Performance of Domestic and Foreign Banks during Global Financial Crisis and the Debt Crisis in the Eurozone

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Abstract

The aim of this study is to examine the effect of bank-specific and macroeconomic factors of bank profitability in Poland during the Global Financial Crisis and Eurozone Debt Crisis. Also, this paper analyse the differences of the determinants of profitability between domestic and foreign banks during the global financial crisis of 2008 and the debt crisis in the Eurozone.

Empirical results based on panel data sets containing both micro-level and macro-level data found evidence of differences of determinates of the performance between domestic and foreign banks, and also between foreign subsidiaries and foreign institutions branches. Finally, this paper find that the profitability of all commercial banks in Poland (domestic and foreign) was contingent upon the business cycle.

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

Keywords: bank profitability, Polish banks, domestic banks, foreign banks, business cycle, financial crisis.

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Introduction

The profitability of banks is a subject of great interest in bank management, financial markets, bank supervision, and academics. This interest is driven by increasing globalization and consolidation within the banking sector and macro prudential policy. Also, ownership structure is widely accepted in the finance literature as an instrumental determinant of banks performance.

Globalization is changing the ownership structure of banking sectors around the world, between 1999 and 2009 the average share of bank assets held by foreign banks in developing countries rose from 26 percent to 46 percent (Anginer at all., 2016) and the Polish banking sector is no exception. However, after Lehman Brothers collapsed, governments saved many banks with capital injections (including the Royal Bank of Scotland (RBS)) while other banks were nationalized (e.g. ABN AMRO, HypoVereinBank). Finally, in many banking sectors the share of foreign banks decreased. Furthermore, in many countries (including Poland), we observed an increased trend toward domestic banks.

It should be noted that the impact of foreign bank is unambiguous. On the one hand, the pre-global financial crisis evidence suggests that foreign bank participation brought many benefits to developing countries including financial stability. On the other hand, the recent Global Financial Crisis highlighting the role of multinational banks in the transmission of shocks across countries. In addition, foreign banks can be a channel through which shocks in one country are transmitted and affect the supply of credit in another country. Therefore, foreign banks can introduce financial instability (Claessens and Van Horen (2013).

The aim of this study is to estimate the determinate of the performance of banks in Poland during the financial crisis - after the Lehman Brothers failure. This paper will also examine whether financial development and business cycles affect the profits of Polish banks. Also, this paper examine the differences of the determinants of profitability between domestic and foreign banks. This paper distinguishes between determinants of profitability of foreign subsidiaries and branches.

In order to carry out a quantitative assessment of the effect of bank-specific and macroeconomic determinants of bank profitability in Poland, this study uses panel data sets to combine micro- and macro-statistical data covering cyclical factors and the macroeconomic environment. Panel data consisted of quarterly micro- and macro-level data, combining data for Polish commercial banks and their parent banks, and information about the macroeconomic environment for the period of 2007Q4–2013Q4. We received micro-level data for Polish commercial banks from the National Bank of Poland (balance sheets, profit

and loss accounts). We received macroeconomic data from the Polish Central Statistical Office. We analysed profitability in the Polish banking sector using the return on assets ratios (ROA) and return on equity (ROE).

This study consists of two parts and a summary. The first part is a broad literature review concerning the determinant of bank profit. The second part describes the changes in profitability within the Polish banking sector and presents data, empirical models, and the results of the analysis of panel data for the period 2007Q4–2013Q4. The summary provides an overview of the empirical results and the conclusions that we made.

1. Determinants of Banks Profitability: Survey of the Literature

The profitability of the banking sector is of interest not just at the individual bank level, but also at a broader macroeconomic level. Dramatic changes in regulation and technology have modified ownership structure of the banking sectors, and have increased presence of foreign banks. However, empirical research on the relative performance of domestic and foreign banks has produced ambiguous results, with some studies finding that foreign banks perform better and other studies reporting stronger performance from domestic banks (cf. Degryse and Ongena, 2008; Chen and Liao, 2011). Also, a lot of studies focusing on state ownership of banks. Barth et al. (2001) conclude that state ownership of banks tends to be associated with more poorly developed banks, nonbanks, and securities markets. Furthermore, La Porta et al. (2002) concluded that a state bank follows a political rather than a social agenda. Whereas, Kane (2000) used agency-cost and contestable-markets theory to present a general model of the life cycle of a regulation-induced banking crisis and suggested that the increasing globalization of financial services has the effect of creating pressure to discipline inefficient regulators.

The literature concerning foreign banks we can divided into two groups: concerning industrial and emerging markets. Studies focusing on industrialized countries find that foreign owned banks perform significant worse than domestic banks do (see, among others, DeYoung and Nolle 1996) or not different from domestic banks (Vander Vennet 1996). When studying foreign banks in developing countries, many studies find that foreign banks perform better than domestic banks (Grigorian and Manole 2006, Degryse and Ongena (2008), Havrylchyk and Jurzyk (2011)). Others, however, find the opposite (Nikiel and Opiela 2002; Yildirim and Philippatos 2007, Claessens and Van Horen (2013), Rumler and Waschiczek, (2010)) or no significant difference between domestic and foreign banks (Crystal, Dages and Goldberg

2001). Also, most empirical studies in this area focused on increased participation the foreign banks' in emerging markets, raising questions about their potentially stabilizing or destabilizing role during times of financial distress and also has produced ambiguous results. Furthermore, foreign banks' legal structure (branch versus subsidiary) along with the nature of the banking crisis (systemic versus non-systemic) could also determine their stabilizing or destabilizing role (Adler and Cerutti, 2015). Claessens and Van Horen (2013), found that foreign banks might have higher capital and more liquidity, but they have lesser profitability than domestic banks. Also, during the global financial crisis of 2008, foreign banks reduced credit more sharply when compared to domestic banks, except when they dominated the host banking systems.

Number of studies examined the influence of the market structure on bank performance based on the Market Power (MP) hypothesis. The MP hypothesis, which is sometimes also referred to as the Structure-Conduct-Performance (SCP) hypothesis, asserts that increased market power yields monopoly profits. A special case of the MP hypothesis is the relative-market-power (RMP) hypothesis which was created by Smirlock (1985). Smirlock (1985) posited that there is no relationship between concentration and profitability, but rather between bank market share and bank profitability. A positive relationship between concentration and profitability was reported e.g. by Demirguc-Kunt and Huizinga (1999), Molyneux and Thornton (1992), Goddard et al. (2004), which confirm the traditional SCP hypothesis. However, Mirzaei et al. (2013) and Fernández de Guevara, (2004) confirmed the relative market-power hypotheses (RMP) in advanced economies. Finally, for Polish banking sector empirical results find no evidence of SCP hypothesis, but only support of the RMP hypothesis (Pawłowska 2016a, Pawłowska 2016b).

Also, the majority of the studies analyzing the determinants of banks performance are focused on selected microeconomic factors. Many authors find a strong, positive correlation between a bank's capitalization and its profitability (Bikker and Hu, 2002; Demirgüç-Kunt and Huizinga, 1999; Maudos and Fernández de Guevara, 2004, Goddard et al., 2004). Some studies look at the influence of disintermediation tendencies on bank profits. Whereas some studies come to the conclusion that a higher share of non-interest income increases the bank profits (Carbó and Rodríguez, 2007), other authors find that the diversification resulting from disintermediation strengthens the banks' profit base (Rossi et al., 2009).

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 (e.g. Albertazzi

and Gambacorta, 2009; Bikker and Hu, 2002; Demirgüç-Kunt and Huizinga, 2000). Comprehensive studies describing many micro factors and business cycles have been published for the Austrian banking sector (cf. Rumler and Waschiczek, 2010) and for Greek banks (cf. Athanasoglou et al., 2008). Furthermore, the Global Financial Crisis and the low interest rates in major advanced economies caused to intensification of research concerning how monetary policy affects bank profitability (cf. Borio et. al., 2015). The results suggests that, low interest rates erode bank profitability.

2. Economic Factors and Profitability of Banks—Panel Data Analysis

Banks' role in the Polish economy grows systematically. This is confirmed by a growing share of the sector's assets in the GDP, as observed over the past dozen or so years (from 55% in 1999 up to 86% in 2013). The profitability of commercial banks in Poland prior to and during the financial crisis was influenced by a large number of internal and external factors: consolidation, technological processes, and the real economy. After Poland's accession to the EU, there was a clear improvement in profitability both with return on assets (ROA) and return on equity (ROE). This improvement in bank profitability was facilitated by, among others, a decrease in the share of non-performing loans in assets.[2] The global financial crisis has resulted in a massive reduction in profitability for many banks in the EU. However, Poland experienced only a slight decrease in the profitability of its banking sector in the first part of the crisis (in 2009). After this, the profitability of the Polish banks increased. (see Figures 7 and 8 in the Appendix).

The turbulence of the global financial market in 2008, which was reflected at the Polish level with lower confidence between financial institutions, lead to obstacles in liquidity management and risk hedging. A decline of mutual trust amongst market participants created a situation where banks, uncertain of the financial situation of their contractors, preferred to invest all available funds in central banks. However, the situation of the Polish interbank market can be considered quite good in comparison to the disturbances occurring in other countries. The WIBOR 3M rate, which is a reference rate for the majority of domestic currency loans, increased from 5.7% at the end of 2007 to 5.9% at the end of 2008. It should be noted, however, that the group of Polish commercial banks was not homogeneous during

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[2] Since Poland's accession to the EU, the classification of non-performing loans become less restrictive. Sub-standard receivables from one to three months changed to three to six months, doubtful receivables from three to six months changed to six to twelve months, and lost receivables from the above six months to the above twelve months. See NBP (2004).

the first part of the crisis. There was a strong deterioration in the financial results of several banks that, in previous periods, were characterized by increasing market shares (particularly in the segment of household loans). These banks had a negative effect on the performance of the entire group (however, some banks reported an improvement in financial results as compared to 2008).[3] In the period 2010–2013, the profitability of Polish commercial banks improved again.

In 2013, operated 41 commercial banks and 28 branches of credit institutions. As of the end of 2013, the share of banks with predominantly foreign capital in Poland was approximately 63% whereas it was approximately 15% at the end of 1997. However, the share of banks controlled by domestic investors was approximately 37% (see Figures 4 in the Appendix)[4]. Domestic investors controlled 10 commercial banks and the Treasury controlled 4 commercial banks; foreign investors controlled 31 commercial banks and all branches of credit institutions. Investors from 17 countries held the controlling interest. The parent financial institutions of Polish banks were located mostly in Western Europe (Austria, Belgium, Greece, Germany, France, Italy, Netherlands, Portugal, and Spain) and in the United States (cf., Figure 4 in the Appendix).

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[3] Polish Financial Supervision Authority, 2014.

[4] As of the end of 2015, the share of banks with predominantly foreign capital in Poland was approximately 59% and the share of banks controlled by domestic investors increased in the sector's total assets up to 41%. As at the end of 2015, domestic investors controlled 15 commercial banks (the Treasury controlled 5 commercial banks); foreign investors controlled 26 commercial banks and all branches of credit institutions. Polish Financial Supervision Authority, 2016.

2.1 Data and Model Specification

In order to find the effect of the micro and macroeconomic factors on the profitability of banks in Poland, this study examined quarterly data covering the period of the financial and debt crises (2007Q4–2013Q4). 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)[5]. The panel data sets combined micro-level data for Polish commercial banks and macro-level statistical data covering cyclical factors, and this study used a variety of microeconomic indicators stemming from the bank data to capture changes in the economic framework, including balance sheets and income statement figures from the National Bank of Poland's balance sheet statistics. Macroeconomic data on the growth of GDP and inflation in Poland came from the CSO (Central Statistical Office).

In order to carry out a quantitative assessment of the effect of market structure on the profitability of banks in the Polish sector, the generalized method of moments (GMM) estimator was used. The GMM estimator was proposed by Arellano and Bond (1991) and generalized by Arellano and Bover (1995) and Blundell and Bond (1998).[6] This paper used the system GMM (xtabond2) procedure, which can fit two closely related dynamic panel data models (the Arellano-Bond [1991] estimator and the Arellano and Bover [1995] estimator, fully developed in Blundell and Bond [1998]). The original estimator is sometimes called difference GMM, and the augmented one is sometimes called system GMM. However, the xtabond2 procedure implements both estimators. As GMM estimators, the Arellano-Bond estimators have one- and two-step variants (Arellano and Bond, 1991; Blundell and Bond, 1998). However, using the two-step GMM estimator may impose a downward (upward) bias in standard errors (t-statistics) due to its dependence on the estimated residuals. This may lead to unreliable asymptotic statistical inference (Bond, 2002; Bond and Windmeijer, 2002; Windmeijer, 2005), especially in data samples with a relatively small cross section dimensions (Arellano and Bond, 1991; Blundell and Bond, 1998).

Finally, taking into account the above factors, this paper used a one-step variant of GMM.[7] Moreover, we used the Sargan test of over-identifying restrictions, which tests the

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[5] The numbers of banks fluctuated in the sample due to acquisitions, liquidations, and new banks entering the market. In 2013 the assets of Branches of credit institutions accounted for 1.4 % assets of the financial system (without the NBP) See. Figure 2 of the Appendix.

[6] Use of a GMM estimator also accounts for possible correlations between any of the independent variables. For a thorough description of the various GMM estimators, see Baltagi (2001).

[7] In the estimations we used lagged dependent variables as an instruments.

overall strength of the instruments for a one step estimator (Arellano and Bond, 1991; Arellano and Bover, 1995; Blundell and Bond, 1998), and we used the Arellano-Bond tests for AR(1) and AR(2) in the first differences. We also performed model estimation separately to avoid any alignment of variables. In order to solve the problems arising from extreme outliers that affect estimation, all outliers were removed from each panel data set (i.e., any value below the first percentage point or above the 99th percentage point in sample distributions was removed).

2.2 The Baseline Model and Estimation (Quarterly Data Set During the Global Financial Crisis and Eurozone Debt Crisis)

In order to carry out a quantitative assessment of the determinates of banking profitability in the Polish sector during the crisis, a quarterly data set was used that was based on data from 2007Q4–2013Q4. Date set combines micro- and macro-statistical data covering cyclical factors and the macroeconomic environment. We received micro-level data for Polish commercial banks from the National Bank of Poland (balance sheets, profit and loss accounts), and we received micro-level data for their parent banks from the Bankscope database. We received macroeconomic data from the Polish Central Statistical Office (CSO) and Eurostat.

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

$$ROA_{it} = \alpha + a_0 ROA_{it-1} + a_1 \text{market power}_{it} + a_2 \text{business cycle}_t + \sum_{j=1}^{N} b_j oth_{it} + \varepsilon_{it} \quad (1)$$

where ROA_{it} denotes the return on assets ratio for each bank i and for each quarter t[8].

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

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

Also, as the measure of relative market power, the model also tested the effect of the size of the bank on profitability, which was defined as follows:

- The log of total assets (LA_{it}) for each bank i for each quarter t.

The model also tests the effect of the business cycle on bank profitability during the crisis. The variable *business cycle* was defined as follows:

- GDP_t growth (yoy) and (CPI_t) for each quarter t.

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[8] 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.

The model also tests the impact of *the cost of the banks self-financing* define as:

- the 3 month WIBOR ($WIBOR_t$)[9] quarterly average for each quarter *t*.

In regressions, we 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}) as an indicator of a bank's risk behavior (the higher the capital ratio, the greater the risk aversion) for each bank *i* for each quarter *t*.

- The share of foreign currency housing 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*.

- The variable α is a constant term, ε_{it} denotes the error in the model, and $a_0, a_1, a_2, a_3,$ and b_j are the regression coefficients.

In case to analyzed the changes in the determinates of profitability in the Polish banking sector we have calculated separate regressions for the all commercial banks, for foreign banks subsidiaries, for branches of credit institutions and for domestic banks. Therefore, in this respect foreign-owned banks was divided into two groups: foreign banks subsidiaries and credit institutions branches. This model also controls for the effect of the global financial crisis and the Eurozone debt crisis in relation to profitability and foreign ownership. Therefore, the full sample was split into three intervals: (1) the global financial crisis, (2) the Eurozone debt crisis (the sample begins in 4Q 2010 and ends in 4Q 2013), and (3) the whole analyzed period (2007Q4–2013Q4).

Tables 4-6 of the statistical Appendix presents the results of regressions using a one-step GMM estimator. For each of the estimations, we also reported the Sargan test results at the bottom of the table as well as the Arellano-Bond tests (AR(1) and AR(2)). The model seemed to fit the panel data reasonably well, as the Sargan-test showed no evidence of over-identifying restrictions. Table 4 present results for subsidiaries of foreign institutions. Table 6 present results for credit institutions branches. Table 7 present results for domestic banks Table 8 present results for all commercial banks.

In Table 4 of the Appendix a positive and significant coefficient (a_1) was found for relative size (*LA*) in regressions 2,4, 6. It means that relative market power—measured in

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[9] Quarterly average based on Thomson Reuters database.

terms of the individual institution's the log of total assets of (LA)—had a positive and significant influence on the profitability indicators of subsidiaries of foreign institutions in this study. However, relative market power—measured in terms of the individual institution's share in total assets (MP)—had a insignificant influence on the profitability indicators in this study. This results may confirmed the RMP hypothesis for Polish banks.

Of the microeconomic control variables, we found the ratio of the core-capital to risk-weighted assets to have a significant and negative influence on bank profitability mainly in domestic banks (Table 6). For subsidiaries of foreign institutions we found a significant and positive influence of the core-capital to risk-weighted assets on bank profitability mainly during the Eurozone crisis. We found that banking sector development—measured in terms of foreign currency lending—had a significant and negative influence on bank profitability mainly for domestic banks. These findings indicate that foreign currency loans did not positively contribute to bank profitability for this group. However we found positive results for subsidiaries of foreign banks during the first part of the crisis regressions 1 in table 5. Results indicates the positive correlation between intermediation (i.e., grater loans in total assets) and bank profitability mainly for subsidiaries of foreign banks (Table 4). However, our results show a negative coefficient between the ratio of total deposit to total assets and profitability for branches of foreign institutions (table 5).

Generally, this paper found positive and significant coefficient (a_2) for all groups of banks. This findings indicate the positive correlations between GDP growth and the profitability of banks throughout the entire period of analysis. This means that the profitability of banks is procyclical. However, inflation (*CPI*) and the cost of the banks self-financing (WIBOR) was insignificant.

Conclusions

Generally, the results of comprehensive analyses concerning the profitability of Polish banks has confirmed difference between determinates of profitability of foreign and domestic banks, and between foreign banks subsidiaries and foreign institutions branches. However for all commercial, this paper demonstrates generally a positive correlation between profitability and the size of the bank. This results has confirmed the RMP hypothesis for Polish banks.

Of the microeconomic control variables, we found that the core capital ratio has a significantly negative influence on bank profitability for domestic banks. Furthermore, the findings indicate that foreign currency loans did not positively contribute to bank profitability mainly for domestic banks. We also found a positive correlation between intermediation (i.e., grater loans in total assets) and profitability of foreign banks subsidiaries. These results may show that business models based on strong lending positions were a stabilizing factor in the current financial crisis. However, the ratio of the core-capital to risk-weighted assets to have a significant and negative influence on bank profitability mainly in domestic banks. For subsidiaries of foreign institutions we found a significant and positive influence mainly during the Eurozone crisis. Finally, as in other countries, bank profitability is strongly influenced by cyclical developments, and this paper found a positive correlation between GDP growth.

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Appendix

Figure 1. GDP growth, inflation rate (yoy) and WIBOR 3 month - quarterly (%).
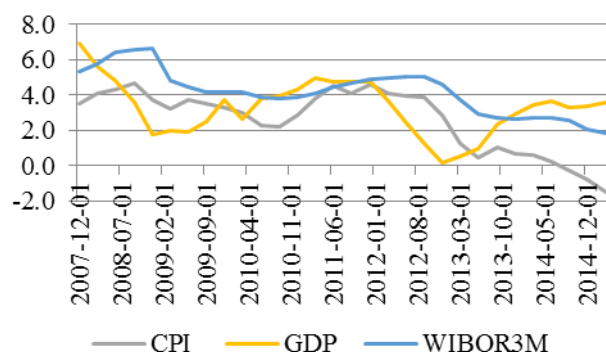
Source: PFS and CSO and Bloomerg.

Figure 2. Number of commercial banks and credit institutions branches
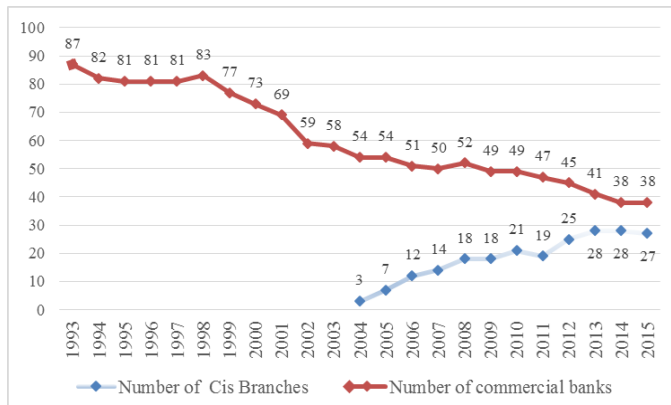
Source: NBP and PFS.

Figure 3. Share of domestic and foreign investors (in assets) in the Polish banking sector.
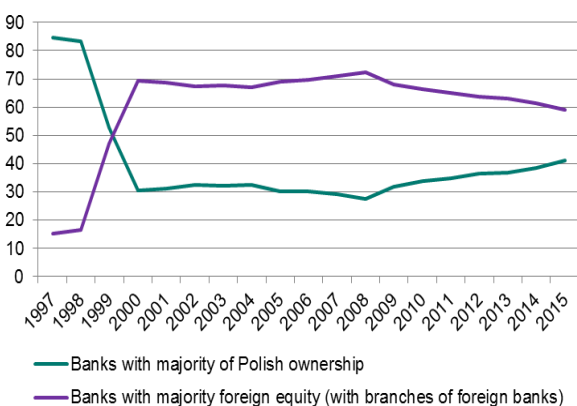
Source: PFS.

Figure 4. Share of foreign investors in assets of the Polish banking sector by country of origin.
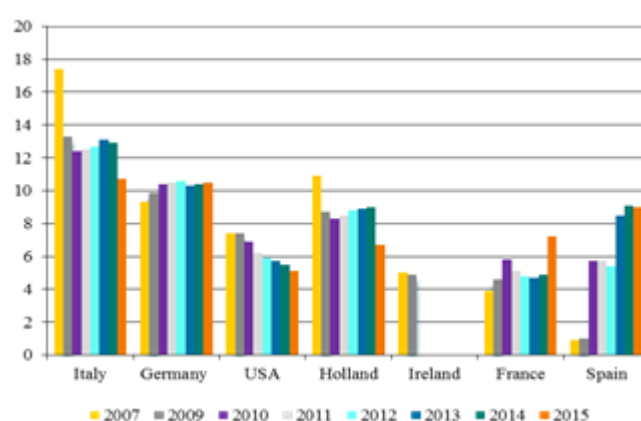
Source: PFS.

Figure 5. Assets of the Polish Banking Sector [bn PLN]
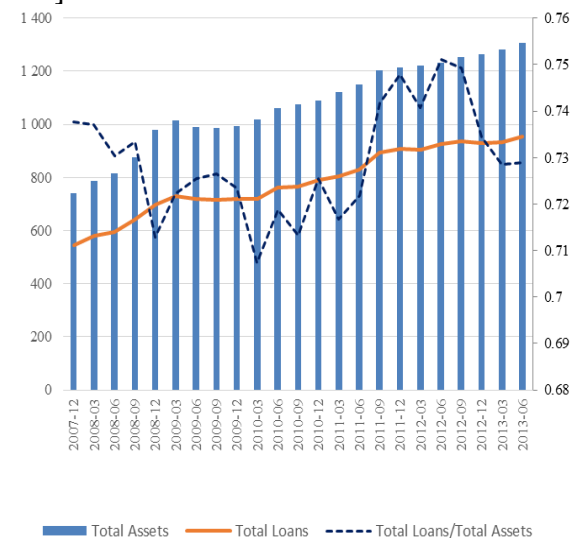
Source: NBP.

Figure 6. CR5 and Foreign banks in UE (%)

Source: ECB.

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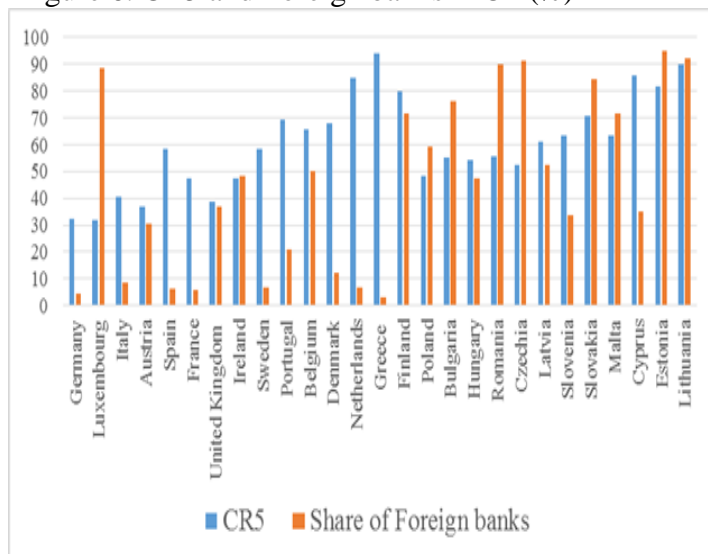
Figure 7. Profitability Ratio (ROA, in %) and Share of Foreign Banks in EU.
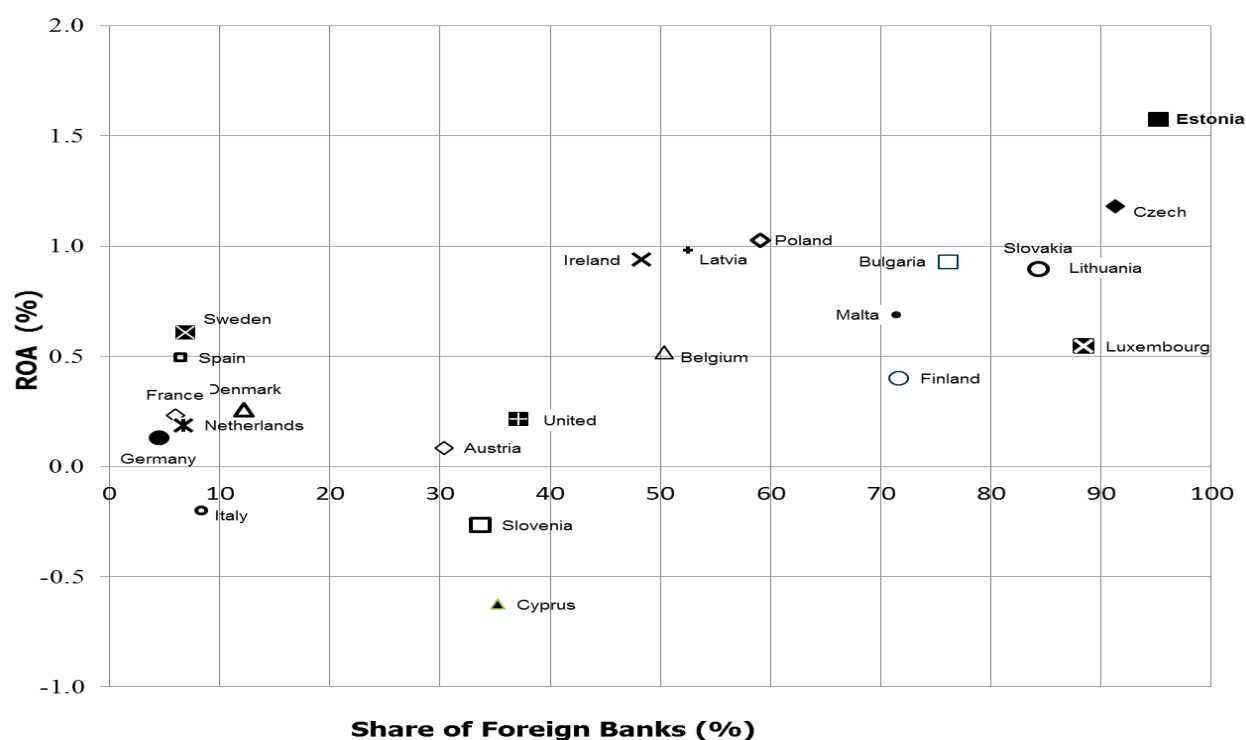
Source: ECB.

Figure 8. Profitability ratio (ROE, in %) and Share of Domestic Banks in EU.
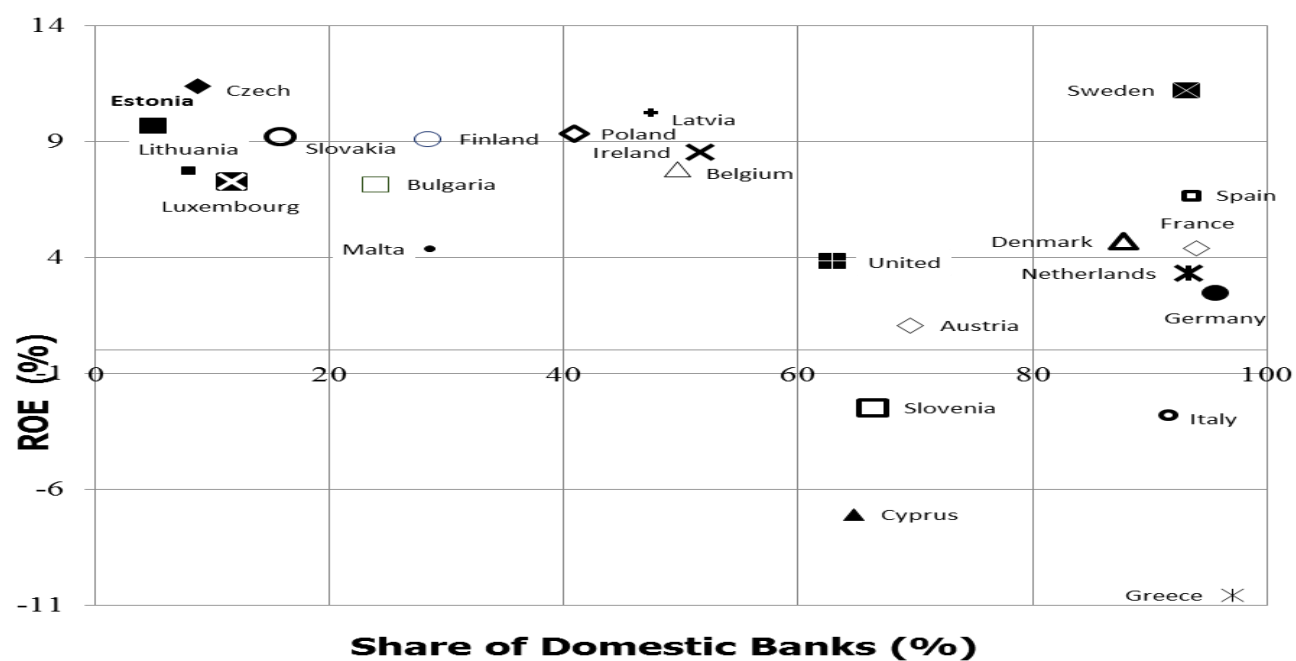
Source: ECB. Note: ROE and ROA indicators are derived using profit after tax.

Table 1

Summary Statistics of Polish Commercial Banks (quarterly data)

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

A. Data for Polish Commercial Banks

|	All Banks				Banks with Majority of Foreign capital				Banks with Majority of Polish capital			
	Mean	SD	Min	Max	Mean	SD	Min	Max	Mean	SD	Min	Max
ROA Ratio(%)	0.003	0.03	-0.32	0.05	0.008	0.02	-2.86	0.82	-0.005	0.19	-0.32	0.43
ROE Ratio(%)	0.036	0.29	-4.7	0.48	0.038	0.13	-1.26	0.40	-0.01	0.32	-1.26	0.49
Market Power												
Independent Variables:												
Balance Sheet Data (for each bank *i* and quarter *t*)												
Market Power												
	Mean	SD	Min	Max	Mean	SD	Min	Max	Mean	SD	Min	Max
MP Ratio (%)	0.014	0.03	1.42	0.16	0.012	0.02	0.0	0.16	0.015	0.03	0.0	0.16
Log of Assets (size)	21.69	2.44	12.07	26.01	21.49	2.49	12.1	25.7	21.48	2.52	12.7	26.1
Bank-Specific Variables												
Balance Sheet Data (for each bank *i* and quarter *t*)												
	Mean	SD	Min	Max	Mean	SD	Min	Max	Mean	SD	Min	Max
Tier1 Ratio (%)	0.17	0.17	0.01	3.15	0.18	0.16	0.01	3.15	0.19	0.24	0.06	3.15
Total Loans/Assets (%)	0.78	0.23	0	1.47	0.79	0.23	0	1.47	0.75	0.19	0.10	1.47
Total Deposit/Assets (%)	0.35	0.34	0	2.53	0.34	0.33	0	2.53	0.38	0.38	0	2.38
FXHousingLoans/Assets (%)	.085	0.15	0	0.65	0.09	0.16	0	0.65	0.08	0.15	0	0.60
Macroeconomics												
GDP (yoy)	3.28	1.75	0.2	6.9	3.28	1.75	0.2	6.9	3.28	1.75	0.2	6.9
GDP (qoq)	0.74	0.54	0.26	1.59	0.74	0.54	0.26	1.59	0.74	0.54	0.26	1.59
WIBOR3M	4.57	1.04	2.67	6.64	4.57	1.04	2.67	6.64	4.57	1.04	2.67	6.64

Source: Author's calculations on the basis of NBP, CSO data and Eurostat data and Bankscope.

Table 2

Spearman's Rank Correlation Coefficients for all Variables

	ROA	MP	LA	HHI	LTA	DEP	Tier1	FXH	GDP	CPI	Wibor
ROA	1										
MP	0.0123	1									
LA	0.0183	0.9979*	1								
HHI	0.1035*	-0.0022	0.0404	1							
LTA	0.1549*	-0.3979*	-0.4006*	-0.0308	1						
DEP	-0.0742	0.2865*	0.2946*	0.0918	-0.7524*	1					
Tier1	0.3373*	-0.5157*	-0.5075*	0.1660*	0.0307	0.0057	1				
FXH	-0.1137*	0.7254*	0.7260*	0.0200	0.0844	-0.1540*	-0.5934*	1			
GDP	-0.0110	-0.0112	-0.0203	-0.1934*	-0.0142	0.0253	0.0051	-0.0060	1		
CPI	0.0230	0.0050	0.0104	-0.2349*	0.0392	-0.0158	-0.1027*	0.0200	0.4511*	1	
Wibor	-0.0397	-0.0019	0.0016	-0.3595*	0.0550	-0.0488	-0.1407*	0.0144	0.1528*	0.8063*	1

Source: Author's calculations on the basis of NBP and CSO data. */ indicates significance at the 10% level.

Table 3

Empirical Results for Banks with Foreign Affiliates - subsidiaries of foreign institutions and Credit institutions branches: Baseline Model

Subsidiaries of foreign institutions	Global Financial Crisis		the Eurozone Crisis		the whole period	
Variables	Estimate (1)	Estimate (2)	Estimate (3)	Estimate (4)	Estimate (5)	Estimate (6)
L1.ROA	0.307***	0.304***	0.512***	0.435***	0.348***	0.431***
Market Power						
MP	0.866	-	0.393	-	-	0.461
LA	-	0.067***	-	0.019***	0.027***	-
Bank-Specific Variables						
LTA	0.085**	0.081**	0.067***	0.079***	0.077***	0.063***
DTA	0.004	0.019*	0.001	0.001	0.002	0.002
CAR	-0.004**	0.009	0.063***	0.0691***	0.018*	0.003
FXHL	0.132*	-0.084	-0.016	-0.02	-0.019	0.003
Macroeconomics						
GDP	0.002**	0.002**	0.001*	0.001*	0.001**	0.001*
WIBOR	-	0.001	0.001	-	0.001	-
CPI	0.001	-	-	0.001	-	0.001
Time Period	2007Q4-2010Q3		2010Q4-2013Q4		2007Q4-2013Q4	
The Sargan Test	0.068	0.610	0.001	0.001	0.001	0.001
AR(1)	0.113	0.142	0.000	0.000	0.408	0.646
AR(2)	0.053	0.886	0.033	0.020	0.001	0.001
Nu of Obser.	266	266	430	430	696	696
Number of gr.	41	41	38	38	42	42
Credit institutions branches	Global Financial Crisis		the Eurozone Crisis		the whole period	
Variables	Estimate (7)	Estimate (8)	Estimate (9)	Estimate (10)	Estimate (11)	Estimate (12)
L1.ROA	0.445**	0.483**	0.015	-0.034	0.064	0.076
Market Power						
MP	-16.096		-5.466			-12.085
LA		0.035		0.049*	0.021	
Bank-Specific Variables						
LTA	-0.262	-0.302	0.032	-0.032	-0.032	-0.026
DTA	-0.201**	-0.198**	0.049	0.032	-0.051	-0.055
FXHL	2.882	3.576	0.068	-0.041	-0.167	-0.424
Macroeconomics						
GDP	0.013	0.012	0.02*	-	-0.001	0.02*
WIBOR	-0.017	-0.016	-0.002	0.004	-0.016	
CPI				-0.001		-0.013
Time Period	2007Q4-2010Q3		2010Q4-2013Q4		2007Q4-2013Q4	
The Sargan Test	0.000	0.000	0.926	0.547	0.011	0.032
AR(1)	0.741	0.982	0.062	0.783	0.766	0.436
AR(2)	0.419	0.589	0.002	0.491	0.193	0.145
Nu of Obser.	126	126	265	265	391	391
Number of gr.	21	21	30	30	32	32

Source: Author's calculations. ***/**/* indicate significance at the 1%/5%/10% levels respectively. All variables were seasonally adjusted. AR(1)—Arellano-Bond test for AR(1) in first differences. AR(2)—Arellano-Bond test for AR(2) in first differences. The Sargan Test—the test for over-identifying restrictions in GMM dynamic model estimation.

Table 5

Empirical Results for Domestic banks: Baseline Model

Domestic banks	Global Financial Crisis		the Eurozone Crisis		the whole period	
Variables	Estimate (1)	Estimate (2)	Estimate (3)	Estimate (4)	Estimate (5)	Estimate (6)
L1.ROA	0.69***	0.70***	0.41***	0.37***	0.41***	0.34***
Market Power						
MP	0.35		0.35		-0.17	-
LA		0.025		0.025		0.010
Bank-Specific Variables						
LTA	0.05	0.053	-0.029	-.006	0.003	0.001
DTA	0.048**	0.049**	|-0.11***	|-0.12***	-0.014	-0.015
CAR	-0.025	-0.025	-0.073***	-.06***	-0.060**	-0.041**
FXHL	-0.10	-0.099	-0.06**	-0.221**	-0.22**	-0.22**
Macroeconomics						
CPI	-	-0.015	-			
GDP	-0.000	0.01*	-	0.002	0.001	0.001*
WIBOR	-.0007	-	0025	-0.000		-0.00
Time Period	2007Q4-2010Q3		2010Q3-2013Q4		2007Q4-2013Q4	
the Sargan Test	0.213	0.224	0.261	0.274	0.261	0.209
AR(1)	0.061	0.326	0.084	0.061	0.048	0.026
AR(2)	0.196	0.426	0.196	0.343	0.070	0.030
Nu of Obser.	80	80	115	115	195	195
Number of gr.	12	12	11	11	12	12
All Foreign banks	Global Financial Crisis		the Eurozone Crisis		the whole analyzed period	
Variables	Estimate (7)	Estimate (8)	Estimate (9)	Estimate (10)	Estimate (11)	Estimate (12)
L1.ROA	0.526***	0.632***	0.086*	0.042	0.129***	0.141***
Market Power						
MP	4.133	-	3.882		-0.034	
LA		0.065*		0.038*	-	0.019
Bank-Specific Variables						
LTA	-0.348**	-0.467***	0.053	-0.003	-0.051	-0.04
DTA	-0.201***	-0.203***	0.054	0.035	-0.061*	-0.062*
CAR						
FXHL	0.896	0.717	-0.083	-0.235	0.026	-0.058
Macroeconomics						
CPI				-0.001		-0.005
GDP	0.004	0.003	-0.009*		0.001	-
WIBOR	-0.007	-0.007	-0.001	0.003		
Time Period	2007Q4-2010Q3		2010Q4-2013Q4		2007Q4-2013Q4	
the Sargan Test	0.000	0.000	0.000	0.000	0.000	0.000
AR(1)	0.548	0.263	0.270	0.519	0.013	0.052
AR(2)	0.104	0.392	0.000	0.000	0.022	0.023
Nu of Obser.	392	392	697	697	1089	1089
Number of gr.	62	62	67	67	73	73

Source: Author's calculations. ***/**/* indicate significance at the 1%/5%/10% levels respectively. All variables were seasonally adjusted. AR(1)—Arellano-Bond test for AR(1) in first differences. AR(2)—Arellano-Bond test for AR(2) in first differences. The Sargan Test—the test for over-identifying restrictions in GMM dynamic model estimation.

Table 6

Empirical Results for All Commercial Banks: Baseline Model

All Banks	Global Financial Crisis		the Eurozone Crisis		the whole period	
Variables	Estimate (1)	Estimate (2)	Estimate (3)	Estimate (4)	Estimate (5)	Estimate (6)
L1.ROA	0.493***	0.607***	0.1**	0.074*	0.154***	0.145***
Market Power						
MP	0.112	-	-0.393	-	-0.788	-
LA	-	0.068*	-	0.022	-	0.014
Bank-Specific Variables						
LTA	-0.313**	-0.441***	0.027	0.013	-0.046	-0.051
DTA	-0.159***	-0.159***	0.05	0.047	-0.054*	-0.053*
FXHL	1.249	1.064	-0.296	-0.428	0.123	-0.033
Macroeconomics						
GDP	0.003	0.002	-0.003	-0.003	0.001	0.001
WIBOR	-0.008			-0.005	-	-
CPI		-0.009	-0.006		-0.001	-0.002
Time Period	2007Q4-2010Q3		2010Q3-2013Q4		2007Q4-2013Q4	
The Sargan Test	0.001	0.001	0.001	0.001	0.000	0.000
AR(1)	0.621	0.191	0.276	0.587	0.017	0.004
AR(2)	0.057	0.323	0.002	0.003	0.023	0.018
Nu of Obser.	472	472	812	812	1284	1284
Number of gr.	74	74	78	78	85	85

Source: Author's calculations. ***/**/* indicate significance at the 1%/5%/10% levels respectively. All variables were seasonally adjusted. AR(1)—Arellano-Bond test for AR(1) in first differences. AR(2)—Arellano-Bond test for AR(2) in first differences. The Sargan Test—the test for over-identifying restrictions in GMM dynamic model estimation.