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**Profitability of Foreign Owned Banks in
Central and Eastern European Countries**

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Abstrakt

Banky pod zahraničnou kontrolou tvoria významný podiel na trhoch strednej a východnej Európy (CEE). Na základe tejto skutočnosti sme sa rozhodli ako cieľ našej štúdie zistiť determinanty ziskovosti zahraničných bánk pôsobiacich v tomto regióne. V našej štúdii sme sa zamerali na vzorku zahraničných bánk v 10 krajinách strednej a východnej Európy v období 2003-2011. Pomocou ekonometrickej analýzy, skúmame vplyv bankových špecifik, makroekonomických charakteristík a štruktúry trhu a takisto aj vývoja v eurozóne na ziskovosť zahraničných bánk. Taktiež skúmame, či sa vplyv týchto faktorov líši v období pred finančnou krízou a počas krízy. Naše výsledky naznačujú výrazný vplyv bankových faktorov na výnosnosť zahraničných bánk, citlivosť ziskovosti týchto determinantov dokonca vzrástla počas obdobia krízy. Prekvapivo, podľa našich výsledkov nenájdeme vzťah medzi štruktúrou trhu v hostiteľskej krajine, kde pôsobia banky, a ziskovosťou. Podobne ako pre trhovú štruktúru v hostiteľskej krajine, sme nenašli vzťah medzi členstvom hostiteľskej krajiny v Európskej únii a eurozóne. Avšak, niektoré z makroekonomických veličín zachytávajúce vývoj hostiteľskej krajiny a eurozóny ovplyvňujú ziskovosť bánk, ale v niektorých prípadoch výsledky ukazujú rôzny vplyv v predkrízovom a krízovom období.

Kľúčové slová

Zahraničné banky, materské banky, ziskovosť, vlastnícke štruktúry

Abstract

Since foreign owned banks create important market shares in the banking sectors in the Central and Eastern European (CEE) countries, the aim of this study is to detect the determinants of the profitability of foreign banks operating in this region. In our study, we focus on the sample of foreign owned banks in 10 CEE countries during the period 2003–2011. We investigate, using the econometric analysis, the impact of bank-specific, macroeconomic and market structure characteristics as well as the euro area development on the profitability of foreign owned banks. We also examine whether the impact of these determinants differs in the period before the global financial crisis and during the crisis. Our results suggest significant influence of the bank-specific factors on the profitability of foreign owned banks and that the sensitivity of profitability to bank-specific characteristics has even risen during the crisis period. Surprisingly, we do not find the relation between the market structure in the host country, where the banks operate, and the profitability similarly to the participation of the host country in the European Union and the euro area. However, some of the macroeconomic variables capturing both the host country and the euro area developments affect bank profitability but in some cases differently in the pre-crisis and the crisis period.

Keywords

Foreign banks, Parent banks, Profitability, Crisis, Ownership structure

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Profitability of Foreign Owned Banks in Central and Eastern European Countries

Předbežná náplň práce:

The aim of the bachelor's thesis is to discuss determinants of profitability of foreign owned banks in Central and Eastern Europe. Since the foreign owned banks create usually an important part of the banking sector in the CEE (Central and Eastern European) countries, for example approximately 97 % of the banking sector in the Czech Republic is under foreign control, we intend to analyze the determinants of profitability of these banks. Foreign owned banks have their specifics since their behavior as well as profitability might be influenced not only by standard factors such as domestic macroeconomic conditions in the host country, business model, market power or concentration of the banking sector.

The specifics of the foreign owned banks could be determined mainly by their foreign ownership structure as well as by their mode of entry to the banking sector in the host country. The influence of the parent company could stem from several factors. Firstly, foreign owned banks could have better access to the international market via its parent company and gain benefits in terms of cheaper funding (liability side). Further, due to their international profile foreign owned banks could more likely provide services to the large multinational corporations than domestic banks (asset side). Both aspects could decrease the sensitivity of foreign owned banks to the conditions in the host banking sector and economic performance of the host country. Secondly, the fact that the parent bank can also act as a lender of last resort if the subsidiary is dealing with serious problems can have positive impact on the reputation and performance of the subsidiary. Thirdly, the experience in the corporate governance and risk management can be also used and implemented by the parent company when setting up subsidiary in the host country. Fourthly, since parent banks might have many

profitable opportunities to choose from, they can decide to allocate less/more capital to their subsidiaries according to the economic situation both in host country and in home country.

Therefore, the performance of the foreign owned banks can be influenced not only by the economic situation in the host country but as well in the home country and by the performance of their parent bank. As it was already mentioned, the mode of entry of the foreign investors to the particular banking sector can also matter. Specifically, we must pay attention to the differences between greenfield and takeover banks (takeover banks are the result of acquisition of domestic bank by foreign bank). Takeover banks had already gained certain market share and they usually have more information about the specifics of the banking sector in the host country hence they could act more confidently on the market and operate more effectively and therefore become more profitable.

The main hypotheses of our research stems from the facts mentioned above. We will be concerned about to what extent the macroeconomic performance in the home country influences the performance of foreign owned banks in the host country in the CEE region, what is the link between performance of the parent company and its subsidiary. Further we will investigate whether the global financial crisis had a significant impact on the profitability of the foreign owned banks in the CEE region and whether the mode of entry of foreign investors to the host banking sector matters.

The empirical analysis will focus on the profitability of foreign owned banks in the CEE region over the period 2001 – 2011 which includes both the pre-crisis and crisis period. The unconsolidated banking data for the analysis will be taken mainly from Bureau van Dijk's Bankscope database. We intend to employ panel estimation method in order to capture the cross sectional as well as time dimension of our dataset.

The hypotheses tested will be:

- 1) The performance of parent bank in the home country influences the performance of its subsidiary in the host country.
- 2) Macroeconomic conditions in the host country influence the performance of the foreign owned banks in the host country.
- 3) Global financial crisis had a significant impact on the profitability of foreign owned banks in the CEE region.
- 4) The mode of entry influences the profitability of foreign owned banks.

Předběžná struktura BP:

Outline:

1. Introduction
2. Literature review
3. Data description
4. Methodology
5. Empirical analysis
6. Discussion of results
7. Conclusion

Seznam základních pramenů a odborné literatury:

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Declaration of Authorship

The author hereby declares that he compiled this thesis independently, using only the listed resources and literature.

The author further declares that the thesis has not been used previously for obtaining any university degree.

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Prague, 30.7.2013

Andrea Kufnerová

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1. Introduction

Bank profitability is an important topic, which has to be investigated since the profitability is a key driver for the country's economy but it is also a particle with large effect on the life of individuals. "When banks are profitable, they are stable. When banks succeed, the economy and communities prosper"(Canadian Bankers Association, 2013, pp. 1). Stable banking system is an inseparable part of the good and healthy financial system. Banks provide jobs directly and indirectly, create tax revenues. Profits expand the capital base of banks, which in turn maintains the stability of the system, ensuring the safety and security of deposits (Canadian Bankers Association, 2013).

The guarantee for achieving profits means the need of sustainable development of the banking sector, which goes hand in hand also with the development of the financial system in the country. Development of financial system plays an important part in the stability of the country's economy. As a proof we can use the currently broadly discussed topic of financial crisis. Bad banking strategies and unstable financing can be a trigger or an accelerator for an unexpected disaster.

The aim of this thesis is to determine the profitability of foreign owned banks in the Central and Eastern European countries (CEE region). We chose to focus on countries in CEE region because of the similar history and development in these countries. CEE countries were known as transition economic states since the 1990's and their economies change from central planned to open markets. This significant change resulted in both differences and similarities in the development across these countries in the next two decades. Our study focuses specifically on the period between 2003 and 2011. While years before 2007 are characterized by economic expansion, period 2008–2011 represents the global financial crisis which influenced the performance of banks worldwide.

The number of foreign (acquired or greenfield) banks has substantially grown from the beginning of 1990s in the CEE region. As in other sectors the transition reflecting the inflow of foreign capital with high-qualified management strategies and technologies meant the start of the development towards the West countries levels. This transformation has caught the attention of researchers and number of studies has analyzed the position, impact, efficiency, and profitability of foreign banks in these markets through years from 1990 on. Our analysis of bank profitability is based on

comparing the impact of several determinants during the two main time series 2003–2007 and 2008–2011.

Foreign owned banks, later on named also foreign banks, form large market shares in the banking sectors in the CEE countries, therefore the aim of this study is to detect the determinants of foreign banks profitability operating in this region. We employ the profitability determinants suggested in the relevant literature as well as variables that correspond to the hypotheses we aim to test in this thesis. We also examine whether the impact of these determinants differs in the period before the global financial crisis and in the years of financial crisis.

Our intention is to investigate the importance of several profitability determinants suggested in the relevant literature. We aim at testing whether there is the relationship between core bank-specific characteristics and profitability. We also want to discover the impact of macroeconomic characteristics in the country, where the banks operate, and also the impact of the euro area development since most of their parent banks have the origin in the euro area and the CEE countries are also linked economically to the euro area member states.

Since all of the countries in the CEE region are members of the European Union and few are also members of the euro area we investigate the importance of these memberships on the foreign banks profitability. The entry to the European Union and euro area should lead to spread of the common standards and regulations to the CEE countries.

Our dataset covers also the period of the global financial crisis 2008–2011, which intervened the whole Europe and also the CEE region. Although some of the countries experienced more difficulties than the others, generally, the global financial crisis had a significant influence on the banks' profitability worldwide. The innovation and contribution of the work is the investigation of effects of financial crisis on the profitability determinants, through the changes in the sign and significance of the determinants. We use a comparison with the period pre-crisis period.

This thesis is structured in the following way. The section 2. (Literature review) reviews related literature dealing with the topic of bank profitability, especially with the focus on the CEE region or European countries. Section 3. (Hypotheses) describes our hypotheses. In the section 4. (Empirical analysis), we describe the data and explain the data selection. This section also presents the

econometrical model and the methodology we decided to use in our analysis. In the end of this section we discuss the empirical results. The section 5. (Conclusion) presents our concluding remarks.

2. Literature review

The topic of bank profitability is in general broadly discussed in the economic literature because bank profitability is considered as a key characteristic describing the bank performance on the market. According to the empirical evidence of the study Dietrich and Wanzenried (2011), which examined banking profitability determinants before and during the crises in Switzerland, profitability determinants can be divided into two groups. First group is created by internal variables including bank-specific variables.¹ Second group contains external variables including environmental variables effecting bank's performance, which does not primarily depend on banks management.² Also Andries (2011), examining the efficiency of banking systems in 7 CEE countries during the time period 2004–2008, and Kanas et al. (2012), determining bank profitability characteristics in the U.S. banking system during years 1988–2011, identify the same groups of variables. Generally, the importance and effects of various determinants of bank profitability differs across studies depending on the data sample and the time period in focus. The important results of the relevant studies can be summarized as follows:

Pančurová and Lyócsa (2013), using the results from the analysis on the sample of 11 CEE countries during the period 2005–2008, identify positive significant relationship between size and revenue efficiency of banks. The larger banks can easily attain operations on lower unit costs and also larger banks might have larger input-to-output ratios, as a result of increasing returns to scale (Pančurová and Lyócsa, 2013). Chen and Liao (2011), using evidence from 70 countries during the time period 1992–2006, find significant negative relationship between profits and the size of the bank. “The negative coefficient indicates that larger banks tend to earn lower profits, while smaller banks tend to earn higher profits. In other words, smaller banks experience economies of scale and scope, while larger banks experience diseconomies of scale and scope” (Chen and Liao, 2011, pp. 830). On the contrary, results in Weill (2003),

¹ Internal variables or microeconomic factors represent group of determinants that are manageable by the bank.

² Main external variables, frequently named also macroeconomic factors, are interest rate, inflation, the GDP development, taxation and variables describing market characteristics, especially market concentration or market capitalization.

based on the sample of 47 Polish and Czech banks in the year 1997, show that there is no significant influence of the bank size on the performance of the bank.

An alternative to express the importance of a bank within a given banking sector is its market share. Positive significant influence of market share has been recognized in the study of Matoušek and Taci (2004) who are interpreting results from the Czech Republic during 1990s'. "Market share has an unexpected positive sign with profitability levels for big banks, supporting the theory that banks operating in more concentrated markets like in the Czech Republic and have higher market power are more profitable" (Matoušek and Taci, 2004, pp. 241). Positive impact of market share on the banks profitability was identified also in the study by Claessens and Horen (2012), using the evidence from developing countries in the world over the period 1995–2006.

Another bank characteristic is the structure of assets that bank possesses, i.e. the level to which is bank engaged in lending and depositing money. Regarding the structure of assets, there is no evidence that the degree of bank's lending has a significant impact on the profitability (Claessens and Horen, 2012). On the other hand they confirmed that especially foreign banks might through better risk management techniques reach higher profitability levels with the increasing loan growth. According to the Dietrich and Wanzenried (2011) it can be very difficult to predict the impact of loan growth on the bank profitability. Firstly we can expect that higher growth rate of loans leads in the higher profits caused to the additional business activity. Secondly, high growth of loans can also lead into decrease in credit quality and consequently to reduction in profitability, which was confirmed in the results of Havrylchyk and Jurzyk (2006). The results in the study of Dietrich and Wanzenried (2011) show significant positive impact of degree of lending, the risk of decrease in credit quality was overcompensated by higher revenues. According to Havrylchyk and Jurzyk (2006) the results agree with the negative significant impact of loan growth on bank's profitability.

Important determinant of the bank's profitability might also liquidity situation of a bank. According to Chen and Liao (2011) liquidity ratios measured by loan divided by customers short-term funding are significantly and positively influencing the profitability.³ On the other hand, Dietrich and Wanzenried (2011) observed

³ "Liquidity ratios correlate significantly and positively with NIM, ROA and ROE, which indicates that an increase in bank liquidity ratios tends to enhance a bank's profitability" (Chen and Liao, 2011, pp.825)

negative and significant effect of deposit growth on banks profitability, this effect is explained by the large impact of crisis on banks in Switzerland, which were not able to convert increasing amount of deposits to increasing revenues during the crisis.

Claeys and Vennet (2008), analysing the sample of 113 banks in Western and Eastern Europe over the years 1994–2001, document that lending risk has a significant positive influence on bank profits, especially in transition countries. It is considered that a substantial part of profits in the transition countries is a compensation for higher risk techniques. “The banks are gradually making more optimal use of economically motivated risk management techniques” (Clayes and Vennet, 2008, pp. 212). The same results are confirmed in the study of Schwaiger and Liebeg (2007), using the evidence from 11 CEE countries during the time period 2000–2005, i.e. risk aversion represented by debt to equity ratio, credit risk, interest rate risk show positive significant influence on the banks. Pančurová and Lyócsa (2013) also identify the risk aversion, measured as equity over total bank’s assets, to have a positive significant impact on the bank’s profitability. They provide an explanation that banks with higher efficiency can earn higher profits and therefore they are able to keep more earnings as capital. More capitalized banks are able to cope with losses more easily than less capitalized banks. This result is shown in the most of studies considering bank efficiency as the subject of the analysis.⁴

According to the Pasiouras and Kosmidou (2007), the cost efficiency of banks represented by cost to income ratio appears to have significant impact on the profitability of foreign banks. The influence is negative, which means that an increase in cost to income ratio leads to decrease in profits on the account of increased operational expenses. For domestic banks this ratio is also negative but not significant.

Macroeconomic variables are in the next group of relevant profitable determinants. GDP growth is shown to have a positive impact on bank performance in the study Dietrich and Wanzenried (2011) analyzing the sample of banks from Switzerland before and during the economic crisis. This result of positive effect of GDP growth is also shown in Fries and Taci (2005). There is a significant negative impact of GDP growth on foreign banks profitability identified in the study Pasiouras and Kosmidou (2007), using the evidence from commercial domestic and foreign banks operating in 15 EU countries during the period 1995–2001. According to the

⁴ Pasiouras and Kosmidou, 2007, Chen and Liao, 2011, Lensink et al., 2008, Bonin et al., 2005

Chen and Liao (2011) GDP growth and real interest rate have a significant negative effect on foreign bank profitability. On the contrary to the impact of GDP growth and real interest rate, the impact of inflation is significantly positive (Chen and Liao, 2011). "The host country with high inflation levels would largely magnify foreign banks margins" (Liao and Chen, 2011, pp. 832).

The differences in the results for this macroeconomic variables can be to some extent justify by the different ownership forms dominating in the data of individual studies. The factors, GDP and real interest rate, have opposite effect on the profitability of domestic and foreign banks (Pasiouras and Kosmidou, 2007). According to the Pasiouras and Kosmidou (2007) there are two main reasons for the opposite sign of the impact for the domestic and foreign banks. Firstly, banks in countries with high GDP growth are used to operate on more mature markets, which means more competitive environment leading to competitive interests and decrease in the revenues. Secondly, GDP growth is a determinant with the impact on various factors related to the bank profitability and the opposite sign for domestic and foreign banks can be well grounded by the fact that domestic and foreign banks provide different products and services and serve different customers who may react differently under the same conditions.

Providing the results from 11 Central and Eastern European countries from the time period 2000–2005, Schwaiger and Liebeg (2007) conclude that GDP per capita, which can serve as an indicator for the progress in the development of the country made during the transition process, does have a negative significant effect on the foreign bank profitability. Their estimation results confirmed the revenues are lower the more developed and economy is.

In the presence of highly concentrated marked, measured by Herfindahl-Hirschman index, it is observable significant positive effect on bank profitability (Clayes and Vennet, 2008). "The coefficient on CONC is positive and significant for the both Western European and accession countries, indicating that, even when controlling for bank-specific and macroeconomic features, banks earn higher interest margins in more concentrated markets" (Clayes and Vennet, 2008, pp.205). The success is easier even considering the disadvantage of entering a new environment (Clayes and Vennet, 2008). High competition leads in the higher efficiency of services and also the level of innovation in the banking sector (Claessens and van Horen, 2011). In the study of Paučurová and Lyócsa (2013) is shown a negative

relationship between market concentration and revenue efficiency. The diversity of the banking sector measured by the variable share of 5 largest banks has a negative impact on banks profitability as it is shown in the study of Schwaiger and Liebeg (2007) and Andries (2011). This impact is shown as a result of persistent imperfect competition on the market, which leads also in situation, where lower costs are not fully passed on customers.

Another important banking structure determinant is financial intermediation. The depth of financial intermediation describes the level of development of lending and deposit activities in the market. Fries and Taci (2005) financial intermediation show a positive sign of financial intermediation on the bank's revenues. According to this study higher financial intermediation means lower costs, which means higher revenues. On the contrary the evidence in the study of Pasiouras and Kosmidou (2007) shows significant negative impact of financial intermediation on the profitability in ROAA model. In countries with low development of financial market, it is a lot easier for foreign banks to earn higher margins than domestic banks. A market in a country where large share of the population does not have appropriate or any knowledge of financial services can be used as an example.

Another variable describing the market structure mentioned in the literature is banking regulation coefficient. "Estimated coefficients on all governance are negative and significant" (Chen and Liao, 2011, 833). Foreign banks choose for the entry such developing countries, where the restrictions for foreign banks do not dominate over profit gaining options (Hryckiewicz and Kowalewski, 2010).

The foreign ownership is one of the main variables explaining the various impacts in the studies examining the bank profitability and its determinants. In the study of Havrylchyk and Jurzyk (2006), analyzing banking sectors in 11 CEE countries, the importance to distinguish between foreign owned banks and domestic banks is highlighted.⁵ Bank ownership is shown to be an important determinant of profitability and also enables us to examine whether there exist differences between countries regarding to the performance of the foreign owned banks (Chen and Liao, 2011). The variable foreign as a dummy variable in a regression has shown a positive

⁵ According to the Claessens and Horen (2012), bank is considered to be foreign if more than 50% of its share capital is owned by foreign investor, mainly by foreign bank with the intention of entering new banking market. Foreign owned banks can be also divided according to the mode of entry to foreign takeover banks and greenfield banks. Foreign takeover banks are the result of acquisition of domestic bank by a foreign bank (Pasiouras and Kosmidou, 2007). Foreign greenfield banks ("de novo" banks), are new established banks, usually part of foreign bank branch in the head with parent bank (Clayes and Hainz, 2006).

significant effect on the profit and cost efficiency, relative to domestic banks, based on the sample of 11 transition countries over the years 1996–2000 (Bonin et al., 2005).

According to Matoušek and Taci (2004), who are interpreting results from the Czech Republic from 1990s', foreign banks earn higher profits than domestic banks. More specified view suggest Chen and Liao (2011), using the data about 70 countries in the world over the years 1992–2006, foreign banks in developing countries or less developed countries are more profitable and shown to be more efficient than domestic banks. In developed countries it is otherwise, the domestic banks are more profitable and efficient than foreign banks. The study of EU banking sector from 1992–2001 by Altunbas and Marque (2008) show the same results that foreign ownership possess some significant advantages, for example modern technology, banking know-how of their parent company and high-qualified management.⁶

According to Havrylchuk and Jurzyk (2006), the better access of foreign banks to new technology leads to an advantage for obtaining hard information through databases and collectable information about customers, especially firms. But on the other hand foreign banks have problems with collecting soft information about their loyal customers and local environment. Problem with possessing of soft information may lead to a big disadvantage but the foreign banks have through parent companies easier entry to international market. The main target customers of foreign banks are international enterprises and big firms acting also on foreign markets or with the interest for foreign capital. "Another advantage of foreign bank ownership is lower cost funds, which stems from better reputation and superior access to international capital markets either directly or via the parent banks. We show that this lower cost of funds is passed on to borrowers and, therefore, we do not observe a change in net interest margin of foreign banks in the post-acquisitions period" (Havrylchuk and Jurzyk, 2011, pp. 1298)⁷.

According to Weil (2003), foreign ownership provides also an advantage in the work of managers. "Foreign shareholders are used to monitoring bank managers,

⁶ "For banks expanding into new products and geographical areas has a number of advantages. Clearly, it allows financial institutions to diversify both their risks and their sources of revenue, thereby providing a buffer in the event of geographic or product-related shocks. In addition, diversification enables banks to obtain additional benefits derived from a more extensive use of firm-specific assets, such as brand name, consumer loyalty or top-quality managers" (Altunbas and Marque, 2008, pp. 207).

⁷ In this study was used a dataset containing 352 banks from 11 Central and Eastern European countries (Bulgaria, the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovakia, Slovenia) in the period 1993–2006.

since they are less inclined to enter into friendly relationships with managers, and this is a problem of corporate governance in transition banking” (Weil, 2003, pp. 587).

On the contrary, Lensink et al. (2008) provided the evidence that on average foreign banks are less profitable than domestic banks based on the empirical analysis of the sample of 2095 banks from 105 countries during the years 1998–2003. “Foreign banks may find it more difficult than domestic banks to deal with a host country’s regulations, banking supervision rules, local judiciary in general and corruption. Hence especially in countries where governance is bad, foreign ownership-bank efficiency relationship is negative” (Lensink et al., 2008, pp. 841). According to Pančurová and Lyócsa (2013), the foreign ownership has a negative significant influence on the bank profitability but their results show also positive impact on the cost efficiency, which indicate that foreign banks gain less revenue in comparison to the domestic banks. The main reason is different banking strategies and operating methods between foreign banks and domestic banks.

The empirical evidence shows that it is important to distinguish between host country macroeconomic conditions, variables describing development in host country, home country macroeconomic information. Havrylchyk and Jurzyk (2006), analyzing the differences between domestic and foreign banks in Central and Eastern European Countries in the period 1995–2003, provide suggestions for many factors that can have influence on bank performance. The profitability variables can be different for foreign and domestic banks, and the same factors can have different effects on domestic and foreign banks. On the contrary, Lensink et al. (2007) show that there is no evidence of significant influence of GDP growth, real interest rate or inflation rate, speaking about macroeconomic in the home country. Banks with the origin in the countries with high GDP growth has usually the advantage of lower costs and better access to new technologies, high-skilled workers and new more efficient banking strategies, which can be a significant factor in increasing the bank revenues.

Chen and Liao (2011) provide the results showing that the performance of parent bank has a significant positive effect on the profit efficiency of their subsidiary. “Parent banks with higher profitability rankings at home tend to experience higher profitability rankings in their foreign banks than do domestic banks in the host country” (Chen and Lian, 2011, pp. 830).

The variable for global financial crisis has a positive significant effect on the profitability of foreign banks (Hryckiewicz and Kowalewski, 2010). Foreign banks

with parent companies from countries less affected by the global financial crisis are more likely to enter emerging markets especially during the crisis period. Foreign banks choose riskier countries motivated with the expectation of gaining higher profits. (Hryckiewicz and Kowalewski, 2010).

Besides the determinants we mentioned above in the literature were used another specific variables with identified impact on the profitability as the time of acting on the market, the mode of entry, form of ownership (private-owned or state-owned) and cultural and geographical variables.

According to the Bonin et al. (2005), time, spent on the host country's market, enables foreign banks to get knowledge about the local market and adjust to new market characteristics.

In the literature are shown advantages for both takeover and greenfield banks but ultimately it is confirmed in most of the studies that greenfield banks are more profitable than takeover banks.⁸

In the study of Lensink et al. (2008), is identified that private-owned banks are in general significantly more profitably efficient than state-owned banks. The non-state banks have more skillful management and are more flexible to adapt to changes in the market, which has positive impact on the profitability.

Geographical and cultural determinants have significant negative influence on the profitability of foreign bank. "Distance in the various dimensions between borrower and lender increases not only transaction costs, but also the information problems a bank faces in its lending decisions and therefore likely affects its profitability" (Claessens and Horen, 2012, pp. 1279). In addition the increase in the problem of asymmetry of information may lead adverse selection, moral hazard.

3. Hypotheses

When formulating the hypotheses we take into account also the results and hypotheses being discussed in the broad profitability literature. Moreover, we take account of the specifics of the region in our focus. Specifically, our aim is to discover the determinants of profitability of foreign owned banks in CEE region, which is historically and economically different from the Western European countries. The differences lie besides others in the level of economic development as well as deepness of financial intermediation. Our sample comprise of banks operating in

⁸ Havrylchyk and Jurzyk (2011A), Claves and Hainz (2006) and Poghosyan and Poghosyan (2009)

countries in the CEE region, which are currently members of the European Union, some of them are currently also part of the Eurozone. The convergence and integration process in the past decade is something, which these countries have in common which makes them rather homogenous group in this respect, hence they should be a suitable group of countries/banking sector for testing our hypotheses.

As shown in the literature review, the empirical studies discussing the topic of bank profitability provide different results of the impact of single determinants depending on the data sample and the time period in focus. In our study we want to examine the profitability of foreign banks in CEE region in recent time, i.e. in the period 2003–2011. Foreign banks play an important role in the development of CEE countries. We decide to concentrate on the determinants of foreign banks profitability because foreign banks form usually the majority stake on the markets in CEE countries.

Table 1 Share of foreign owned banks in individual banking sectors in CEE region (in % assets) in 2011

Country	Foreign assets (mil.EUR)	Domestic assets (mil.EUR)	Total assets (mil.EUR)	Share of foreign asstes to total assets
Bulgaria	30,003	12,163	42,166	0.71
Czech Republic	159,233	21,134	180,367	0.88
Estonia	18,556	464	19,020	0.98
Hungary	66,467	47,984	114,451	0.58
Latvia	16,324	13,138	29,462	0.55
Lithuania	21,300	3,396	24,696	0.86
Poland	189,565	120,135	309,700	0.61
Romania	69,779	22,020	91,799	0.76
Slovakia	49,181	8,842	58,023	0.85
Slovenia	14,513	37,910	52,423	0.28

Source ECB

Table 1 shows the banking sector assets under foreign and domestic control in individual countries.⁹ The highest share of foreign capital is in the Estonia with 97.5%. In other countries the foreign assets represents above 50% of the whole assets in the banking sector.

We consider the paper by Havrylchyk and Jurzyk (2006) as a reference study for our analysis due to similar composition of analyzed countries Bulgaria, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovakia, and

⁹ The statistics are based on the data, containing consolidated data about foreign controlled subsidiaries and branches from EU countries and non-EU countries, from ECB Statistical Data Warehouse.

Slovenia, due to their interest in foreign owned banks as well as due to their similar methodology. Their study however covers only the period 1995–2003 and the profitability determinants might have changed significantly from that time possibly also due to the EU membership.

Similarly to Havrylchyk and Jurzyk (2006) we explain the differences in the profitability of foreign banks by various factors, bank-specific characteristics, macroeconomic conditions, banking sector characteristics, but we also consider other factors which might be significant with respect to the profitability of bank in CEE region, such as the recent global financial crisis, development in the euro area or membership in the EU and euro area. Contrary to Havrylchyk and Jurzyk (2006) we do not differentiate the mode of foreign banks' entry because such information is not available to us. In this thesis, we aim at testing the following hypotheses:

- H₁: Bank-specific characteristics such as size, market share, loan growth, stable funding ratio, risk costs connected with bank's loan portfolio, cost to income ratio and bank's risk aversion are significant factors determining the foreign bank profitability.
- H₂: Foreign owned banks are sensitive to domestic macroeconomic conditions, i.e. conditions in the country where they operate.
- H₃: The membership in the European Union and the euro area has a positive impact on profitability of foreign owned banks.
- H₄: Foreign owned banks are affected by the development in the euro area since most of their parent banks have the origin in the euro area and the CEE countries are also linked economically to the euro area member states.
- H₅: Financial crisis had an impact on the foreign owned bank's profitability determinants.
- H₆: Higher concentration of a banking sector is connected with higher profitability of foreign owned banks operating in this banking sector.

4. Empirical analysis

4.1 Data description

We created our own dataset containing the data sample from 10 CEE countries (Bulgaria, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania,

Slovakia, Slovenia) over the period 2003–2011. The final sample contains 131 banks both foreign and domestic, actually 15 banks from Bulgaria, 17 banks from the Czech Republic, 4 banks from Estonia, 14 banks from Hungary, 8 banks from Latvia, 6 banks from Lithuania, 31 banks from Poland, 16 banks from Romania, 12 banks from Slovakia, 8 banks from Slovenia.¹⁰ The variables for the econometrical analysis including their type, shortcut, units, data sources according to our hypotheses are presented in the Table 2 in the Appendix. Moreover, Table 3 in the Appendix shows the descriptive statistics for these bank specifics and expected impact.

Our main source of the information regarding the bank specific characteristics was the Bureau van Dijk's BankScope database, containing the information about 30 000 banks all over the world. The BankScope database contains balance sheet and income statement information. There are several advantages of using the BankScope database. Firstly, it contains information for 8 000 top European banks, which includes the more than about 75% of assets in each country. Secondly, the banking data are in the standardized form making the figures comparable across individual banks.¹¹ We rely mainly on unconsolidated data in annual frequency if possible, however, sometimes consolidated statements are used because of unconsolidated data unavailability. On the other hand, the disadvantage of BankScope database is that it provides only the information about the actual ownership, it lacks the historical ownership data.¹² Hence, the additional information about bank ownership were taken from the banks' annual reports and official publications.

In our econometric analysis we focus only on foreign owned banks. The foreign owned bank is defined (similarly to the definitions used in the relevant literature) as a bank with more than 50% of capital owned by a foreign parent institution. Our sample includes commercial banks, savings banks, cooperative banks and real estate & mortgage banks.

The macroeconomic and market structure data, the second segment of the dataset, were collected from publicly available sources (Eurostat, The World Bank, IMF Financial Soundness Indicators and ECB Statistical Data Warehouse).

¹⁰ The number of banks in our dataset does not reflect the number of foreign banks operating in the markets in CEE region. In our dataset we included only active banks, especially subsidiaries operating on the CEE countries' markets, providing the data from 2003. We excluded the branches from our regression, because of the high dependence on parent banks and lack of data collected in BankScope. From our dataset we exclude also banks that fulfill all our requirements mentioned above but do not provide the data for variables we needed.

¹¹ Bureau van Dijk, www.bvdinfo.com

¹² The CD version of the Bureau van Dijk's BankScope database, which is used for the purpose of this thesis, contains only information on the actual ownership.

Since some banks stopped operating or start operating during the period 2003–2011, we come up with unbalance dataset where some of observations are missing.

4.1.1 Dependent variable

There are several possibilities for measuring the bank profitability. Firstly, return on average assets (ROAA) measures the profitability of banks which is defined as the ratio of net profits to average total assets expressed as a percentage. It displays the efficiency of utilization of bank assets. It is useful determinant for comparison among institutions in the banking sector. The ROAA is considered to be the key determinant for the bank profitability in the literature and is the most commonly used in the profitability analysis.

Secondly, an alternative profitability measure is the return on average equity (ROAE) which is the ratio of net profits to average equity expressed as a percentage. It describes the return to shareholders on their equity. ROAE is also commonly used in the economic studies but according to the Dietrich and Wanzenried (2011) determinant ROAE is not the best indicator of profitability.¹³

Thirdly, net interest margin (NIM) can be used as a measure of profitability, which is defined as the net interest income divided by total assets. NIM describes how successful are the bank's investment decisions compared to its debt situation. NIM in contrast to ROAA focuses the profit earned on the interest activities not on the bank's overall investment activity.

The regressions using these slightly different dependent variables provide usually slightly different results. Based on the facts stated above we decided to use return on average assets (*ROAA*) as the main dependent variable because it is the most commonly used measure in the literature of bank profitability.

4.1.2 Explanatory variables

The choice of the explanatory variables is predominantly motivated by the profitability determinants identified in the relevant literature (see section 2. Literature review) supplemented by variables which correspond to the hypotheses we aim to test in this thesis (see section 3. Hypotheses). Generally, the determinants influencing banks' profitability included both the internal (microeconomic) and external

¹³ "For example, banks with a lower leverage ratio (higher equity) usually report a higher ROAA but a lower ROAE. However, the ROAE disregards the higher risk that is associated with a high leverage and the effect of regulation on leverage. Thus, in our analyses, we consider the ROAA as the better measure of profitability and use it as the main dependent variable" (Dietrich and Wanzenried, 2011, 311).

(macroeconomic and market structure) variables accompanied by the ownership characteristics. The complete list of the explanatory variables is provided in the Table 1 in Appendix.

Bank-specific characteristics

Based of the literature survey, we included the following variables to describe the key bank characteristic: size, market share, loan growth, stable funding ratio, risk costs, cost efficiency and risk aversion.

The explanatory variable bank size is measured by the total amount of assets in the certain year in thousands of euros (*size*). Specifically, we use the logarithm form of total assets.¹⁴ Additionally, we use the market share (*mshare*) that is considered as an indicator of bank's strength on the market. The market share is a ratio of bank's total assets to the total amount of assets in the banking sector. We decided to use variable market share according to the model of our base study Havrylchyk and Jurzyk (2006). The variable size is used according to the study Claessens and Horen (2012) and Chen and Liao (2011).

Loan growth (*loang*) is a variable describing the proportion of the amount of loans comparing to the amount of loans in the previous year. We decided to use the variable loan growth according to the studies by Claessens and Horen (2012) and Havrylchyk and Jurzyk (2006).

The ratio of client deposits to total assets (*depositratio*) belongs to the group of liquidity ratios. The client deposits are generally considered as a cheap and stable source of funding. We expect this variable to have a positive impact on the banks profitability. Low ratio means lower profits comparing to the other banks. Liquidity ratios are considered to be significant according to Chen and Liao (2011), therefore we add it also to our regressions.

The variable risk costs (*riskcosts*) indicate the quality of loans provided by the bank. It is expressed as a ratio of loan loss provisions to gross loans. This ratio belongs to the group of the determinants that describes the quality of bank assets. The expected impact on the profitability of this variable has a negative sign, the higher ratio, and the more problematic loans. The risk costs variable was used also in Havrylchyk and Jurzyk (2011) to describe the management techniques and the credit quality of banks.

¹⁴ The alternatives to measure size of the bank are total amounts of deposits or number of employees.

Cost to income ratio (*costinc*) is determinant of the efficiency of the bank especially of the ability to turn resources into revenue. Cost to income ratio is calculated as the operating expenses as a percentage of net revenues. The impact of this ratio to the performance of the bank is expected to be inversely proportional. Lower ratio means better performance of the bank. Additionally, the increase in the cost efficiency ratio denotes usually increasing costs or decreasing profits. The use of the variable cost to income was inspired by the paper of Dietrich and Wanzenried (2011) where it is used as a measurement of the operational cost over the total revenues.

The last variable, the equity to total assets ratio (*riskavers*), is a proxy variable for risk aversion. The variable equity to total assets ratio is a financial ratio describing the perspective solvency situation of the business in the long run. It also indicates the portion of shareholders funds involved in financing of the assets of the company. “Banks with higher equity-to-assets ratios normally have a reduced need for external funding, which has again a positive effect on their profitability in terms of return on assets. From this point of view, a higher capital ratio should have a positive effect on profitability“ (Dietrich and Wanzenried, 2011, pp. 311). The theoretical background provides two opposite impacts of the capitalization of the bank, therefore we want to examine the influence on the banks from the CEE region contained in our dataset. According to the Lensink et al. (2008) and Claessens and Horen (2012) we decided to use variable equity to total assets representing the risk aversion and capital suitability of the bank according to the risk.

Macroeconomic characteristics

In addition to bank characteristics we use also macroeconomic variables to capture the effect of the host country economic performance on the bank profitability. For our analysis we chose the most frequently used macroeconomic variables in the literature: GDP growth, GDP per capita, inflation and real interest rate.

We have collected the data on GDP growth (*GDPghost*), GDP per capita (*GDPghost*), inflation (*inflhost*) and real interest rate (*rinterhost*) from Eurostat database for all years of our analysis. The variable GDP per capita is calculated as a ratio of GDP in euros to the number of inhabitants of particular country. The macroeconomic variables are constant for each single state and vary over time. The GDP growth represents current economic growth of the country, while GDP per capita rather describes the wealth of the country and its inhabitants.

The inflation plays significant role in the decisions of customers how to act on the market. The inflation is a substantial rise in general price levels related to the increase in the volume of money in the circulation and resulting to the decrease in the value of currency. In the case of the inflation we have to pay attention that customers are sensitive and are acting also according to their expectations. The real interests reflects the real cost of funds to the borrower and the revenue for the lender excluding the effect of inflation.

Market structure characteristics

Besides the macroeconomic variables describing the overall economic development in the countries, we also have to take into account the market development in each host country in order to properly evaluate the impact of the host country conditions on the profitability of foreign banks. To capture the market structure we use the variables Herfindahl-Hirschman index and the depth of financial intermediation.

The Herfindahl-Hirschman index (*HHI*) is an accepted measure for market concentration. It is calculated as a sum of the squared market shares of each firm competing on the market. The range of the value of HHI can be from close to zero to 1 HHI. The market with low market concentration can be more interesting from the foreign investors' point of view. The ability to gain profit from their advantages is increasing with the decrease in the competition on the market (Clayes and Vennet, 2008) is considered to be an important factor with respect to the bank profitability according to our base study Havrylchyk and Jurzyk (2006), therefore we decide to add it into our empirical analysis as well and investigate its impact on bank profitability on our dataset. An alternative measure of the concentration might be the share of 5 largest banks in the banking sector used e.g. in Schwaiger and Liebeg (2007).

The variable the depth of financial intermediation (*finintermed*) is a ratio of total assets of banking sector to GDP in the country. The depth of financial intermediation describes the level of development of financial services, lending and deposit activities, in the market. The low depth of financial intermediation enables banks to lend out money with high interest rates and receiving the deposits at low interest rates. Therefore we expect the negative impact on the bank profitability.¹⁵ On

¹⁵ www.businessdictionary.com

the other hand, the financial intermediation decreases the banks costs, which signify higher revenues for the bank. The positive effect of financial intermediation is identified in the study of Fries and Taci (2005).

Development in the euro area

Havrylchyk and Jurzyk (2006), Pasiouras and Kosmidou (2007) and Chen and Liao (2011) find out a significant influence of home country conditions on the foreign owned banks profitability. Since all of the countries in our dataset are members of the EU in 2011, some of them also members of the euro area and many of foreign banks contained in our dataset have a parent bank with the origin in the Euro area we decided to incorporate this knowledge also into our analysis. The development in the countries of the euro area is highly integrated, therefore we decided to concentrate on the influence of the Euro area conditions as a whole not as the influence of conditions in each single sovereign state.

For the description of the development in the euro area we use similar macroeconomic variables as for the host countries, i.e. the GDP growth (*GDPgEA*), inflation (*inflEA*) and real interest rate (*rinterEA*), collected from Eurostat database for all years of the analysis.¹⁶

Dummy variables

The entry of CEE countries to the European Union means for foreign investors easier access to the market and possibility of operating with lower costs. All countries in our dataset are part of the European Union in 2011 and we want to observe the impact of the entry to the EU on the profitability of foreign owned banks in our analysis. Therefore we use the dummy variable *EU* to capture the impact of the participation of the host country in the EU.

Three countries¹⁷ in our dataset were also members of the euro area as of 2011. We decided to use a dummy variable *EA* to investigate if we can find an impact of membership in the euro area on the profitability of the foreign owned banks since the EA membership leads to the easier excess of foreign owned banks to the European market thanks to the common currency Euro.

¹⁶ We do not include the variable GDP per capita for euro area in our regression, because of high correlation with the inflation and GDP growth of euro area

¹⁷ Estonia (2011), Slovakia (2009), Slovenia (2007)

4.2 Econometric model

We decided to use the panel data estimation similarly as Havrylchyk and Jurzyk (2006), Pasiouras and Kosmidou (2007) and Claessens, Horen (2012). This method seems to be the suitable given our hypotheses and dataset structure. To use appropriate panel data techniques, we have to run the tests on our data to exclude the errors in the estimation. Since our dataset has the cross sectional as well as time dimension we use the panel data analysis. Due to the fact that individual banks might have some time invariant banks specific effect, which cannot be captured by other explanatory variables, we decided to use fixed effect method for the estimations.

In this section we want to describe the methods used for obtaining results in our analysis. In order to examine the impact of internal and external variables on profitability, we developed the following base model for our analysis. We used a panel model relating profitability to ownership, internal and external variables mentioned above. We use model in this base form:

$$\begin{aligned} ROAA_{ijt} = & \beta_0 + \beta_1 \text{Bank-specific}_{ijt} + \beta_2 \text{Macroeconomic}_{jt} + \beta_3 \text{Market structure}_{jt} \\ & + \beta_4 \text{Euro area development}_t + \beta_5 \text{Dummy}_{jt} + u_{ijt} \end{aligned} \quad (1),$$

where i refers to individual banks, t describes the year and j describes the host country, where the bank carry own the business. The explained variable is the return on average assets (*ROAA*). Further, the explanatory variables are divided in to five subgroups (see Table 2 in Appendix), i.e. banks specific characteristics (*Bank-specific*), macroeconomic development in the host country (*Macroeconomic*), variables describing market structure (*Market structure*), variables that captures the development in the Euro area (*Euro area development*) and the dummy variables (*Dummy*). The term u_{ijt} consists of the individual effect a_{ij} and the actual residual term v_{ijt} . According to our hypothesis we decide to run three groups of separate regressions.

The model (1) is estimated through fixed effect (FE) regression for panel data. While deciding whether to use first differencing method (FD) of estimation or FE, it is important not to forget the information that our dataset is unbalanced. As the dataset used is unbalanced the results of FD estimation would not be consistent. The most appropriate method to use is FE regression, which provides the equivalent results as method FE for balanced model. The other choice we have is the random

effect regression. We have to take into account the assumption that unobserved country specific effects influence our dataset. The usage of random effect estimation would be out of choice because for the consistency of random effect estimation's results, the assumption that unobserved effect is uncorrelated with each explanatory variable must hold. To prove our assumption we used the Hausman test. It tests whether the unobserved effect a_{ij} , ($u_{ijt} = a_{ij} + v_{ijt}$) is correlated with explanatory variables. The null hypothesis is that the preferred model is random effect regression.¹⁸ If the null hypothesis is rejected, only the FE estimation is consistent. (Wooldridge, 2009) The usage of FE regression is in agreement with the studies Havrylchyk and Jurzyk (2006), Pasiouras and Kosmidou (2007). We had to pay attention to the possibility that the heteroskedasticity, serial correlation, cross-sectional dependence or contemporaneous correlation, are present in our model. As it is noted later on, we ran several tests in order to make sure that our results are not affected by heteroskedasticity or serial correlation and we took further steps to get as best results as possible.

In order to prevent from serious errors in our results we run tests suitable for fixed effect estimation. We ran a modified Wald test to test for heteroskedasticity. The null hypothesis states the presence of homoscedasticity or constant variance. If the null hypothesis is rejected on the significance level 5%, the heteroscedasticity is present in our dataset.

In order to exclude correlation across the time periods, to avoid the standard errors of the coefficients to be smaller than they actually are and higher R-squared to be present in our results, we used tests for serial correlation, especially a Wooldridge test for serial correlation. The null hypothesis suggests no presence of first-order autocorrelation. If the p-value is smaller than 0.05 we are able to reject the null hypothesis and confirm the presence of serial correlation.

4.3 Graphical analysis

Since the profitability of banks is expected to be influenced by the local factors in the country where the banks operate, such as macroeconomic determinants and market structure this section provides an overview of recent development with this respect. Additionally, this section includes a brief overview of the development of

¹⁸ $H_0: \text{cov}(a_{ij}, x_{it}) = 0$, where x_{it} represents the explanatory variables and a_i the unobserved effect. Under the null hypothesis are both RE, FE estimation consistent

banking sectors profitability in CEE. The figures for CEE countries are compared to the development in the euro area. The whole period in focus 2003–2011 is divided into two structurally different periods, i.e. 2003–2007 and 2008–2011. While years before 2007 are characterized by economic expansion, the period 2008–2011 represents the global financial crisis, which influenced the performance of banks worldwide. Every indicator used in this section is expressed as the average over the given subperiod.

Macroeconomic environment

Graphical description of the macroeconomic variables, describing the local factors in the countries, are shown in this section. GDP growth is a variable, which describes the economic development in a country and which is also used as a determinant in our econometrical analysis. Chart 1 shows that GDP growth was positive in all CEE countries and reached high values in the period before the crisis. The Euro area has significantly smaller average GDP growth in this period in comparison to CEE countries which is connected with the convergence and integration process of CEE countries in the EU. The highest growth is recorded in Baltic countries – Latvia, nearly 10%, Lithuania, over 8% and Estonia, around 8%, too. On the contrary, Hungary exhibited the smallest GDP growth slightly below 4% in the pre-crisis period. Compared to the value for Hungary in the pre-crisis period we can find slower growth only in the euro area.

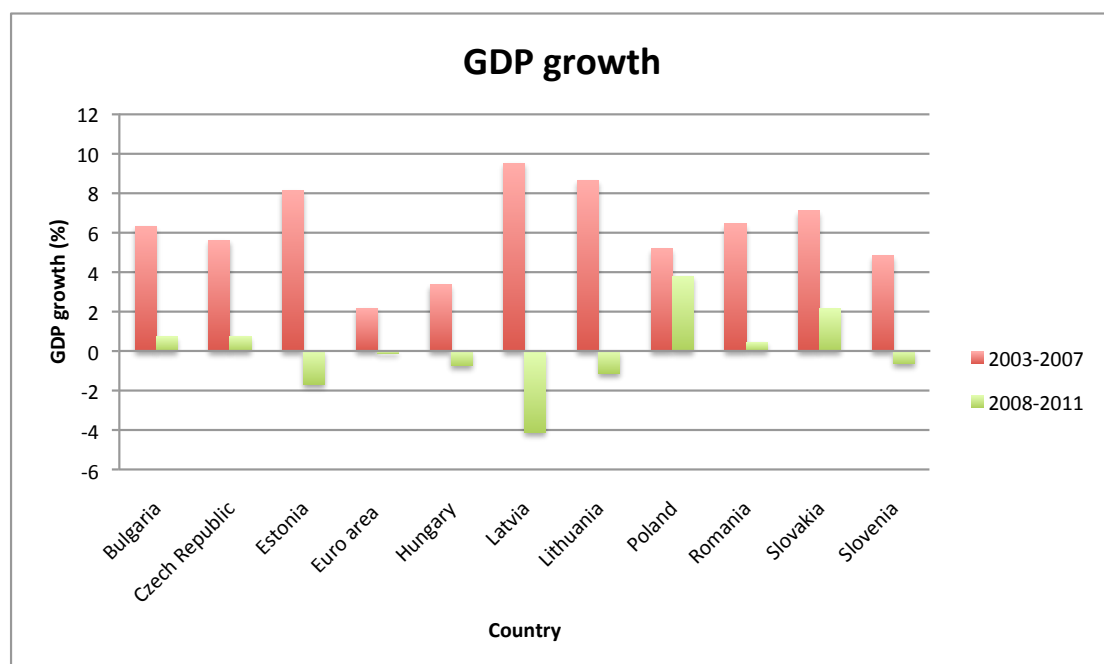


Chart 1 Source Eurostat

The values of all CEE countries are higher than the value for the euro area. The GDP growth in other countries like Bulgaria, the Czech Republic, Poland, Romania, Slovakia and Slovenia has similar growth of GDP, about the value 6% during the period 2003–2007. In the crisis period 2008–2011, the values of GDP growth are significantly different. CEE countries were painfully affected by the crisis and experienced significant GDP growth decline, i.e. -4% for Latvia, nearly -2% for Estonia and Lithuania over -1%. Except Baltic countries, Hungary and Slovenia are the only countries with negative GDP growth in this period and even with GDP growth smaller than the value for the euro area.

Chart 2 shows a decrease in the inflation between the examined periods for all CEE countries, except the Czech Republic, Estonia, Lithuania and Poland. Despite this decrease, the inflation is still significantly higher than in the euro area in number of CEE countries. The Czech Republic similarly to the euro area kept the inflation on average close to the target 2% in both periods. Despite the significantly negative GDP growth during the crisis period, the inflation remained on average on relatively high levels in Latvia, it was still slightly higher than in other Baltic states. The highest inflation experienced Romania in both periods.

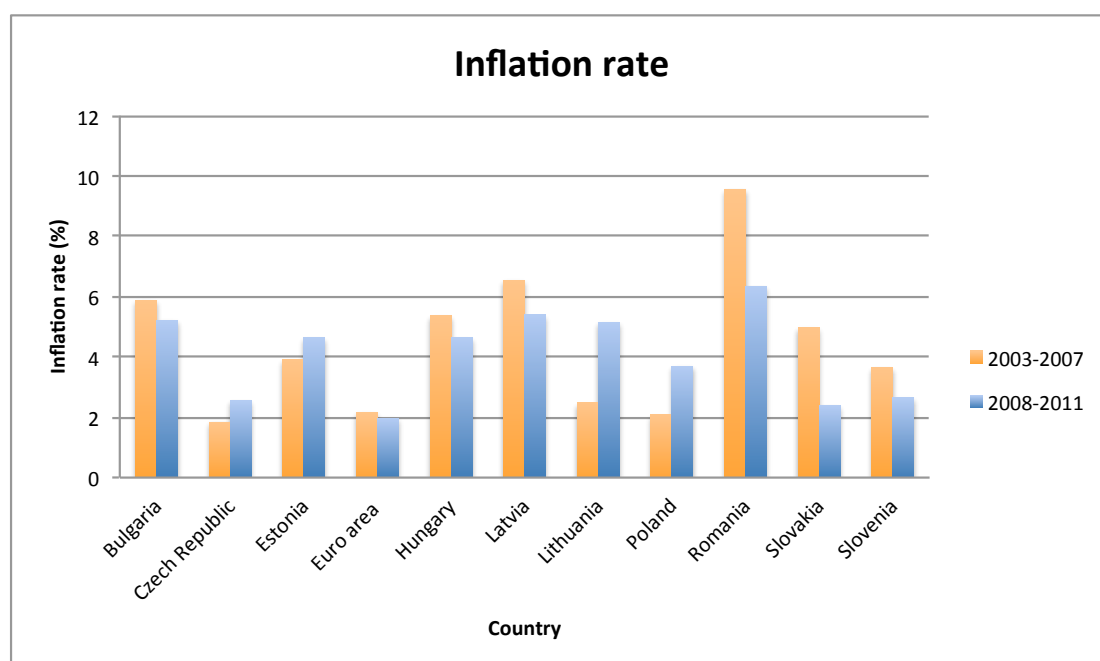


Chart 2 Source Eurostat

The real interest rate is used as an indicator reflecting the real cost of funds to the borrower and the revenue for the lender excluding the effect of inflation. The decrease in the average real interest rate between the two periods was also connected with monetary policy easing during the crisis period. The highest value is observed in Latvia in the first period. The real interest rate in Latvia is showing also the biggest increase among the CEE countries. The values for Estonia and Latvia are actually the smallest values of the interest rate shown in the. In the period 2008–2011 CEE countries, except Lithuania and Slovakia, show higher real interest rate in comparison to the value for the Euro area. We can say that these states are more interesting for investors because as lenders they will earn higher profits.

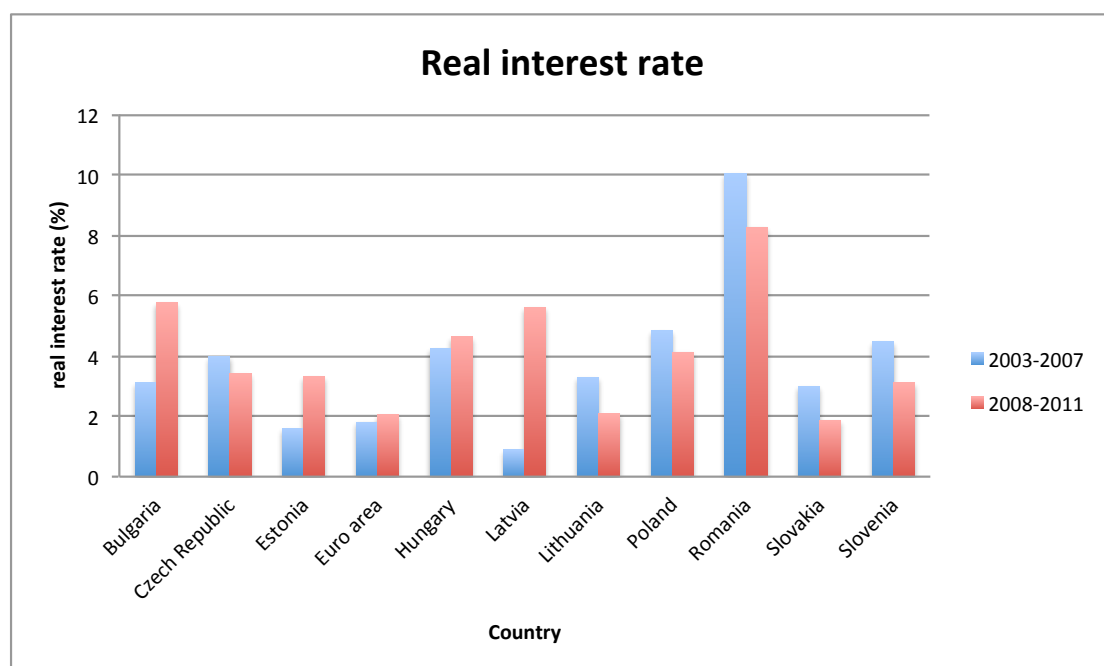


Chart 3 Source IMF Soundness Indicators

Market structure

The Herfindahl-Hirschman index (HHI) describes the concentration of the banking sectors in CEE countries. It is the highest in Estonia for both examined periods, which indicates high concentration of the market with few dominant players. On the other hand, the lowest value is shown for Bulgaria for the period before financial crisis and for Poland for the global financial crisis period.

Chart 4 shows that HHI values are varying around the value 0.1 for most CEE countries, except Lithuania (almost 0.2) and Estonia with the value above 0.35 for the whole period 2003–2007. When we compare the examined periods we can see that

only in 3 countries (Bulgaria, Hungary and Slovakia) and also in euro area there is a slight increase in the value of HHI in the period 2008–2011 compering to the previous period. In terms of HHI CEE countries are similar to the euro area, which means that market concentration in the CEE region is on the similar level as in the Eurozone.

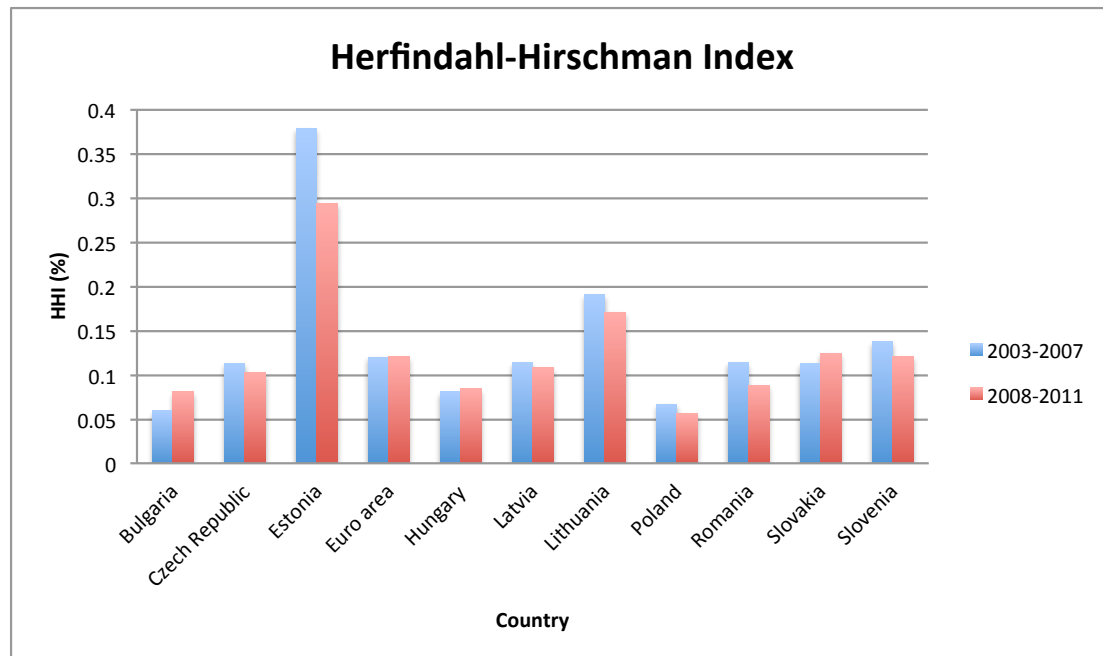


Chart 4 Source ECB

The depth of financial intermediation, measured by total assets of the banking sector to GDP describes the level of development of lending and deposit activities in the market. We can say it measures the level of development in the services and products offered by banks in the market. The lowest development is shown in the Romania, which is observed for both examined periods. On the other hand the highest values for the period before financial crisis are shown in Latvia and Slovenia, the value is fluctuating about the 120%.

The highest values of financial intermediation in the years 2008–2011 are exhibited in Estonia, Hungary and Slovenia. The data for CEE countries for the period 2003–2011 show that values of financial intermediation are quite high in this region. In comparison with the values for the Euro area the CEE countries are significantly dropping behind in both periods before and during the crisis. The value for the Euro area is more than two times larger that the average value showed for the CEE countries.

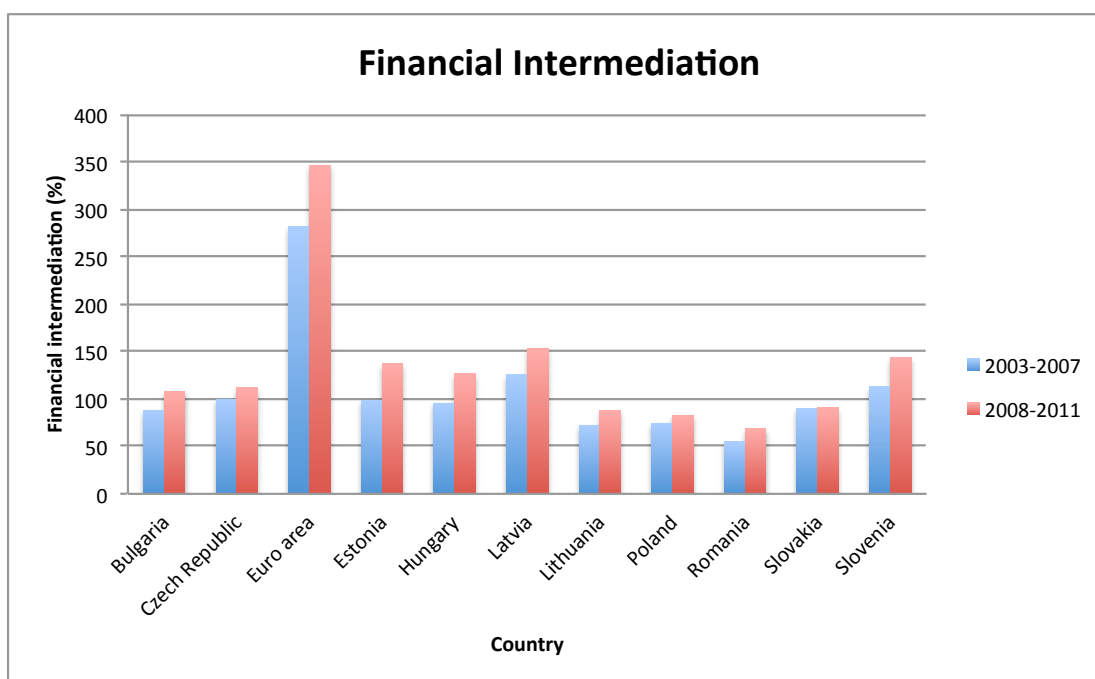


Chart 5 Source ECB

Banking sector profitability

As a measure of the banking sector profitability in examined countries we use the return on assets (ROA). According to the values shown in the Chart 6, we can say that the highest profitability during the period before crisis was achieved in the Bulgaria, Estonia and Latvia; the values are floating around the value of 2%. The data for the period during the financial crisis show slightly different results in the profitability measures. The highest values we can notice in the Bulgaria, the Czech Republic, Poland and Slovakia, the value is around the 1.2%. We can see significant decline in the ROA values among states between the period before crisis and during the financial crisis. The profitability values for the Czech Republic and Slovakia are shown to be stable over the time. In contrast to these stable values, the highest drop in the ROA indicator of profitability can be noticed in Latvia, from 2% to less than -1% and in Lithuania, from 1.3% to -0.5%.

According to the data, we can conclude the presence of significant negative impact of financial crisis on the bank's profitability. The data shows that profitability in CEE countries is significantly higher than the profitability in the euro area in pre-

crisis period.¹⁹ But during the period 2008–2011 we can see that profitability indicator in Latvia, Lithuania and Slovenia has dropped even under the value of the euro area.

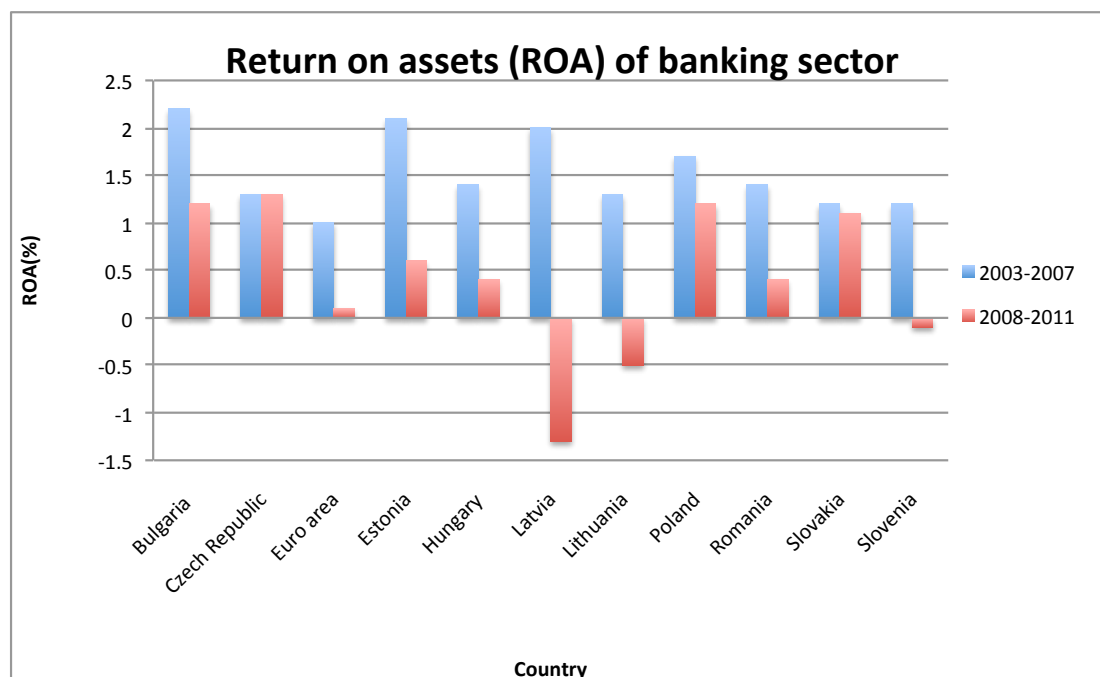


Chart 6 Source IMF Financial Soundness Indicators

4.4 Results

Firstly, we estimated the general impacts of our determinants on the bank profitability using the whole sample of 131 banks during the period 2003–2011, in order to be able to comment on the influence of characteristics for foreign banks in general. Secondly, we divided our dataset into two separate periods, i.e. period before the global financial crisis 2003–2007 and during the crisis 2008–2011, to be able to discover the changes in the impact of individual determinants on the profitability (*ROAA*).

Summing up the tests we ran on our econometric model we conclude that the fixed effect estimation is the best suitable method for our regression. We found out the presence of heteroscedasticity and no serial correlation.

To decide whether to use the random effect or fixed effect estimation we ran the Hausman test, tests whether the unobserved effect are correlated with the regressors, the null hypothesis is they are not. We reject the null hypothesis on the 5%

¹⁹ The values for the Euro area are counted from values of individual member states through the period 2003–2011, because the official data for the Euro area are not available.

significance level for all of our econometric models, therefore we use only fixed effect estimation. The results are shown in Tables 7-9 using the χ^2 values.

For testing the heteroscedasticity we used modified Wald test for group wise heteroscedasticity²⁰ in fixed effect regression model. The null hypothesis states the presence of homoscedasticity. In our case for all econometric models was the p-value under 0.05, which means rejecting the null hypothesis and implies the presence of heteroscedasticity.

For testing the serial correlation (autocorrelation)²¹, the relationship between a given variable and itself over various time intervals, we used a Wooldridge test for serial correlation. The null hypothesis expresses presence of no autocorrelation. We fail to reject the null hypothesis on the 5% significance level, because the p-value equals to 0.12, 0.17, and 0.23 in our tests. For controlling the heteroscedasticity and serial correlation is best the cluster standards errors method. In our case is the robust standard errors method the best method of estimation suitable for our data.

Regarding the correlation shown Tables 4–6 in the Appendix, we are conscious of the possibility of existing multicollinearity problem. A large number of econometrical studies mention how serious problems can be when are explanatory highly correlated with each other. In order to avoid the problems due to collinearity we decide eventually to eliminate the most highly correlated variables from the regression model, but as it is shown in Tables 4–6 there are not included such variables.

Table 7 provides the regression of our first econometrical model for the whole period 2003–2011. We can find significant effect of bank specific variable cost to income ratio (*costinc*). The impact of the variable *costinc* is negative showing that an increase in the expenses reduces the profits in large extent and other way round. In other words, operating on high cost-efficiency levels means higher profit. We can see that foreign banks are not influence by the size of the bank but on the other hand the profitability is positively and significantly influenced by the power of banks position on the market (*mshare*). We can conclude that foreign banks with more dominant position on the market gain higher revenues. Other bank-specific characteristics are not shown as significant in the first econometric model for the whole period 2003–2011.

²⁰ Stata code: xttest3

²¹ Stata code: xtserial

The impact of macroeconomic indicators, especially GDP growth (*GDPghost*), GDP per capita (*GDPghost*) and inflation (*inflghost*) are found to be significant through our regression models. The foreign profitability seems to be procyclical, which means that during economical upswings when the demand for lending is increasing, the profitability is increasing. “The adroitly managed banks profit from inflation due to the lag between raising their lending and deposit rate”(Havrylchyk and Jurzyk, 2006, pp.14).

GDP per capita, as the measure of the different levels of the economic and technological convergence process, shows to have a significant negative effect, describing that the increase 1000 Euros in GDP per capita in the country leads into 2–3% decrease in the return on average assets (*ROAA*). Foreign banks in the countries with high-level development process lose on their advantages of possessing new technologies, high-skilled management techniques etc., which leads into decline in revenues.

Our results suggest that foreign banks in the CEE region are not responsive to the economic development in the Euro area, which in our analysis we consider as a home country condition due to the fact that most of the foreign banks in this region have parent banks from the euro area and those countries are also linked economically to the euro area members states.

In the first model we also investigate the influence of membership in the European Union and in the euro area. The variables *EU* and *EA* are included only in the first regression model for the whole period 2003–2011, it was omitted in the models for the sub periods 2003–2007 and 2008–2011 due to limited number of changes (number of entries into the EU and EA) in these two variables during time. According to the results European Union membership is not related to the foreign banks profitability. The same results are shown for the euro area, which is not significant on the 5% significant level but show more importance to the foreign banks profitability than the membership in the EU.

Table 7. Regression table for the whole period 2003–2011.

Variables	foreign1	foreign2	foreign3	foreign4	foreign5	foreign6
size				0.375 (0.252)	0.308 (0.361)	0.342
mshare	0.00462*** (0.001)	0.00438*** (0.001)	0.00371 (0.10)			
loang	0.00361 (0.152)	0.00370 (0.158)	0.00356 (0.159)	0.00372 (0.148)	0.00359 (0.151)	0.00363 (0.147)
depositratio	0.718 (0.218)	0.759 (0.219)	0.777 (0.228)	0.979 (0.157)	0.878 (0.174)	0.930 (0.156)
riskcosts	-22.22 (0.118)	-22.15 (0.118)	-22.32 (0.117)	-22.18 (0.116)	-22.36 (0.114)	-22.22 (0.116)
costinc	-0.0368** (0.026)	-0.0363** (0.029)	-0.0364** (0.025)	-0.0361** (0.027)	-0.0367** (0.022)	-0.0366** (0.023)
riskavers	0.0194 (0.567)	0.0201 (0.550)	0.0257 (0.431)	0.0385 (0.204)	0.0347 (0.264)	0.0360 (0.242)
GDPghost	0.0801*** (0.002)	0.0963*** (0.001)	0.0813*** (0.004)	0.104*** (0.000)	0.0844*** (0.002)	0.0861*** (0.001)
GDPghost	-0.000223 (0.162)	-0.000199 (0.224)	-0.000273** (0.019)	-0.000324*** (0.006)	-0.000333*** (0.004)	-0.000349*** (0.003)
inflhost	0.0775** (0.025)	0.0770** (0.024)	0.0849** (0.024)	0.0965** (0.017)	0.0901** (0.014)	0.0932** (0.017)
rinterhost	0.0199 (0.624)	0.0216 (0.625)	0.0256 (0.550)	0.0338 (0.443)	0.0278 (0.483)	0.0321 (0.433)
HHI	-2.894 (0.516)	-3.197 (0.489)	-2.294 (0.607)	-0.514 (0.907)	-0.976 (0.813)	0.00898 (0.998)
finintermed	0.00793 (0.245)	0.00805 (0.242)	0.00479 (0.569)	0.00401 (0.630)	0.00420 (0.606)	0.00438 (0.591)
GDPgEA		-0.0396 (0.253)		-0.0411 (0.224)		
inflEA		0.00000544 (1.000)		-0.00954 (0.923)		
rinterEA		-0.0782 (0.736)		-0.123 (0.555)		
EU			0.167 (0.488)		0.0860 (0.676)	
EA				0.410 (0.162)		0.456 (0.107)
_cons	2.954 (0.147)	3.035 (0.153)	1.364 (0.843)	-1.342 (0.809)	-0.650 (0.906)	-1.173 (0.830)
Number of observations	661	661	661	679	679	679
Number of groups	131	131	131	131	131	131
adjusted R2	0.467	0.466	0.466	0.467	0.466	0.467
Hausman test	33.950	30.930	31.640	29.590	29.090	31.680
Chow test	chi2(18)=435.93, Prob>chi2=0.00					

p-values in parentheses

* p<0.10

** p<0.05

*** p<0.01"

The regressions are estimated using robust errors.

Since the global financial crisis might have caused the structural break in our data, we use the Chow test which allows us to test whether a particular date causes a break in the regression coefficients. The null hypothesis means no structural break. In

our case the p-value was equal to zero, so we reject the null hypothesis in favor of the alternative of presence of the structural break in our data. We can conclude that the 2008–2011 cause a break in the regression coefficients, therefore for the following estimations and testing the hypotheses we split the whole period 2003–2011 into two subsets belonging to the period 2003–2007 (pre-crisis period, Table 8) and to the period 2008–2011(crisis period, Table 9).

H₁: Bank-specific characteristics such as size, market share, loan growth, stable funding ratio, risk costs connected with bank's loan portfolio, cost to income ratio and bank's risk aversion are significant factors determining the foreign bank profitability.

As it is shown in Table 7–9 in the results the most stable bank-specific determinant is cost to income ratio (*costinc*). The rise in operational efficiency leads in decrease of the expenses and magnifying of the foreign banks profits. Our results are in agreement with the study Pasiouras and Kosmidou (2007), where the cost to income ratio is shown as the most significant determinant of profitability with negative impact.

In terms of bank-specific characteristics other significant variables (but only in the crisis period, not pre-crisis period) are the market share (*mshare*) and the size of the bank according to total assets (*size*). The effect is not unexpected, banks with greater market shares have stronger position on the market and it magnifies their profits. The positive influence of market share is confirmed in Chen and Liao (2011) and Claessens and Horen (2012).

Another finding in our study is that loan growth (*loang*) is significantly positive in the pre-crisis period, as bank increases the amounts of loans, in spite of the probable increase in the risk, bank gain higher revenues. The positive relationship is in agreement with results in the study of Claessens and Horen (2012). During the crisis period the probability of making bad loans is higher, which increases risk and decreases the revenues. In the crisis period the higher growth of lending does not compensate the risk that big volume of lending would lead into decrease in the credit quality. The same results are found in our reference study Havrylchyk and Jurzyk (2006).

The variable risk costs (*riskcosts*) as a measure of credit quality, represented by a ratio loss provisions to gross loans, do not have an important effect on the

foreign bank profitability in the pre-crisis period. This finding is not surprising because the values of loan loss provisions, expressing the quality of loan portfolio, are reaching smaller values in the pre-crisis period. On the contrary in the crisis period a significant negative effect of risk costs on the bank profitability is found. In the crisis period higher risk of bad loans leads to smaller profits, also the values of loan loss provisions in our data are achieving significantly higher values for this period. These results are confirmed in the studies of Lensink et al. (2008), Dietrich and Wanzenried (2011).

During the crisis period foreign bank profitability is positively related to the stable funding ratio (*depositratio*) while it is not significant in the pre-crisis period. The client deposits are usually considered as a relatively cheap and stable source of funding. So it is reasonable that increase in the *depositratio* results in higher profitability and since banks do not have to rely too much on more expensive wholesale funding.

H₂: Foreign owned banks are sensitive to domestic macroeconomic conditions, i.e. conditions in the country where they operate.

According our to base study Havrylchyk and Jurzyk (2006), small sensitivity to the domestic country macroeconomic conditions is one of the foreign banks advantage. In order to test this hypothesis we include in the regression models host country macroeconomic indicators as a GDP growth (*GDPghost*) and GDP per capita (*GDPghost*), inflation (*inflhost*) and real interest rate (*rinterhost*). In our results in Table 8–9 we can see the instability of significance among the macroeconomic variables across our regression models. In the pre-crisis period foreign banks were influenced only by GDP growth and GDP per capita. The GDP growth effect is procyclical, i.e. foreign banks gained more profits during economic expansion. On the other hand GDP per capita has negative sign as explained above. The significant positive impact of GDP growth is in agreement with the results in the study of Dietrich and Wanzenried (2011) and Fries and Taci (2005).

The crisis period provides different results. During the crisis foreign banks sensitivity to macroeconomic indicators increased. Comparing to the period 2003–2007 there is an unexpected loss of influence of GDP growth variable. GDP per capita is a stable indicator, being significant in all our models. We can conclude that the revenues are decreasing with the increasing level of development. The negative

relationship between GDP per capita and profitability is identified also in the study of Schwaiger and Liebeg (2007).

In the contrast with the results for the pre-crisis period there is an increase in the influence of inflation in the host country. The higher inflation levels largely magnify the foreign banks margins. The results are in agreement with the study of Chen and Liao (2011) and also with our reference study of Havrylchyk and Jurzyk (2006).

During the crisis period popped out the variable real interest rate. The rise in price of lending money means increase in the revenues. Positively related real interest rate in the host country is shown also in our reference study of Havrylchyk and Jurzyk (2006).

According to the results we can conclude that foreign banks are sensitive to the macroeconomic conditions in the host country and their influence increased in the global financial crisis period, due to its unpredictability and changes in the countries development.

H₃: The membership in the European Union and the euro area has a positive impact on profitability of foreign owned banks.

In the examined period 2003–2011 we found that profitability of foreign banks is not sensitive to the European Union membership of CEE countries. The reason of the lack of sensitiveness can be firstly reasoned by the fact that each of country from our dataset is part of the European Union, most of them with the entry in 2004, which is close to the beginning of our examined period. And secondly, the entry to the European Union was prevented by long lasting and thorough preparations. The impact of the membership in the euro area is more significant than the membership in the EU but comparing to our defined levels of significance it is still insignificant. Important is to mention that the results are showing a positive impact of euro area participation. The euro area represents more tight integration than the European Union, especially in terms related to the financial market. Foreign banks acting on the market in country, which is member of the euro area have the advantage of acting on the market with similar regulations, standards and principles as well as currency as in the home country, which is in most cases in our dataset member of euro area.

Table 8. Regression table for foreign banks in the period 2003–2007

Variables	foreign before crisis1	foreign before crisis2	foreign before crisis3	foreign before crisis4	foreign before crisis5	foreign before crisis6
size				-0.172 (0.582)	-0.293 (0.556)	-0.0898 (0.849)
mshare	0.00297 (0.207)	0.00300 (0.220)	0.00346 (0.147)			
loang	0.00469** (0.033)	0.00467** (0.036)	0.00507** (0.032)	0.00426* (0.054)	0.00544** (0.029)	0.00541** (0.033)
depositratio	1.191 (0.219)	1.199 (0.219)	1.341 (0.131)	0.470 (0.505)	1.202 (0.194)	1.440 (0.105)
riskcosts	-13.53 (0.122)	-13.54 (0.124)	-13.73 (0.112)	-14.02 (0.133)	-13.97 (0.116)	-14.05 (0.107)
costinc	-0.0862*** (0.000)	-0.0862*** (0.000)	-0.0848*** (0.000)	-0.0779*** (0.000)	-0.0856*** (0.000)	-0.0838*** (0.000)
riskavers	0.0285 (0.278)	0.0287 (0.299)	0.0215 (0.440)	0.0300 (0.337)	0.0186 (0.564)	0.0200 (0.511)
GDPghost	0.156** (0.020)	0.158** (0.017)	0.141** (0.017)	0.135** (0.035)	0.134** (0.029)	0.139** (0.013)
GDPghost	-0.000348** (0.031)	-0.000374** (0.046)	0.000104 (0.669)	-0.000328* (0.050)	-0.000409** (0.050)	0.0000910 (0.673)
inflhost	0.0199 (0.620)	0.0203 (0.595)	-0.00966 (0.794)	0.0114 (0.737)	0.0490 (0.172)	0.0114 (0.726)
rinterhost	0.0567 (0.199)	0.0572 (0.216)	0.0257 (0.610)	0.0293 (0.460)	0.00665 (0.862)	-0.0256 (0.503)
HHI		-1.551 (0.871)	1.134 (0.918)		0.193 (0.985)	2.888 (0.787)
finintermed		0.00140 (0.865)	0.00662 (0.464)		0.00508 (0.606)	0.0111 (0.246)
GDPgEA			-0.492** (0.022)			-0.635*** (0.003)
inflEA			6.541* (0.082)			7.682** (0.029)
rinterEA			0.522 (0.162)			0.741** (0.030)
_cons	6.599*** (0.001)	6.811*** (0.002)	-12.07 (0.271)	9.145** (0.039)	11.03* (0.080)	-14.09 (0.230)
Number of observations	312	312	312	360	330	330
Number of groups	103	103	103	103	103	103
adjusted R2	0.657	0.654	0.661	0.685	0.640	0.651
Hausman test	48.14	16.86	21.44	43.04	18.19	39.14

p-values in parentheses

* p<0.10

** p<0.05

*** p<0.01"

The regressions are estimated using robust errors.

Table 9. Regression table for foreign banks in the period 2008–2011

Variables	crisisforeign1	crisisforeign2	crisisforeign3	crisisforeign4	crisisforeign5	crisisforeign6
size				0.816*** (0.002)	0.775*** (0.008)	0.769*** (0.003)
mshare	0.00817*** (0.000)	0.00848*** (0.000)	0.00770*** (0.000)			
loang	-0.00381** (0.016)	-0.00344** (0.033)	-0.00295* (0.068)	-0.00402** (0.010)	-0.00384** (0.019)	-0.00353** (0.033)
depositratio	1.661** (0.030)	1.577* (0.058)	1.361* (0.091)	1.939** (0.032)	1.809* (0.071)	1.612* (0.092)
riskcosts	-68.23*** (0.000)	-68.20*** (0.000)	-68.52*** (0.000)	-66.89*** (0.000)	-67.01*** (0.000)	-67.07*** (0.000)
costinc	-0.0298*** (0.000)	-0.0295*** (0.000)	-0.0286*** (0.000)	-0.0300*** (0.000)	-0.0298*** (0.000)	-0.0287*** (0.000)
riskavers	0.0325 (0.401)	0.0323 (0.410)	0.0257 (0.441)	0.0668 (0.119)	0.0641 (0.153)	0.0624 (0.112)
GDPghost	0.0163 (0.353)	0.0208 (0.298)	0.0588* (0.051)	0.0213 (0.224)	0.0208 (0.304)	0.0631** (0.034)
GDPghost	-0.000383** (0.019)	-0.000375** (0.025)	-0.000370* (0.076)	-0.000512*** (0.003)	-0.000490*** (0.008)	-0.000432** (0.043)
inflhost	0.129*** (0.003)	0.141*** (0.001)	0.156*** (0.008)	0.157*** (0.000)	0.169*** (0.000)	0.173*** (0.002)
rinterhost	0.0621 (0.130)	0.0665 (0.104)	0.0857* (0.088)	0.0754* (0.064)	0.0799** (0.049)	0.0959* (0.050)
HHI		-0.504 (0.953)	9.660 (0.375)		-5.172 (0.605)	5.602 (0.640)
finintermed		0.00865 (0.187)	0.000597 (0.953)		0.00480 (0.504)	-0.00243 (0.815)
GDPgEA			0.0285 (0.686)			-0.00231 (0.974)
inflEA			-0.322 (0.232)			-0.252 (0.346)
rinterEA			0.503 (0.277)			0.336 (0.465)
_cons	4.009*** (0.005)	3.074* (0.089)	1.482 (0.436)	-7.105* (0.061)	-6.647 (0.135)	-8.231* (0.050)
Number of observations	349	349	349	349	349	349
Number of groups	123	123	123	123	123	123
adjusted R2	0.823	0.823	0.828	0.820	0.820	0.826
Hausman test	48.14	46.52	22.79	38.42	35.91	24.81

p-values in parentheses

* p<0.10

** p<0.05

*** p<0.01"

The regressions are estimated using robust errors.

H₄: Foreign owned banks are affected by the development in the euro area since most of their parent banks have the origin in the euro area and the CEE countries are also linked economically to the euro area member states.

In order to test this hypothesis we included characteristics of euro area development. We present the specification results in the Tables 7–9, we do not find a significant impact of Eurozone characteristics for the whole period (2003–2011), these results are in agreement with our base study, where is stated that foreign banks in CEE countries are not sensitive to their home characteristics. On the other hand in the pre-crisis period (2003–2007) we find a significant impact of euro area characteristics on the foreign banks profitability (*GDPgEA*, *inflEA*). Surprising is the finding of strong negative impact of GDP growth of euro area on the foreign bank profitability. We do not find any significant impact of Euro area development indicators for the crisis period.

H₅: Financial crisis had an impact on the foreign owned bank's profitability determinants.

During the crisis period, we observe the increase in the sensitivity to the bank-specific variables. In the pre-crisis period it is shown only the influence of the robust variable cost to income (*costinc*) and loan growth (*loang*). On the other hand during the crisis period the variable size (*size*) and also variable measuring the banks strength on the market (*mshare*) are showing positive relationship to the profitability. The larger banks are more conservative in their operation and in the occurrence of trouble they are more likely to expect financial help. Higher market share ensures the bank on the market higher revenues. Important change shown in the results is the change in the impact of loan growth (*loang*) determinant. In the period 2003–2007 more higher loan growth means for the bank higher profits. On the contrary in the crisis period, the increase in probability of adverse selection and moral hazard increase the risk and costs of issuing loan and it decreases the revenues. During this period we can see that funding structure and assets side development play an important role in determining the profitability. In comparison to the degree of lending with strongly negative impact the stable funding ratio (*depositratio*) is showing significant positive influence on bank profitability.

As it is mentioned above we also find change in the influence of macroeconomic variables during the crisis period, in this period the results show

significant influence of GDP per capita (*GDP_{host}*), inflation (*infl_{host}*) and real interest rate (*r_{interhost}*). On the contrary in the pre-crisis period the only significant variables are GDP growth and GDP per capita. These findings suggest that foreign owned banks despite their multinational parent institutions, sensitively react to the host country conditions.

H₆: Higher concentration of a banking sector is connected with higher profitability of foreign owned banks operating in this banking sector.

The level of financial sector development in the host country can also be related to foreign banks profitability as documented in the relevant literature and we include the characteristics market concentration, described by Herfindahl-Hirschman index, and financial intermediation to capture the influence of market structure. The results are shown in the Tables 7–9, but we do not observe any significant relationship between market structure characteristics and performance of foreign banks.

5. Conclusion

This thesis focused on the profitability of the foreign owned bank during the period 2003–2011, with special focus on the period of the global financial crisis. We analyzed sample of 131 foreign owned banks operating in 10 CEE countries where all of them are currently members of the European Union, some of them are also part of the Eurozone. We used BankScope database as the source of the data which is used in most papers covering the topic of banking and we employed panel data techniques to investigate the profitability determinants of foreign owned banks.

We do not reject the hypothesis that the bank-specific factors are important determinants of foreign owned banks in CEE region. Specifically, we find significant impact of cost to income ratio, market share and loan growth. During the crisis time, stable funding ratio and risk costs are also found significant. Hence, our findings suggest that during the crisis period the sensitivity of profitability to bank-specific characteristics has risen. Surprisingly, we reject the hypothesis of the relation between the market structure in the host country and the foreign banks profitability.

We also do not reject the hypothesis that the foreign banks profitability is sensitive to the domestic macroeconomic indicators. We find GDP growth, inflation and GDP per capita to be related to the foreign banks profitability. The impact of macroeconomic indicators, however, differs across the two subperiods, i.e. pre-crisis

period (2003–2007) and crisis period (2008–2011). During the pre-crisis period, the profitability of foreign banks is influenced mainly by GDP growth and GDP per capita in the host country, where the foreign bank operates. In the crisis period, also other macroeconomic factors such as domestic inflation and real interest rates are found to be significant.

Our findings surprisingly do not show that there is a significant relationship between foreign bank profitability and the membership of the host country in the European Union and in the euro area. Therefore, we do reject the hypothesis that EU or euro area membership is related to the foreign banks profitability. Further, we do not reject the hypothesis that macroeconomic development in the euro area had an influence on the foreign banks profitability in the pre-crisis period in contrast to the crisis period where such a relationship was not found.

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7. Appendix

Table 2. Description of the variables in use for the empirical analysis

Type of variable	Type of characteristic	Name	Symbol	Unit	Description	Source of data
dependent	Bank-specific	return on assets	<i>ROAA</i>	%	ratio of net profits to average total assets	BankScope
explanatory	Bank-specific	total assets	<i>size</i>		logarithm of total assets (in thousands of euros)	BankScope
explanatory	Bank-specific	market share	<i>mshare</i>	%	ratio of total assets of a bank to the total amount of the banking sector assets	BankScope, ECB database
explanatory	Bank-specific	loan growth	<i>loang</i>	%	year on year growth of total gross loans	Bankscope
explanatory	Bank-specific	stable funding ratio	<i>depositratio</i>	%	a ratio of total client deposits and total assets	BankScope
explanatory	Bank-specific	risk costs	<i>riskcosts</i>	%	share of loan loss provisions in gross loans	BankScope
explanatory	Bank-specific	cost efficiency	<i>costinc</i>	%	operating expenses as a percentage of net revenues (cost to income ratio)	BankScope
explanatory	Bank-specific	risk aversion	<i>riskavers</i>	%	ratio of equity to total assets	BankScope
explanatory	Macroeconomic	GDP growth in host country	<i>GDPghost</i>	%	GDP growth in host country	Eurostat
explanatory	Macroeconomic	GDP per capita in host country	<i>GDPghost</i>	eur/ inhab	GDP per capita in host country	Eurostat
explanatory	Macroeconomic	inflation rate in host country	<i>inflhost</i>	%	inflation rate in host country	Eurostat
explanatory	Macroeconomic	real interest rate in host country	<i>rinterhost</i>	%	real interest rate in host country	World Bank

Type of variable	Type of characteristic	Name	Symbol	Unit	Description	Source of data
explanatory	Market structure	Herfindahl-Hirschman index	<i>HHI</i>		sum of squared shares of banks' assets	ECB database
explanatory	Market structure	financial intermediation	<i>finintermed</i>	%	ratio of assets of banking sector to GDP	ECB database
explanatory	Euro area development	GDP growth in the Euro area	<i>GDPgEA</i>	%	GDP growth in the Euro area	Eurostat
explanatory	Euro area development	inflation rate in the Euro area	<i>inflEA</i>	%	inflation rate in the Euro area	Eurostat
explanatory	Euro area development	real interest rate in the Euro area	<i>rinterEA</i>	%	real interest rate in the Euro area	IMF Soudness Indicators
explanatory	Dummy	foreign ownership	<i>foreign</i>	1;0	dummy variable taking the value 1 if the bank has an foreign institution as an owner, 0 otherwise	BankScope
explanatory	Dummy	EU entry	<i>EU</i>	1;0	dummy variable taking the value 1 if host country is the EU member in a given year, 0 otherwise	
explanatory	Dummy	Euro area membership	<i>EA</i>	1;0	dummy variable taking the value 1 if host country is member of EA in a given year, 0 otherwise	

Table 3. Descriptive statistics for explained and explanatory variables

Variable	Obs	Mean	Std. Dev.	Min	Max
ROAA	1310	0.565	2.864	2.406	3.430
size	1311	13.711	1.599	8.763	17.323
mshare	1231	40.613	59.997	0.145	94.980
loang	1191	29.910	57.541	-100.000	72.325
depositratio	1271	0.575	0.247	0.000	0.962
riskcosts	1206	0.013	0.033	-0.667	0.382
costinc	1301	70.280	47.683	10.080	88.464
riskavers	1311	12.026	9.526	2.476	21.552
GDPghost	1728	3.612	4.845	-1.233	8.458
GDPghost	1728	7471.488	3216.309	4255.179	10687.797
inflhost	1728	4.499	3.174	-1.200	15.300
rinterhost	1646	4.554	3.203	-4.900	13.713
HHI	1707	0.105	0.053	0.056	0.404
finintermed	1614	93.087	34.269	0.469	168.331
GDPg	1728	1.144	2.146	-4.400	3.200
inflEA	1728	2.078	0.769	0.300	3.300
rinterEA	1728	3.999	0.324	3.420	4.410
EU	1728	0.813	0.390	0	1
EA	1728	0.073	0.260	0	1

Table 4. Correlation matrix for the whole period

Variables	ROAA	size	mshare	loang	deposratio	riskcosts	costinc	riskavers	GDPghost	GDPghost	inflhost	rinterhost	HHI	finintermed	GDPgEA	inflEA	rinterEA	EU	EA
ROAA	1																		
size	0.2234	1																	
mshare	0.1709	0.5862	1																
loang	0.0722	-0.1556	-0.0416	1															
deposratio	0.0386	0.1547	0.1032	-0.0222	1														
riskcosts	-0.3667	-0.0044	-0.0262	-0.062	-0.0615	1													
costinc	-0.5705	-0.3675	-0.2769	0.1621	0.0241	0.0361	1												
riskavers	-0.0151	-0.3932	-0.149	0.0477	-0.2089	0.1057	0.0785	1											
GDPghost	0.3008	-0.0735	0.0346	0.3237	0.043	-0.2496	-0.0351	0.0158	1										
GDPghost	-0.0565	0.1974	-0.0382	-0.1085	-0.0986	-0.0733	0.0353	-0.2401	-0.0788	1									
inflhost	0.0621	-0.1955	-0.0016	0.1513	-0.0636	0.0231	-0.0049	0.1221	0.1443	-0.3356	1								
rinterhost	-0.1546	-0.0533	-0.1576	-0.0813	0.0335	0.1436	0.1204	0.1259	-0.3428	-0.2734	-0.2787	1							
HHI	-0.0134	-0.0335	0.4324	0.0316	0.0806	-0.0397	-0.0249	-0.1282	0.0101	0.1548	0.0372	-0.167	1						
finintermed	-0.0137	0.0125	-0.1205	-0.1435	0.0093	0.0188	-0.0937	-0.0597	-0.2505	0.3349	-0.0867	-0.0794	-0.0913	1					
GDPgEA	0.1593	-0.0658	0.0143	0.2485	0.0517	-0.1484	0.0151	-0.0045	0.7482	-0.0564	0.0971	-0.2128	0.0371	-0.1553	1				
inflEA	0.1661	-0.0016	0.0258	0.2007	-0.0202	-0.1502	-0.014	0.0056	0.5696	0.0234	0.3812	-0.4049	0.0344	-0.1118	0.61	1			
rinterEA	0.0744	0.0743	0.0294	0.0944	-0.0352	-0.0504	-0.0418	-0.0233	0.1768	0.0997	0.2553	-0.2426	0.0392	0.0403	0.1101	0.5157	1		
EU	-0.0774	0.2405	-0.0013	-0.1809	-0.0796	0.1265	-0.0708	-0.1021	-0.2098	0.3729	-0.2722	-0.1713	-0.0226	0.2602	-0.1385	-0.0488	0.1425	1	
EA	0.0077	0.0496	0.0601	-0.0408	-0.1209	-0.0432	-0.0105	-0.0957	-0.0822	0.4221	-0.0826	-0.1001	0.1372	0.2234	-0.113	-0.04	0.0863	0.072	1

Table 5. The correlation matrix for the pre-crisis period (2003–2007)

Variables	ROAA	size	mshare	loans	deposratio	riskcosts	costinc	riskavers	GDPghost	GDPghost	inflhost	rinterhost	HHI	finintermed	GDPgEA	inflEA	rinterEA
ROAA	1																
size	0.293	1															
mshare	0.1904	0.5822	1														
loang	0.0049	-0.1003	-0.032	1													
deposratio	-0.0217	0.1466	0.1051	-0.0882	1												
riskcosts	-0.2792	-0.0347	-0.0405	0.0719	-0.0701	1											
costinc	-0.7483	-0.4497	-0.3267	0.1707	0.0242	0.1583	1										
riskavers	-0.1703	-0.4747	-0.1698	0.0755	-0.2256	0.1843	0.2246	1									
GDPghost	0.1976	0.007	0.2157	0.1245	0.1481	-0.1283	-0.2186	-0.0966	1								
GDPghost	-0.1462	0.2212	-0.0103	-0.1699	-0.1096	0.0206	0.0657	-0.2773	-0.1927	1							
inflhost	-0.0171	-0.2962	-0.0914	0.1047	-0.0345	0.0675	0.0444	0.2079	0.0878	-0.4528	1						
rinterhost	-0.0833	-0.0446	-0.1883	0.0435	0.0148	0.0497	0.2613	0.1957	-0.1732	-0.1918	0.1363	1					
HHI	0.0017	-0.0038	0.43	-0.0079	0.0678	-0.0338	-0.0244	-0.1398	0.2879	0.1732	-0.0812	-0.1309	1				
finintermed	-0.0227	0.0149	-0.13	-0.1009	-0.0206	-0.0028	-0.1191	-0.1043	0.0154	0.4006	0.0661	-0.4146	-0.1265	1			
GDPgEA	-0.0264	0.1925	-0.0796	-0.0269	-0.0047	0.1458	-0.0484	-0.0468	0.2103	0.1496	0.0469	-0.1397	-0.0976	0.1656	1		
inflEA	0.0125	-0.1246	-0.0382	-0.084	0.047	0.0461	0.0472	0.0797	-0.0121	-0.1425	0.0467	0.1184	-0.0245	-0.1748	-0.0741	1	
rinterEA	0.0009	0.0687	0.0319	0.0657	-0.0198	-0.0103	-0.0437	-0.0508	0.1313	0.1091	0.018	-0.0744	0.0728	0.1192	0.3652	-0.7517	1

Table 6. Correlation matrix for the crisis period (2008–2011)

Variables	ROAA	size	mshare	loans	deposratio	riskcosts	costinc	riskavers	GDPghost	GDPghost	inflhost	rinterhost	HHI	finintermed	GDPgEA	inflEA	rinterEA
ROAA	1																
size	0.2429	1															
mshare	0.1326	0.6458	1														
loang	0.0277	-0.0769	-0.1241	1													
deposratio	0.0846	0.1925	0.0972	0.0173	1												
riskcosts	-0.5193	-0.0611	0.0278	-0.2211	-0.0304	1											
costinc	-0.5078	-0.334	-0.2645	0.1929	0.0223	-0.0819	1										
riskavers	0.1433	-0.3566	-0.1299	0.0537	-0.1939	-0.0067	0.0031	1									
GDPghost	0.3208	0.0929	-0.3253	-0.0263	0.0922	-0.3253	-0.0263	0.0922	1								
GDPghost	0.0751	0.146	-0.061	0.0552	-0.0798	-0.3058	0.0222	-0.2178	0.0294	1							
inflhost	0.1196	-0.099	0.0778	0.2051	-0.0929	-0.0101	-0.0337	0.066	0.1588	-0.2354	1						
rinterhost	-0.2029	-0.0935	-0.1286	-0.1984	0.0556	0.2827	0.0543	0.0759	-0.452	-0.3567	-0.5474	1					
HHI	-0.1102	0.0095	0.4345	-0.0815	0.0799	0.0436	-0.0386	-0.1147	-0.3495	0.1775	0.1455	-0.1924	1				
finintermed	0.0787	-0.086	-0.0963	-0.0219	0.0598	-0.0595	-0.0746	-0.0423	-0.2126	0.2568	-0.1793	0.1226	0.0287	1			
GDPgEA	0.1271	0.0491	-0.0011	0.1223	0.0351	-0.2058	0.0061	0.0333	0.6674	-0.0471	0.0914	-0.2425	-0.0939	-0.0749	1		
inflEA	0.2264	0.0373	0.0327	0.3376	-0.0386	-0.2835	-0.0218	0.0094	0.675	0.0536	0.4892	-0.5151	0.0263	-0.112	0.6979	1	
rinterEA	0.1923	0.0425	0.0373	0.2671	-0.0388	-0.1809	-0.0376	-0.0073	0.3829	0.0752	0.4556	-0.3874	0.0391	-0.0678	0.1989	0.7604	1