procyclical. This paper find the positive coefficients (a_3) between GDP growth and inflation in regressions 1-5.

2.2.2 Panel B (quarterly data set, during the financial crisis)

In order to carry out a quantitative assessment of the impact of banking sector structure on the banking profitability in the Polish banking sector during the crisis, the quarterly data set was used, based on panel B, and also GMM estimator.

The following baseline model with ROA as the dependent variable was calculated as follows:

$$ROA_{it} = \alpha + a_1 market\ structure_{it} + a_2 market\ power_{it} + a_3 business\ cycle_{t+} + \sum_{j=1}^N b_j oth_{it} + \varepsilon_{it} \quad (2)$$

where ROA_{it} denotes the return on assets ratio for each bank i for each quarter t ¹³.

Market structure measure was defined as:

- the concentration ratio such as Herfindahl-Hirschman index for assets (HHI_t) for each quarter t .

Also in this model was defined the size of the banking sector: as the log of total assets of the whole banks ($Size_t$) for each quarter t .

Market power, the relative market power measure, was defined as:

- the share of bank assets in the total assets (MP_{it}), for each bank i for each quarter t .
- the share of bank loans in the total loans (ML_{it}), for each bank i for each quarter t .

Also, as the relative market power measure, the model also tests the impact of the size on the banks on profitability, which was defined as: the log of total assets (LA_{it}) for each bank i for each quarter t .

In the model was also estimated the dummy variables indicating the foreign ownership:

- the dummy (FO) that takes the values of 1 if banks is foreign-owned and zero elsewhere, for each bank i for each quarter t .

The model also tests the impact of business cycle on banks profitability during the crisis. The variable *business cycle* was define as: GDP_t growth (yoy) and inflation growth (CPI_t) for each quarter t .

In regressions were also used control variables (oth_{it}):

- the ratio of total deposit to total assets (DTA_{it}), for each bank i for each quarter t ,
- the ratio of total loans to total assets, as a measure of the magnitude of disintermediation tendencies (LTA_{it}), for each bank i for each quarter t ,
- the core capital ratio (CAR_{it}) ratio, as an indicator of bank's risk behavior (the higher the capital ratio, the greater the risk aversion), for each bank i for each quarter t ,
- and the share of housing foreign currency loans to the household sector in total loans ($FXHL_{it}$) as an indicator of banking sector development, for each bank i for each quarter t .

In table 4 in the Appendix 2, positive coefficient (a_1) are find only in regressions 3. However, positive and significant coefficients (a_1) was find for variable *Size*. Also, positive and significant coefficients (a_2) was find for relative size (*LA*) in regression 2-4.

However, relative market power – measured in terms of the individual institution's share in total domestic lending (*MPL*) and measured in terms of the individual institution's share in total assets (*MP*) – had no significant influence on the profitability indicators in analyzed in this study. Also based on Panel B this paper find positive impact of foreign capital on profitability, the results indicate a significant correlation between the profit, and the dummy variables for, majority foreign owned banks (estimations 4 and 5).

¹³ To determine the robustness, additional estimations were calculated with the return on equity (*ROE*) for each banking sector i for each year t , as a dependent variable. The results were very similar.

Of the microeconomic control variables, the ratio of core capital to risk weighted assets was found to have a significant and negative influence on bank profitability. Bank size – measured in terms foreign currency lending negative and significant influence on profitability. The findings indicate that foreign currency loans did not positively contribute to banks' profitability. Similar to results based on panel A, results based on Panel B indicate the positive correlation between intermediation (i.e., greater loans in total assets) and banks profitability. However surprisingly, also similar to panel A, results indicate the negative coefficient between the ratio of total deposit to total assets and profitability.

Generally, for the whole analysing period this paper find positive correlation between, GDP growth and inflation (*CPI*), and profitability of banks. It means that profitability of banks is procyclical.

Impact of situation in parent banks on profitability of their affiliates

Furthermore, the paper also test impact of condition of parent banks on profitability of their affiliates. In this case was estimated additional regressions based on data from Panel B with using GMM estimator. ROA of banks with majority of foreign capital was the dependent variable in this model, where ROA_{it} denotes the return on assets ratio for each bank with majority of foreign equity i for each quarter t .

The model tests the impact of business cycle in parent country on foreign banks profitability during the crisis. The variable *business cycle* was define as GDP growth in parent country, and was taken from Eurostat (*parent_GDP*). In regressions were also used the following control quarterly variables (oth_{it}) from Bankscope database institutions of the Polish affiliates for each bank with majority of foreign equity i for each quarter t : *parent_Total_Capital_Ratio* - the capital ratio of foreign parent institutions of the Polish affiliates, *parent_Net_Loas_to_Assets* – net loans to assets ratio of foreign parent institutions of the Polish affiliates, *parent_ROA* – ROA ratio of foreign parent institutions of the Polish affiliates.

In table 5 in the Appendix 2, the positive coefficient (a_1) is find. It means that GDP growth in the parent country of the bank operating in Poland has a significant and positive impact on their profitability in Poland. Also ratio of net loans to assets of foreign parent institutions of the Polish affiliates (*parent_Net_Loas_to_Assets*) has positive influence of the profitability of bank operating in Poland. It means that generally disintermediation tendencies in European banks has negative impact of profitability of their affiliates. Negative impact of parent total capital ratio (*parent_Total_Capital_Ratio*) it may means that a higher capital ratio on average did not prevent higher profitability. This result is also relevant for the current economic policy debate about future regulatory requirements for the banking sector. However, ROA ratio of foreign parent institutions of the Polish affiliates (*parent_ROA*) is insignificant in the model.

Conclusions

In order to test the traditional SCP hypothesis and the RMP hypothesis prior to and during the Global Financial Crisis, this paper empirically investigated the effects of market structure and market share on the profitability of Polish banks based on two panel data sets for the two time periods (i.e., prior to and during the crisis - panel A and panel B only during the crisis). This paper also empirically investigated the impact of other bank-specific characteristics and the macroeconomic environment on the profitability of Polish banks, particularly the impact of foreign capital.

All empirical results based on two panel data sets, for the most part, are confirmed the RMP hypothesis but when verifying the traditional SCP hypothesis, the empirical results are ambiguous. On the one hand, this paper demonstrate a positive or insignificant correlation between profitability and market structure indicating by HHI ratio, and for the most estimations the positive and significant correlation between profitability and market power as well as between profitability and the size of the bank, prior to and during the crisis (based on panel A data). This result was supported in more detail with the quarterly information during the crisis, based on panel B. What is important, based on panel A, that in each estimation we find a negative and significant impact between the cost to income ratio and profitability. This means that better cost management leads to better profitability in banks.

Of the microeconomic control variables based on other bank-level specific characteristics from panel B, the core capital ratio was found to have a significant negative influence on bank profitability. Furthermore, the findings indicate that foreign currency loans, did not positively contribute to banks' profitability. This paper found a positive correlation between intermediation (i.e., grater loans in total assets) and bank profitability in both panel data sets. However, this paper found a negative coefficient between the ratio of total deposits to total assets and profitability.

The regression results, based on panel A, showed that banks have generally benefited from a change of ownership structure during the past fifteen years. Also, the detained quarterly data found in panel B shows that foreign capital was a stabilizing mechanism during the crisis. This paper finds a positive correlation between the context of parent banks and the profitability of their affiliates. Those results support the fact that geographical diversity with parent institutions and different characteristics of their Polish affiliates help the local financial system to remain relatively vigorous throughout the global financial crisis (Pawłowska, Serwa, & Zajączkowski, 2015).

Finally, bank profitability are strongly influenced by cyclical developments, and this paper found a positive correlation between GDP growth and bank profit for both panel data sets - the same effect was found for CPI indices. Also, based on the Bankscope database, this paper found a positive correlation between GDP growth and bank profits in the parent country.

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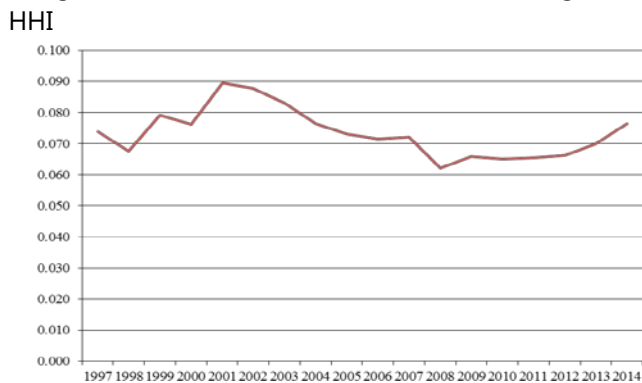
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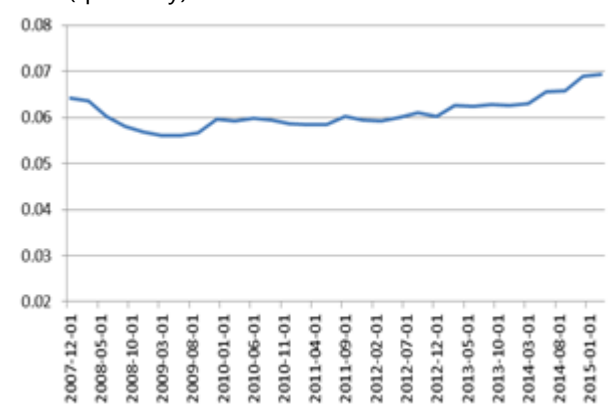
Appendix 1

Figure 1: Concentrations in the Polish banking sector



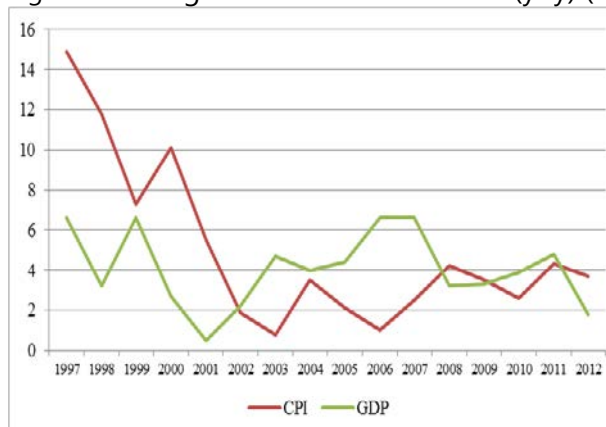
Source: PFS and own calculations.

HHI (quarterly)



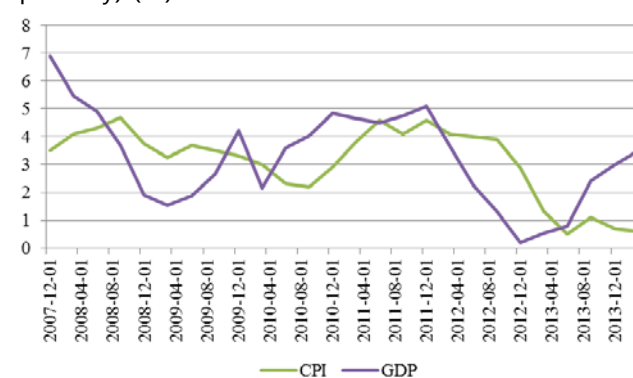
Source: NBP and own calculations. HHI index was seasonal adjusted.

Figure 2: GDP growth and Inflation rate (yoy) (%)



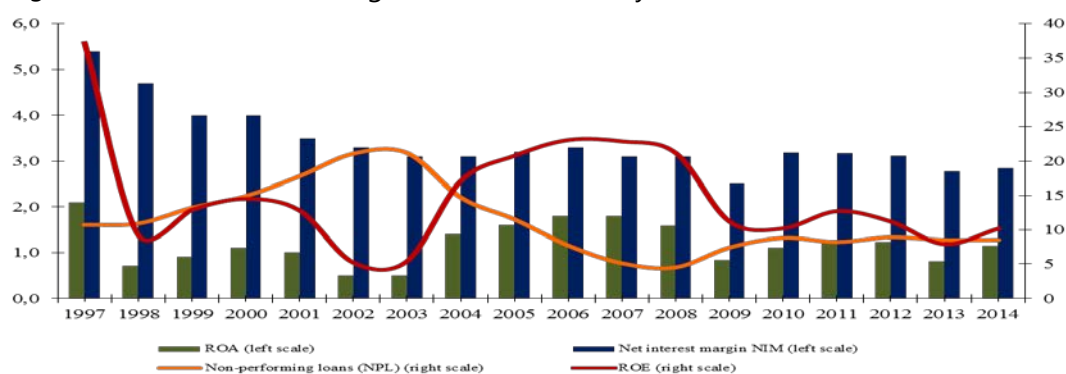
Source: CSO.

Figure 3: GDP growth and Inflation rate (yoy quarterly) (%)



Source: CSO.

Figure 4: Commercial Banking Sector's Profitability Indicators in Poland



Source: NBP and own calculation.

Appendix 2

Table 1: Panel A Summary Statistics on the Characteristics of Polish banking sector structure and balance sheet data

This table provides summary statistics (mean, min, max and standard deviation (SD)) for all variables in the model. Data are observed yearly 1997-2012 for each Polish commercial banks.

	All Banks			
	Mean	SD	Min	Max
Observations	1978			
<i>Dependent Variable</i>				
Balance sheet data (for each bank i and year t)				
ROA Ratio (%)	-0.004372	0.1183983	-1.345672	1.148604
<i>Independent Variables:</i>				
Market Structure				
Balance sheet data for each year t				
HHI	0.0734929	0.0078982	0.0620602	0.0894186
Lerener Av ¹	0.2251663	0.0602216	0.116554	0.3069982
Share of Foreign Capital (%)	58.28561	19.25915	15.3	72.3
Market Power				
Balance sheet data (for each bank i and year t)				
MP Ratio (%)	0.0145719	0.0294166	1.94e-06	0.197598
Log Assets (size)	14.37138	2.101532	6.864837	19.07505
Lerener Index	0.1938524	0.2280034	0.0125002	3.912896
Bank-Specific Variables				
Balance sheet data (for each bank i and year t)				
Total Loans/Assets (%)	15.23042	3.212855	6.864837	25.34692
Total Deposit/Assets (%)	0.4173208	0.4128244	0	6.4821
Interest Cost/Interest Income (%)	0.7750329	3.14585	0	75.73241
Macroeconomics				
Data for each year t				
GDP	4.0505	1.81972	0.5	6.6
CPI	5.4792	4.166438	0.8	14.9

Source: own calculations on the basis of NBP and CSO data. ¹Average of the Lerner index for each year was normalized (see Pawłowska 2014).

Table 2: Summary Statistics on Bank Characteristics for Panel B (quarterly data)

This table provides summary statistics (mean and standard deviation for bank balance sheets data and macroeconomics data). Data are observed quarterly 2007Q4–2013Q2.

1. Data for All sample

	All Banks				Banks with majority of Foreign capital			
	Mean	SD	Min	Max	Mean	SD	Min	Max
Observations	1634				1407			
<i>Dependent Variables:</i>								
Balance sheet data (for each bank i and quarter t)								
ROA Ratio(%)	-0.02455	0.20185	-2.86388	0.81991	-0.0279	0.2178	-2.8639	0.8199
ROE Ratio(%)	0.020114	0.20185	-4.731094	0.48876	0.01802	0.21173	-4.73109	0.4047
<i>Independent Variables:</i>								
Balance sheet data for each quarter t								
Market Structure								
Balance sheet data for each quarter t								
HHI	0.059575	0.002153	0.05599	0.06412	0.05957	0.00215	0.05599	0.06413
Log Size of Banking Sector	27.68921	0.158017	27.3304	27.8992	27.6892	0.15798	27.3305	27.8992
Market Power								
Balance sheet data (for each bank i and quarter t)								
MP Ratio (%)	0.014539	0.027114	1.42e-1	0.16214	0.01236	0.022408	1.42e-1	0.16213
ML Ratio (%)	0.014539	0.027267	0	0.17197	0.01230	0.021413	0	0.15757
Log Assets (size)	21.69478	2.438546	12.0695	26.0074	21.4947	2.492519	12.0694	25.7244
Bank-Specific Variables								
Balance sheet data (for each bank i and quarter t)								
Tier1 Ratio (%)	0.182737	0.1653909	0.0054	3.14585	0.17869	0.161253	0.00538	3.14584
Total Loans/Assets (%)	0.777339	0.2256738	0	1.47161	0.79578	0.227887	0	1.47160
Total Deposit/Assets (%)	0.346451	0.3381435	0	2.52977	0.3411	0.330231	0	2.52977
FXHousingLoans/Assets (%)	0.085851	0.1521338	0	0.65490	0.08676	0.1559	0	0.65490
Macroeconomics								
Data for each quarter t								
GDP	3.278261	1.75493	0.2	6.9	3.27721	1.75502	0.2	6.9
CPI	3.408696	1.02258	0.5	4.7	3.40863	1.02233	0.5	4.7

Source: own calculations on the basis of NBP and CSO data.

2. Data for Parent Banks

	Mean	SD	Min	Max
Observations	1257			
<i>Independent Variables:</i>				
parent Net Loans/Assets (%)	52.27033	23.10678	0.005	99.251
parent_Total_Capital_Ratio (%)	14.16492	5.224161	7	56.6
parent_ROA (%)	0.477185	0.866871	-6.36	8.958
parent_ROE (%)	6.934040	9.598102	-129.584	42.196
parent_loan_loss_ratio (%)	2.734991	1.982544	0.021	12.44
parent_GDP	0.1164969	2.770955	-9.2	7.9

Source: own calculation on the basis of Bankscope and Eurostat.

Table 3. Results for the Panel A

This table provides empirical results for data are observed yearly 1997-2012.

<i>Variables</i>	Estimate (1)	Estimate (2)	Estimate (3)	Estimate (4)	Estimate (5)
L1.ROA	0.1291524***	0.1848878***	0.1397995***	0.1828694***	0.2213944***
Market structure					
HHI_t	0.004034	0.0183837*	-	-	-
LA_{vt}	-	-	0.1567493**	-	-
FC_t	-	-	-	0.0006266**	0.1567493
Market power					
MP_{it}	-	1.057503*	-	1.020856**	-
LI_{it}	-	-	-	-	0.155171***
LA_{it}	0.0272884***	-	0.023718***	-	-
Macroeconomics					
GDP	-	0.012952***	0.0090024***	-	-
CPI	0.0069283***	-	-	0.0075206***	0.0020774**
Bank-Specific Variables					
CTI_{it}	-0.0040247**	-0.004425**	-0.0039121**	-0.004188***	-0.009632***
LTA_{it}	-	-	-	0.0087123**	0.0097125***
DTA_{it}	-0.000698	-0.000392	0.0005646	-	-
Impact of the crisis:					
Market structure					
$HHI_t * CRI$	-0.0014337	0.0642391	-	-	-
$Lm_t * CRI$	-	-	-	-	-
$FC_t * CRI$	-	-	0.2813902	0.0000411	0.0066043***
Market power					
$MP_{it} * CRI$	-	0.4018004	-	0.4831009	-
$LI_{it} * CRI$	-	-	-	-	-0.1312851**
$LA_{it} * CRI$	0.0136843**	-	0.0151119***	-	-
Binary variable					
CRI	-0.2350996*	-	-0.3315409**	-0.0329648*	-0.4615208***
const	-1.138948**	1.183***	-1.307023***	-0.833817***	1.183***
Sargan test	0.2625	0.3081	0.2524	0.2700	0.0592
Time Period	1997-2012				
Number of observations	963	963	896	963	963
Number of groups	117	117	111	117	117

Source: author's calculations. ***/**/* indicate significance at the 1/5/10% level respectively.

Table 4. Results for the Panel B

This table provides empirical results for data are observed quarterly 2007Q4–2013Q2.

<i>Variables</i>	Estimate (1)	Estimate (2)	Estimate (3)	Estimate (4)	Estimate (5)
<i>L1.ROA</i>	0.734351***	0.7206154***	0.877926***	0.6548425***	0.6526878***
Market structure					
<i>HHI</i>	-4.567491	0.4545575	0.617823***	1.767206	3.145156
<i>Size</i>	0.200488**	-	-	-	-
Market power					
<i>MP</i>	-	0.556646	-	-	-
<i>ML</i>	1.017407	-	-0.0946574	-	-
<i>LA</i>	-	-	-	0.058173***	0.0581294***
Foreign ownership					
<i>FO</i>	-0.0475637	-0.016291	-	0.2766389**	0.3084672***
Macroeconomics					
<i>GDP</i>	-	0.0023232	-	-	0.0028546**
<i>CPI</i>	-0.0016897	-	0.0009523**	0.0496***	-
Bank-Specific Variables					
<i>LTA</i>	-	0.1969856***	-	0.0497474**	-
<i>DTA</i>	-0.0371561***	-	-0.017174***	-	-0.080709**
<i>CAR</i>	-	-	-0.013356***	-	-
<i>FXHL</i>	-	-0.0246905	-	-0.780618**	-0.752328**
<i>const</i>	-5.254702	-0.1833865	-0.0270513	-0.0270513	-1.62991
Sargan test	0.1698	0.1465	0.0408	0.2524	0.0097
Time Period	2007Q4-2013Q2				
Number of observations	1231	1231	1231	1231	1231
Number of groups	86	86	86	86	86

Source: author's calculations. ***/**/* indicate significance at the 1/5/10% level respectively. All variables were seasonal adjusted.

Table 5. Impact of Situation in Parent Banks on Profitability of Foreign Banks in Poland: results based on the Panel B

<i>Variables</i>	Estimate
<i>L1.ROAf</i>	0.8000654***
Macroeconomics - business cycle in parent country	
<i>parent_GDP</i>	0.0045741***
Bank-Specific Variables in parent country	
<i>parent_Total_Capital_Ratio</i>	-0.0061702*
<i>parent_Net_Loas_to_Assets</i>	0.0025147***
<i>parent_ROA</i>	0.0067614
<i>const</i>	-0.091345
sargan test	0.0021
Time Period	2007Q4-2013Q2
Number of observations	710
Number of groups	51

Source: author's calculations. ***/**/* indicate significance at the 1/5/10% level respectively. Macroeconomic variable was seasonal adjusted.