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5 • 2006

Olena Havrylchyk and Emilia Jurzyk

Profitability of foreign banks in Central and Eastern Europe

Does the entry mode matter?



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BOFIT Discussion Papers
Editor-in-Chief Iikka Korhonen

BOFIT Discussion Papers 5/2006
25.4.2006

Olena Havrylchyk and Emilia Jurzyk: Profitability of foreign banks in Central and Eastern Europe: Does the entry mode matter?

ISBN 952-462-818-X
ISSN 1456-4564
(print)

ISBN 952-462-819-8
ISSN 1456-5889
(online)

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All opinions expressed are those of the authors and do not necessarily reflect the views of the Bank of Finland.

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Profitability of foreign banks in Central and Eastern Europe: Does the entry mode matter?

Abstract

Using data for 265 banks in Central and Eastern European Countries for the period of 1995-2003, this paper analyses the differences in profitability between domestic and foreign banks. We show that foreign banks, especially greenfield institutions, earn higher profits than domestic banks. However, this effect is acquired rather than inherited, since there is evidence that foreign banks tend to take over less profitable institutions. Profits of foreign banks in CEECs also exceed profits of their parent banks, explaining the reasons for their entry. Further, we study benefits and costs of foreign ownership by analyzing determinants of profitability for domestic, takeover, and greenfield banks. Profits of foreign banks are less affected by macroeconomic conditions in their host countries. However, greenfield banks are sensitive to the situation of their parent banks. Only domestic banks enjoy higher profits in more concentrated banking markets, whereas takeover banks suffer from diseconomies of scale due to the fact that they acquired large institutions.

JEL classification: G15, G21, F36

Keywords: foreign banks, bank profits, multinational banking, transition economies

Olena Havrylchuk and Emilia Jurzyk

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Tiivistelmä

Tässä tutkimuksessa analysoidaan koti- ja ulkomaisten pankkien kannattavuutta Keski- ja Itä-Euroopassa. Tutkimuksessa käytetään tilastotietoa 265 pankista vuosina 1995–2003. Tuloksien mukaan ulkomaiset pankit ovat kannattavampia, erityisesti jos pankki on ulkomaisen sijoittajan perustama. Tämä havainto voidaan kuitenkin selittää osaksi siten, että jos ulkomaiset pankit ostavat kotimaisia pankkeja, ne ostavat erityisesti vähemmän kannattavia pankkeja. Keski- ja Itä-Euroopan tytäryritysten kannattavuus on parempi kuin niiden ulkomaisten emoyritysten, mikä selittää näiden maiden houkuttelevuuden sijoituskohteena. Työssä analysoidaan myös ulkomaisen omistuksen etuja ja haittoja selvittämällä, mitkä tekijät vaikuttavat kannattavuuteen kotimaisissa, ulkomaalaisten ostamissa ja ulkomaalaisten perustamissa pankeissa. Makrotaloudelliset tekijät vaikuttavat vähemmän ulkomaisten pankkien kannattavuuteen, mutta ulkomaalaisten perustamien pankkien tulokseen vaikuttaa niiden emoyritysten tulokunto. Jos pankkisektori on keskittynyt, kotimaiset pankit ovat kannattavampia.

Asiasanat: Ulkomaalaiset pankit, pankkien voitot, kansainväliset pankit, siirtymätaloudet

1 Introduction

The literature on determinants of bank profitability is very extensive. However, the majority of papers focus on markets with a low presence of foreign banks. Furthermore, they ignore two facts: first, that foreign banks might be differently affected by certain factors than domestic banks would, and, second, that they can be affected by additional factors, such as home country conditions and strategies of their parent institutions. The only study that addresses this issue is the work of Williams (1998a, 1998b, 2003), who constructs an empirical model of foreign banks' profit determinants and tests a number of hypotheses concerning profitability of foreign banks in Australia. The results show that domestic factors do not add a great deal of descriptive power to the model, albeit they offer important insights into foreign banks' strategic and policy decisions (Williams, 2003).

Theoretically, foreign banks' profits can be affected by business conditions in their home countries and by their parents' health or a change in the latter's strategy. These can entail both costs and benefits for banking industries in CEECs. The biggest advantage of foreign ownership is the smaller sensitivity of foreign banks to host country conditions and significantly better access to international markets. International experience also indicates that parent banks serve as lenders-of-last-resort if their subsidiaries run into trouble. For example, the Belgian bank KBC recapitalized its Polish subsidiary Kredyt Bank and its Hungarian subsidiary K&H when they encountered problems. As regards Kredyt Bank, the problems stemmed from rapid loan growth that led to a large volume of non-performing loans, whereas the problems of K&H were caused by fraudulent management activities.

At the same time, foreign banks may be influenced by poor performance or strategy changes by their parent banks. There are two main channels here that are worth considering. First, a foreign bank may be liquidated if the parent bank experiences problems and decides to close some of its subsidiaries. A recent example of an impact of parent bank problems on foreign banks operating in CEECs was the withdrawal of Dresdner Bank from Romania and the Czech Republic, which was apparently linked to Dresdner's problems at the headquarters. Second, managers of international banks admit to allocating capital to subsidiaries with the highest expected returns (de Haas & Naaborg, 2005). Therefore, even a profitable foreign subsidiary could be closed in order to reallocate capital to even more profitable project in another country.

The impact of home country conditions on foreign banks is more ambiguous and cannot be easily predicted. Let us assume, for example, that the home country experiences an economic upswing. In this situation parent banks may have numerous profitable opportunities in their home countries and may decide to allocate less capital to their subsidiaries. At the same time, robust growth in the home country could render parent banks more profitable and better able to develop their subsidiaries abroad. The situation would be the reverse in an economic slowdown in the home country, as parent banks may decide to either cut their foreign operations – due to low profits at home – or expand abroad in search of new opportunities.

Apart from economic environment at host and home countries, other factors could have a differential impact on foreign and domestic banks. The increase in foreign bank ownership in CEECs went hand in hand with the rise in banking market concentration. Foreign banks contributed to higher concentration of banking markets through two channels: 1) foreign banks acquired a few domestic institutions and merged them into one; 2) domestic institutions consolidated because of competitive pressures from foreign peers. It would be interesting, therefore, to investigate whether domestic and foreign banks react differently to the changing structure of the market. In addition, stock markets developed considerably in CEECs, providing firms with alternative sources of funds. Since foreign banks are often accused of servicing only large enterprises, we can expect that profits of foreign banks decrease when stock markets develop.

In light of the above discussion this paper attempts to answer the following questions: Did foreign banks acquire more or less profitable institutions in CEECs? Are foreign and domestic banks affected in the same way by macroeconomic conditions in their host countries? Are foreign banks sensitive to macroeconomic conditions in their home countries and to parent banks' financial situation? Does market concentration in host countries have the same impact on foreign as on domestic banks? How does the development of stock markets affect profits of foreign and domestic banks?

It should be mentioned that in this study we expressly consider the entry mode of foreign banks, that is we differentiate between foreign banks that have taken over existing institutions (takeover banks) and those that have established new institutions (greenfield banks). This distinction is very important because there are pronounced differences in the strategies pursued by these banks. Greenfield banks traditionally service large international corporations and thus they could be more influenced by home country conditions and par-

ent banks' financial situation as compared to takeover banks, which are more oriented to domestic retail markets.

The present paper investigates the determinants of banks' profitability using a dataset comprising 265 banks from 10 CEECs (Bulgaria, the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovakia, and Slovenia) between 1995-2003. Since our interest lies in the profitability determinants of banks with different ownership, we estimate regressions for the whole sample and separately for the domestic, foreign, takeover, and greenfield banks. In order to gain insight into the factors that affect the profitability of banks in CEECs, we investigate the relationship between banks' return on assets and indicators of individual banks' characteristics, host country macroeconomic conditions, stock market capitalization, banking market concentration, parent banks' performance, and home country macroeconomic conditions.

This paper contributes to the literature in several ways. First, in our analysis of profitability we clearly differentiate between greenfield and takeover institutions. Second, we assume that foreign and domestic banks can react differently to the same profitability determinants, such as domestic macroeconomic conditions, market structure, and level of banking sector development. Therefore, we construct separate econometric models for domestic, greenfield and takeover banks. Finally, we focus on transition countries and test a number of hypotheses that have been previously tested for developed countries but might yield different results for CEECs.

The paper is structured as follows. In Section 2, we present a short review of circumstances under which foreign banks entered CEECs. In Section 3 we give a literature overview. Section 4 shows data sources and descriptive statistics. Sections 5 and 6 present econometric methodology and empirical results. Section 7 concludes.

2 Entry of foreign banks into the banking sectors of CEECs

The banking sectors in CEECs are characterized by very high levels of foreign presence. In Hungary, the Czech Republic, and Estonia foreign banks control more than 80% of total banking capital. The largest five foreign owners in CEECs are KBC Bank, Erste Bank, HVB Group, Société Générale and Unicredito Italiano (Table 1). It is easy to notice some regional specialization among foreign banks. Large Scandinavian banks (Swedbank and

Skandinaviska Enskilda) virtually monopolize the banking markets of the Baltic states, and Greek banks (National Bank of Greece, Piraeus Bank, Alpha Bank, Emporiki Bank of Greece) have a foothold only in the Balkan countries. At the same time, Austrian banks (Erste Bank, HVB Group¹, Raiffeisen) control large shares of banking assets in all CEECs, except for the Baltic states. There are also a few examples when CEE banks have stakes in banks of other CEECs. For example, the Hungarian OTP bank acquired banks in Bulgaria and Slovakia, and the Latvian Parex bank took over Lithuanian AB Industrijos Bankas. Mian (2006) reports that there are significant distance constraints for foreign banks and finds that, as geographical distance between banks and host country increases, so do the information and agency costs. Therefore, it is not surprising to see that foreign banks tend to enter countries with more familiar culture and social customs, whose economic, political and social environments they know best.

The entry of foreign owners into CEE banking markets has not always been so easy. In the beginning of the 90s, only few foreign banks entered the CEEC by establishing greenfield institutions. This was motivated by two factors: lack of support for foreign bank ownership in CEECs and the unattractiveness of these countries prior to structural reforms. The greenfield banks that were established followed foreign enterprises into CEECs and focused their operations on them. At the same time they searched the local markets for new opportunities. These greenfield banks grew rapidly in CEECs, and they acquired large domestic banks as the privatization process got under way.

Hungary

The first country in CEECs to invite foreign strategic investors was Hungary. Until 1994 foreign investors were limited to minority shares in Hungarian banks. The Hungarian banking sector, however, was suffering from loose budget constraints and moral hazard problems, stemming from repeated bank recapitalizations between 1993-1994. In order to improve banks' corporate governance and reduce fiscal costs of recapitalizations, a consensus was reached in 1994 to privatize banks to strategic foreign investors. The process was completed by the end of 1997, when all the large banks were controlled by foreign owners. The only exception was OTP, the largest Hungarian savings bank, which was privatized

¹ HVB Group is formally a German group, but it became the leader in CEEC banking market after the acquisition of Bank Austria Creditanstalt, an Austrian bank that had large presence in the CEEC.

via a public offering on the stock exchange to institutional investors, without a single majority owner.

Baltic States

The Baltic states have also been quick to invite foreign investors. However, foreign banks were able to gain strategic ownership here only after the Russian crisis in 1998. Banks in this region had large exposures to the Russian market and many banks experienced financial difficulties in the wake of the Russian crisis. For example, 10% of Latvian banks' assets were exposed to the Russian market with more than a third of this exposure being to the Russian GKO bonds. As a result, banks' liquidity was reduced, the interbank market dried up, and there was an outflow of non-resident deposits. Rigas Komerbanka, the country's fifth largest bank, was subject to a bank run. It held 14% of its assets in Russia, and about 20% of its capital was owned by Russian investors. The bank was declared insolvent, along with a few other, smaller banks. Estonian and Lithuanian banks were less exposed to the Russian market, but nevertheless their profitability was affected. The crisis led to a consolidation of the banking markets and privatization of the remaining state banks. As a result of this restructuring, foreign banks, which were already present in the Baltic states, gained an even larger share of the local market.

Balkan States

Bulgaria and Romania have both been reluctant to privatize their banks to foreign strategic investors, and only the banking crises have induced them to rethink their strategies. Bulgaria experienced a banking crisis in 1996-1997, and Romania in 1998-1999. The underlying reasons for these were very similar: soft budget constraints, inadequate laws, and virtually unlimited liquidity flowing from central banks. In Bulgaria soft budget constraints led to a lending boom, but by 1995 roughly 75% of all bank loans were classified as nonperforming. Faced with this situation, the Bulgarian central bank provided liquidity, which ended in a currency and banking crisis. In 1997 the Bulgarian authorities finally embarked on privatization, and major Bulgarian banks were sold to foreign strategic investors. Before the crisis in Romania, large state owned banks were lending to inefficient state enterprises, and were quasi-automatically refinanced by the central bank. When the central bank decided to discontinue this practice, many large banks experienced difficulties. After costly recapitalizations, the authorities began the privatization process with the active participation of foreign investors.

Poland

Poland did not incur large fiscal costs to support its banking sector, and this might have been one of the reasons why the political opposition to foreign bank ownership was very strong. Between 1992 and 1998 conditional licensing was applied to foreign banks, meaning that a foreign bank could obtain a license only after agreeing to rehabilitate a distressed Polish bank. The privatization process started in 1993. Even though foreign investors were allowed to participate, they were entitled only to minority shares. Restrictions on foreign banks were removed in 1998 after the passing of new laws on banking, which were in line with EU legislation. The concept of privatization changed as well and the government began to seek reputable foreign banks in order to collect large privatization revenues. The high minimum capital requirement of ECU 5 million accelerated the involvement of foreign banks, since domestic banks could not raise such large amounts of money on the local market.

Czech Republic

The Czech Republic decided to restructure its banking sector via voucher privatization. The mass privatization turned out to be a failure and the country suffered from one of the highest fiscal costs of bank restructuring (25.4% of GDP) in CEECs. In 1998, the government sold its stake in Investicna a Postovna Banka (IPB) to the Japanese investor firm Nomura. This was the first time that a foreign investor had the opportunity to acquire a majority interest in a large Czech Bank. As the IPB was declared insolvent in 2000, the benefits of foreign ownership became subject to doubt. However, the privatization to foreign investors continued. The Erste Bank and Société Générale acquired majority shares in large banks, but this happened only after the Czech government protected the new owners against the remaining credit risks on loan portfolios through a ring-fencing agreement. In 2003, 85% of Czech banking capital was controlled by foreign investors.

Slovak Republic

The banking reform started late in Slovak Republic. Due to continuous political interference into lending practices, banks accumulated a burdensome amount of non-performing loans. However, starting in 1999, reform accelerated, and major banks were recapitalized and sold to strategic foreign investors.

Slovenia

In 2003, 32.5% of Slovenian bank capital was in the hands of foreign owners, a much lower ratio than in its CEE peers. Having started from a more favorable position than the other CEECs, Slovenia chose not to privatize banks and limit foreign competition. It should be mentioned that this strategy has proven effective as bank intermediation developed rapidly and no major banking crises occurred. However, competition between Slovenian banks has remained rather weak, and this led to a change in attitudes to foreign ownership. As a result, between 2001 and 2003, foreign investors increased their ownership of bank capital from 13% to 32.5%.

3 Determinants of foreign bank profits: Literature overview

It has long been observed that in developed countries foreign banks exhibit lower profitability than their domestic competitors, whereas the reverse is true for transition economies. Demirguc-Kunt and Huizinga (2001) document lower returns on assets for foreign banks in the US, Canada, the UK, Germany, France, and the Netherlands. De Young and Nolle (1996) analyze this phenomenon for the US market and find evidence that foreign banks sacrifice profits in exchange for larger market share. At the same time, Bonin et al. (2005) show that foreign banks in most of the transition countries enjoy higher profitability than domestic banks. However, Majnoni et al. (2003), in their study of the Hungarian banking market, underline that a majority of well-performing foreign institutions were created as greenfield investments and so did not inherit problems related to an inefficient branch network, underdeveloped IT, and low-quality clientele. Chmielewski and Krzesniak (2003) show that foreign banks in Poland underperform domestic banks in terms of return on assets.

The literature on determinants of bank profitability is very extensive, however the majority of papers focus on markets with low presence of foreign banks. Many recent studies take into account the large share of foreign banks' assets in transition countries and include foreign ownership characteristic as one of the profitability determinants (Bonin et al., 2005; Demirguc-Kunt and Huizinga, 1999; Majnoni et al., 2003; Chmielewski and Krzesniak, 2003). However, most of these studies assume that profitability of domestic and foreign banks is influenced by the same factors. As a result, the analyses are performed on

pooled data. In reality, foreign banks are subject to two processes. Besides competing with domestic banks in their host countries they are part of multinational institutions and, therefore, can be affected by business conditions in their home countries and by strategy decisions of their parent banks.

The only studies that take into account international factors as profit determinants of foreign banks are the ones of Williams (1998a, 1998b, 2003), who tests a number of hypotheses concerning profitability of foreign banks in Australia. The results of these studies show that domestic factors add only a limited descriptive power to the model, albeit they offer important insights into foreign banks' strategic and policy decisions (Williams, 2003). Among international factors affecting foreign banks in Australia the most important are home-country GDP growth² (Williams, 2003) and home NIM (Williams, 1998a), which both have a positive impact on foreign banks' profits in Australia. There is also limited support for the defensive expansion hypothesis, especially for the brief period after the opening of the Australian banking market to foreign bank entry.

A number of papers investigate the relationship between assets growth and profitability. It is natural to assume that an efficient bank would lower its prices, and thus gain additional market share, or it might choose to convert its superior efficiency into higher profits and forgo the opportunity for growth (Goddart et al., 2004). This is a particularly important issue for foreign banks that are interested in gaining a larger market share, and a few papers show that foreign banks in transition and developing countries exhibit higher and less volatile loan growth that continues even during crisis periods (de Haas and Lelyveld, 2005; Goldberg et al., 2002).

DeYoung and Nolle (1996) directly investigate the relationship between asset growth and profitability of foreign banks in the US and conclude that foreign banks might have placed growth ahead of profitability. The study shows that foreign banks do not succeed in developing a relationship with retail customers and therefore have to rely on expensive purchased funds. These results are also confirmed for the Australian market (Williams, 1998a, 1998b, 2003). Alternatively, Molyneux and Seth (1998) find that growth has a positive impact on profits of foreign banks in the US.

² The literature on the relationship between home countries conditions and loan growth of foreign banks is much larger, but the evidence that it provides is ambiguous. Peek and Rosengren (1997) and Jeanneau and Micu (2002) document positive relationship between home country GDP growth and expansion abroad, whereas de Haas and Lelyveld (2005) provide prove to the contrary and show that when banks face problems at home, they try to diversify and expand abroad.

In the analysis of foreign banks, it is important to take into account the transition period, which helps us understand whether higher/lower profitability of foreign banks is acquired or created. The most interesting study in this field is Berger et al. (2005). The authors control for static, selection and dynamic effects of foreign ownership in Argentina and find that foreign banks select slightly less profitable institutions and do not improve their performance afterwards. Peek and Rosengren (1999) focus on the transition period of foreign bank subsidiaries in the US and attempt to explain their poor performance. Their results indicate that banks targeted by foreign acquirers exhibit lower profitability prior to acquisition, during the transition period, and in the long run after the change of ownership. Contrasting results are presented by Majnoni et al. (2003), which does not control for the years before the acquisition, but shows that the profitability of Hungarian banks increases in the first four years after acquisition by foreign investors and remains positive in the long run.

De Haas and Naaborg (2005) present an interesting analysis of foreign banks in transition economies, which is based on focused interviews with managers of foreign parent banks, their affiliates, and central bank officials in the CEEC. They document a number of channels through which the conditions in the home country could have an affect on the profitability of foreign subsidiaries. For example, the National Bank of Poland points out that due to the poor economic situation in Germany, some German banks were transferring subsidiaries' profits to the German head office though extraordinarily high dividends. The Hungarian Central Bank mentions a scenario in which a foreign bank, due to problems in the home market, may not be willing to provide capital support to its subsidiary. Moreover, parent bank's increased risk premium may be translated into higher funding costs for the local subsidiaries.

The literature on bank profitability is closely related to the literature on the determinants of banks' net interest margin (NIM). From a wide pool of work on this topic, one could single out a recent paper that compares NIM determinants for foreign and domestic banks. Martinez Peria and Mody (2004) analyze the impact of the increased foreign bank ownership and the simultaneous increase in industry concentration on bank spreads for the South American countries. They find that foreign banks, in particular greenfield institutions, charge lower interest margins. One of the most interesting findings of this study is that foreign and domestic banks react differently to the same market developments: greater market concentration widens spreads more for domestic than for foreign banks.

4 Data

In our study we use a sample of 265 banks from Bulgaria, the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovakia, Slovenia and the data ranges from 1995 to 2003. All balance sheet and income statement data is taken from Bureau van Dijk's BankScope database. We use unconsolidated statements whenever possible but rely on consolidated statements otherwise. We include in our sample commercial and savings banks but exclude investment banks, micro-finance banks and development banks. Merged banks are considered as two entities before merger and one entity after merger.

In order to answer our research question, it is crucial to obtain the appropriate information on bank ownership (BankScope database lacks historical ownership data). For the years 1994-2001 we use the information kindly provided by de Haas and Lelyveld from de Nederlandsche Bank. We determined bank ownership for the two remaining years on the basis of banks' official publications and central bank reports. For the whole investigated period, a bank was considered foreign in a certain year if at least 51% of its capital was owned by foreign investors. We differentiate further between the two types of foreign ownership, namely takeover banks (i.e. institutions that were taken over by foreign banks) and greenfield banks (foreign banks that started operations as start-ups).

In addition, we used the BankScope database to obtain financial information on parent banks. Due to a lack of historical information, we identified the largest investor in each case in the BankScope database and checked other sources (newspapers, banks' annual reports, central banks' publications) for information on past changes of ownership. Here, we relied on consolidated balance sheets and income statements, since we are interested whether parent banks' financial health impacts subsidiaries in CEECs. The numbers of domestic, greenfield, and takeover banks in our sample are reported in Table 2.

The data on macroeconomic variables was taken from the International Financial Statistics, indices of banking reforms in CEECs from the EBRD Transition Report, and stock market capitalization from national stock exchanges. We use macroeconomic data for all host countries as well as for home countries of foreign banks. A host country is defined as a country where a bank is operating and the home country is the country of its parent bank. We include the following home countries in our sample: Austria, Belgium, Denmark, Finland, Germany, Greece, Hungary, Japan, Latvia, Italy, Netherlands, Portugal, Russia, Sweden, the UK, and the US. Since many parent banks are large multinational in-

stitutions that operate beyond their home countries, we also decided to use an alternative definition of home area and to use macroeconomic data for the EU instead of individual home countries.

We perform the necessary steps to ensure consistency of our dataset. First, we remove banks for which BankScope does not report any financial information. We also eliminate observations with the 1% smallest and largest values of return on assets and capitalization³. As a result, we obtain a database with 1314 bank-year observations. Comparison with data published by the central banks of the respective CEEC reveals that our dataset covers 84% of total banking assets on average. Table 3 presents a correlation matrix for our variables.

Table 4 presents summary statistics of ROA for banks of three types of ownership: domestic, takeover, and greenfield. The data is presented for each host country separately, and we show number of observations, mean, standard deviation, and p-value for t-test of equality of means. The results indicate that, on average, foreign banks are more profitable than domestic banks. However, the results are clearly driven by greenfield banks that enjoy ROA at least twice the size of that for domestic banks. Takeover banks also enjoy higher profits than domestic banks, but the t-statistic on equality of means does not show a significant difference. Furthermore, the situation varies greatly across the countries. In Bulgaria, the Czech Republic, Estonia, Hungary, Latvia, and Slovakia, both takeover and greenfield banks show higher ROA than do domestic banks. On the other hand, in Romania and Slovenia foreign banks' profits are not just lower than those for domestic banks; they are even negative.

In Table 5 we show the profitability of foreign banks in CEECs and profitability of their parent banks in their home countries. Again we present calculations for each host country separately, and we show number of observations, mean, standard deviation, and p-value for t-test of equality of means. The results indicate that it is very profitable for foreign banks to diversify into the Central and Eastern European banking markets, because their subsidiaries in these countries earn higher profits than the parent banks on their own. Again the situation is different across countries. While it is profitable to invest in most of the countries, in some countries, such as Lithuania and Romania, the profits of foreign banks are negative.

³ This step is motivated by quality of data. Some of the values of ROA and NIM were absurd and therefore we decided to trim the data in order to exclude unreasonable values of variables.

5 Econometric methodology

We proceed in two steps. To answer the first question “Did foreign banks acquire more or less profitable institutions in CEECs?”, we estimate a logit model with *year_of_takeover* as a dependent variable:

$$year_of_takeover_{ijt} = \begin{cases} 1 & \text{with probability } \Pr(year_of_takeover_{ijt} = 1) = P \\ 0 & \text{with probability } \Pr(year_of_takeover_{ijt} = 0) = 1 - P \end{cases} \quad (1)$$

We use a logistic distribution to define the logit model:

$$\Pr(year_of_takeover_{ijt} = 1) = \Lambda(\alpha'x) = \frac{e^{\alpha'x}}{1 + e^{\alpha'x}} \quad (2)$$

with x denoting the vector of explanatory variables and α the vector of coefficients.

Therefore, the first model that we estimate is the following:

$$\begin{aligned} \Pr(year_of_takeover_{ijt} = 1) = \Lambda(\alpha_0 + \alpha_1 \times ROA_{ijt} + \alpha_2 \times loan_gr_{ijt} + \alpha_3 \times h_cap_{ijt} + \\ + \alpha_4 \times h_inf_{jt} + \alpha_5 \times REER_{jt} + \alpha_6 \times h_gdp_{jt} + \alpha_7 \times h_irate_{jt} + \alpha_8 \times credit_{jt} + \alpha_9 \times EBRD_{jt} + \\ + \alpha_{10} \times stock_{jt} + \alpha_{11} \times share_{ijt} + \alpha_{12} \times HHI_{jt} + \alpha_{13} \times crisis_{jt}) \end{aligned} \quad (3)$$

where the variables are as explained in Table 6.

The estimation is performed on the pooled sample without fixed effects, because logit estimation with fixed effects would result in deletion of banks that have not been taken over⁴. Our sample includes all banks except greenfields because these, by definition, have never been acquired by foreign investors. Three models are estimated with dependent variables for year of takeover, year before takeover and two years before takeover.

In order to answer the remaining four questions, we investigate the relationship between banks' return on assets and five groups of variables: a) individual banks' characteristics; b) host country macroeconomic conditions; c) indicators of bank market structure and development of the stock market; d) parent banks' performance indicators; e) home country macroeconomic conditions.

The baseline model that we test takes the following form:

$$\begin{aligned}
 ROA_{ijt} = & \beta_0 + \beta_1 \times loan_gr_{ijt} + \beta_2 \times h_cap_{ijt} + \beta_3 \times h_inf_{jt} + \beta_4 \times REER_{jt} \\
 & + \beta_5 \times h_gdp_{jt} + \beta_6 \times h_irate_{jt} + \beta_7 \times credit_{jt} + \beta_8 \times EBRD_{jt} + \beta_9 \times stock_{jt} \\
 & + \beta_{10} \times share_{ijt} + \beta_{11} \times HHI_{jt} + \beta_{12} \times foreign_{ijt} + \beta_{13} \times crisis_{jt} + \beta_{14} \times p_NIM_{ijt} \\
 & + \beta_{15} \times p_cap_{ijt} + \beta_{16} \times p_gdp_{ijt} + \beta_{17} \times p_irate_{ijt} + \eta_i + \mu_j + \gamma_t + home\ e'_{ijt} + \varepsilon_{ijt}
 \end{aligned} \tag{4}$$

where the variables are as explained in Table 6.

Estimation of the above equation with an ordinary least squares (OLS) approach may be simple, but would be deceiving in our case. Taking into account our data characteristics, it is plausible to assume that the level of dependent variable varies consistently with the cross-section (i.e. bank), home/host country or time period. As a result, it is necessary to use appropriate panel data techniques.

The first step in our analysis is to ascertain the nature of bank-specific effects, that is to determine whether they are correlated with explanatory variables. This issue is very important as improper specification of individual effects can result in estimates that are biased and inconsistent. In order to determine the nature of individual effects, we perform a Hausman test⁵. Its results indicate (for all specifications) that the individual effects are indeed correlated with independent variables. Hence, we choose a fixed effect model, controlling for bank-specific effects. Additionally, in all specifications we include dummies that control for home country-, host country-, and time-specific effects.

The next issue that we need to tackle is the possibility of heterogeneity and autocorrelation in the error term. We perform two tests: a modified Wald test for group-wise heteroscedasticity and the Wooldridge (2002) test for serial correlation. The statistics obtained indicate that both the variance of error terms is not constant across banks and that there is autocorrelation of order 1 (i.e. an AR1 process) in the residuals. Consequently, we choose the fixed effect model with Newey-West standard errors and an AR1 process in the error terms

⁴ Since only 56 banks were taken over by foreign investors in our sample, the number of observations would shrink from 912 to 314.

⁵ The values for Hausman tests are reported in the last line of Tables 9-10.

6 Empirical results

In this section we attempt to answer the questions that we posed in the Introduction.

Did foreign banks acquire more or less profitable institutions?

Descriptive statistics in Table 4 show that takeover banks enjoy ROA of 0.51%, whereas domestic banks earn 0.45%. Therefore, the question that comes to mind is whether foreign banks earned their higher profitability or inherited it when they took over a bank. To answer this question we run logit regressions. The results are presented in Table 7. We estimate three models with dependent variables for year of takeover (first model), year before takeover (second model) and two years before takeover (third model).

The estimations have low explanatory power and the significance of coefficients is not consistent for the three estimated models. However, it does allow us to draw conclusions about institutions which were acquired by foreign investors. First of all, foreign investors looked for banks with large market share, as this variable is positive and strongly significant across all models. Second, we can conclude that timing of acquisitions was important, since domestic banks were acquired during economic downturns when their profitability was low. This reflects the situation in some of the CEECs, where foreign banks were restricted in takeovers to failing institutions (Poland between 1993-1997) or were allowed to enter only after the crises (Bulgaria and Romania). Interestingly, two years prior to takeovers, profitability of target banks was significantly higher than for banks that remained domestic.

Our next step is to investigate profit determinants separately for all, and individually for domestic, greenfield, and takeover banks. The results are presented in Table 8. There are two columns entitled All banks and in the first column we include a foreign dummy to analyze an effect of foreign ownership on ROA, as is usually done in the literature, and in the second column we include greenfield and takeover dummies to control for the entry mode of foreign banks. The results of these two regressions show that greenfield banks exhibit higher profitability than domestic banks, whereas the effect of the takeover dummy is not statistically significant. Among other profit determinants, we observe the positive effect of capitalization, inflation, GDP growth, market concentration and banking sector reform, whereas loan growth and capital market capitalization have all negative impact on ROA. We can conclude that the higher profitability of greenfield banks that we no-

ticed in the descriptive statistics (Table 4) does not disappear when we control for other profitability determinants⁶. Our findings for all banks are broadly in line with the existing literature on profit determinants and therefore are not discussed here in detail.

Further, the results are presented for domestic banks (column 3, Table 8) and foreign banks (column 4, Table 8). Moreover, we can now compare profitability determinants between greenfield banks (column 5, Table 8) and takeover banks (column 6, Table 8).

Are foreign and domestic banks affected in the same way by macroeconomic conditions in their host countries?

One of the advantages of foreign bank ownership could be their smaller sensitivity to macroeconomic conditions in host countries. To test this hypothesis we included such variables as GDP growth, inflation, real interest rate, and change in real effective exchange rate (REER) in the host country.

As expected, domestic banks react positively to business cycles and this effect is significant at the 1% level. In support of our hypothesis, foreign banks are not influenced by business cycles of their host countries. Moreover, GDP growth affects profitability of greenfield banks in a countercyclical manner: greenfield banks have higher ROA during economic downturns, and lower ROA during upswings. There could be a few possible reasons for this. First, greenfield banks might charge higher interest rates during economic downturns to compensate for the increased risk, which would lead to higher profits, other things being equal (Martinez Peria and Moody., 2004). Second, they can use their loan loss provisions counter-cyclically, increasing them in good times and reducing them in bad times. Finally, greenfield banks might receive more support from parent banks during economic downturns in host countries. This may be related to greenfield banks' strategy of building up market shares during economic downturns, when domestic banks usually reduce their lending (de Haas and Lelyveld, 2005).

As to other macroeconomic variable, such as inflation, we also observe different reactions for domestic and foreign banks. Profits of domestic banks are not affected by infla-

⁶ During the presentation at the National Bank of Poland, we were suggested that the higher profitability of greenfield institutions stems from the fact that they bring to the market a new product. As other banks follow them and also include this product into their services, the abnormal positive returns should disappear with time. We tested this hypothesis by including an age variable for greenfield banks, but the results were not significant, indicating that the profitability did not change during the analyzed period.

tion, whereas we observe a positive relationship between greenfield banks' ROA and inflation. Our finding that profits of some banks react positively to inflation confirms other profitability studies, and it is a well-known fact that adroitly managed banks profit from inflation, due to the lag between the raising of their lending and deposit rates.

All banks except greenfields react positively to changes in the REER. It was difficult to foresee the direction of this relationship from balance sheet analysis of banks, because the assets and liabilities in foreign currency were in proportion to each other in most countries. Since the data on maturity of these items was not available, and given that large parts of both assets and liabilities were denominated in foreign currencies, the real effect of currency fluctuations on profits was unpredictable (Baudino et al., 2004). In addition to this direct impact, banks may have suffered indirectly from exchange rate movements. During the period studied, most local currencies in our samples appreciated and this might have made it more difficult for exporting clients to repay loans, thus affecting banks' profits. As our results show, banks in CEECs benefited from appreciation of their currencies, suggesting that their foreign currency liabilities had longer maturity than assets⁷. The reason why greenfield banks are not influenced by exchange rate fluctuations can be attributed to the use of instruments for hedging against foreign exchange risk.

Are foreign banks sensitive to macroeconomic conditions in their home countries and to their parent banks' financial situation?

In order to answer this question we included in our econometric model characteristics of parent banks and home countries of parent banks. Our findings show that foreign banks in CEECs are not sensitive to economic conditions in their home countries. Since the majority of foreign banks that are present in CEECs belong to multinational institutions that operate beyond their home countries, it would be better to include macroeconomic variables for the whole EU, rather than for individual countries. We perform this robustness check, but still we do not observe any significant impact of home area macroeconomic conditions on foreign banks' performance (the results are available from authors upon request). It should be mentioned that Williams (2003) introduces home country GDP growth into his model and treats it as a proxy for an opportunity cost of accessing the host

nation. He finds a positive association between home GDP growth and foreign bank profits and interprets it as a substitution effect between international banking and multinational banking. This substitution occurs as a result of home GDP growth producing increased demand for offshore banking services that are serviced by the Australian subsidiary rather than by the parent.

Concerning the financial situation of the parent banks, our findings show that greenfield banks are affected by strategies pursued by their parent banks. Specifically, we observe that greenfield banks in CEECs improve their profitability when their parent banks' NIM goes down. This finding is contrary to the results of Williams (2003), who finds a positive relationship between ROA of foreign banks and NIM of their parent banks, explaining that only profitable banks can channel funds to their subsidiaries. However, low parent NIM can also result from a lack of profitable opportunities in the home market or a very competitive banking environment. Therefore, such banks may seek opportunities abroad, which would explain the negative coefficient of parent NIM in our regression. Such a finding is logical in light of statements of managers of international banks, who admit that they allocate capital to subsidiaries with the highest expected returns (de Haas and Naaborg, 2005). We also estimated our model with parent ROA as an explanatory variable, and the coefficient turned out to be positive, albeit not significant (the results are available from the authors upon request). This provides further support for our hypothesis that low NIM is a sign of tight competition and not of low profitability.

Does market concentration in host countries have the same impact on foreign and domestic banks?

The increase in foreign bank ownership in CEECs went hand in hand with the rise in banking market concentration. According to the structure-conduct-performance (SCP) paradigm, higher market concentration causes less competitive bank behavior⁸ and leads to

⁷ As it was pointed to us by Iikka Korhonen, our results can be explained by the fact that exchange rate appreciation is usually associated with many kinds of positive developments in the economy, eg higher credibility of economic policies, better institutions, etc.

⁸ The relationship between market concentration and competition can be more complex. Claessens and Laeven (2004) estimate degree of competition in 50 developed and developing countries and demonstrate that more concentrated banking markets actually entail more competition than do less concentrated markets. Similarly, the number of banks is never significantly positively related to the competition indicator. Berger et al. (2004) offer a good review of current theoretical and empirical research on the relationship between bank concentration and competition.

higher bank profitability (see Gilbert, 1984, for a survey). In our study we would like to see whether there are differences in the way foreign and domestic banks react to higher market concentration or own market share. It is particularly interesting in our case, because the foreign ownership contributed to higher concentration of banking markets through two channels: 1) foreign banks acquiring a few domestic institutions and merging them into one; 2) domestic institutions consolidating because of competitive pressures from foreign peers.

Similar to our previous findings, we observe differences in reactions of domestic and foreign banks. Domestic banks enjoy higher profits in more concentrated markets, indicating that the structure-conduct-performance paradigm holds for them. At the same time, foreign banks do not seem to profit from these factors, and the results hold for takeover and greenfield banks. Our results are in line with Martinez Peria and Mody (2004) who, in their study of foreign and domestic banks in Latin America, documented that greater market concentration widens spreads more for domestic banks than for foreign ones. The possible reason for this is that foreign banks charge lower interest rates in order to attract new customers and achieve the desired size.

How does the development of the stock market affect profits of foreign and domestic banks?

Capital markets can perform a complementary or a substitution function for the banking sector. On the one hand, the Miller-Modigliani theorem states that debt and equity finance are pure substitutes in the absence of taxes and bankruptcy costs. Therefore, we would expect to see a negative impact of deep stock markets on banks' profits (substitution effect). On the other hand, as capital markets develop, banks get more information about clients, which facilitates the tasks of selecting and monitoring clients. Therefore, deep stock markets could help to mitigate problems of adverse selection and moral hazard and increase banks' profits (complementary effect). We test these hypotheses by including the measure of size of the national stock markets, while controlling for possible changes in the access to bank credit with indicators of the size of private credit market and EBRD index of banking sector reform.

Our finding of a negative relationship between profits of all types of banks and stock market capitalization shows that the substitution effect dominates. The stock market

exerts competitive pressure on all banks and there is no significant difference in the reaction for takeover, greenfield and domestic banks. This result is interesting since foreign banks, in particular greenfield institutions, are often accused of reducing loan supply to small and medium enterprises and of cherry picking the best customers. If this was the case, their profits would be the most affected by availability of alternative sources of finance i.e. equity and debt finance raised on the stock market. We do not find such an effect, however.

7 Summary

This paper contributes to the literature on benefits and costs of foreign bank ownership in transition economies. We investigate the determinants of banks' profitability using a dataset comprising 265 banks from 10 CEECs between 1995-2003. Since our interest is in the profitability determinants of banks with different ownership, we estimate the model for the whole sample and separately for the domestic, foreign, takeover, and greenfield banks. We study the relationship between banks' return on assets and five groups of variables: a) individual banks' characteristics; b) host country macroeconomic conditions; c) indicators of bank market structure and development of stock markets; d) parent banks' performance indicators; e) home country macroeconomic conditions for parent banks.

Our findings show that greenfield banks perform better than domestic and takeover banks in terms of ROA. Interestingly, the profitability of takeover banks is not significantly different from that of domestic banks. This finding is surprising in light of previous literature which shows that foreign banks possess superior technology and are better at mitigating risks. However, it should be mentioned that most of the literature on foreign bank ownership does not differentiate between mode of foreign bank entry – namely, greenfield and takeover banks. Our further analysis shows that relatively low profitability of takeover banks may reflect policy decisions of some countries to allow foreign bank entry only after crises, which resulted in foreign banks taking over less profitable institutions. We also find that it is profitable for international banks to open subsidiaries in transition economies, since in CEECs ROA for foreign banks significantly exceeds that for parent banks in home countries.

Our findings indicate that foreign banks possess one very important advantage in comparison to domestic banks, namely their profits are not negatively affected by economic downturns of their host countries. On the contrary, greenfield banks are able to increase their profitability when GDP growth slows down in CEECs, enhancing banking sector stability. However, the reasons for this are not clear and there could be several explanations for counter-cyclical behavior of banks' profits. First, greenfield banks might charge higher interest rates during economic downturns, to compensate for higher risk, and this strategy would have an adverse effect on companies. Second, greenfield banks might receive extra financing from their parent companies during economic downturns, contributing to the stability of credit supply. It would be an interesting and important question for further analysis.

One of the possible dangers of foreign bank ownership is the dependence of foreign institutions on the performance of their parent banks and their sensitivity to macroeconomic conditions in their home countries. Our study does not find evidence to support these fears. To the contrary, our results indicate that foreign banks in CEECs do not react to changes in macro-environment in their home countries. However, parent banks seem to increase their financing of CEECs subsidiaries when their own margins shrink. This finding is logical and is also confirmed by managers of international banks, who admit to allocating capital to subsidiaries with the highest expected returns.

The increase in foreign bank ownership in the CEEC went hand in hand with increased banking market concentration. It is a well known fact that banks earn higher profits in more concentrated markets, which are usually associated with a less competitive environment. Our results show that foreign banks' profits are not affected by market concentration, whereas domestic banks find it more profitable to operate in such markets. The possible reason for this is that foreign banks charge lower interest rates in order to attract new customers and achieve the desired size.

Our paper shows that it is very important to analyze not only foreign and domestic banks separately, but also to distinguish between two modes of entry of foreign banks: establishing a greenfield institution, or taking over an existing domestic bank. Most of the literature on foreign banks ignores this division, but our study shows that greenfield and takeover banks react differently to the same factors. Of course, the present paper is not without the usual shortcomings. The most important drawback is the lack of possibilities to distinguish the channels through which various profitability determinants affect greenfield,

takeover and domestic banks. It would also be interesting to compare profitability determinants of foreign banks in CEECs with those in other areas with high foreign bank presence, such as Latin America and Asia.

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Table 1. Market share (%) and total assets (in EURO) of major international banks in CEECs, 2003

	Market share in each country (% of total country bank assets)										Total assets in CEECs (in EUR thousands)	
	BG	CZ	EE	HU	LT	LV	PL	RO	SI	SK		
KBC Bank NV			25.48		10.2			5.24				30287910.3
Erste Bank Sparkasse			25.88		6.77						24.26	28534848.9
HVB Group	10.13		5.55		5.66	2.75		10.77	3.4	4.21	5.74	22196820.6
Société Générale	4.01		19.18						15.2	7.51	0.43	19116304.9
Unicredito Italiano	17.11		2.06					14.03	1.32		4.51	18746734.5
Raiffeisen	5.13		3.86		5.9			1.96	7.94	2.35	20.97	14762549.2
Citibank a.s.			2.94		2.58			7.58	3.14		3.05	12463970.1
Banca Intesa SpA					7.58						22.28	8760961.68
ING Bank NV	1.32				2.27			6.45				7932755.62
Commerzbank AG					1.04			6.72				7410738.56
Swedbank				62.8		28.82	17.5					6929075.57
Allied Irish Banks plc								5.38				5478194.61
Skandinaviska Enskilda				26.8		38.46	16.2					5248655.36
Bayerische Landesbank					8.12							4413335.91
Millennium								4.32				4399315.47
GE Capital Bank			2.43		2.77							3358344.92
Oesterreich. Volksbanken	14.45		0.80		1.08				0.98	1.30	3.17	2299759.63
San Paolo IMI					1.41				0.44	5.65		2105390.66
ABN AMRO Bank								0.75	5.65			1621319.39
Deutsche Bank					0.56			1.28				1601328.95
Crédit Lyonnais			0.85		0.89			0.28			0.87	1600961.57
National Bank of Greece	10.94								1.18			1302810.6
BNP Paribas	1.47				1.10			0.52				1275444.42
Bank für Arbeit und Wirtsch.			0.59								3.22	1120549.06
Gazprombank Group					2.01							1094768.34
NORD/LB						12.43	4.04					1077680.99
Fortis								1.02				1039485.02
Credit Agricole					0.06			0.88				934484.246
Nordea								0.90				917856.657
WestLB					0.68			0.48				862762.533
Rabobank								0.81				828800.036
EFG Eurobank Ergasias									4.95			748297.926
Sampo Bank Plc				7.67		3.80	0.46					726243.31
DEXIA											3.08	640902.475
Alpha Bank								3.98				601215.733
Dresdner Bank AG			0.78									593741.997
Hypo Alpe-Adria Bank AG										1.60		360962.134
Danske Bank A/S								0.28				281109.751
United Gulf Bank							2.99					242900.302
Korea Development Bank					0.41							222081.081
DZ Bank AG								0.21				214696.949
MDM Bank								2.5				203021.148
Piraeus Bank									1.16			176008.215
Bank of Tokyo - Mitsubishi								0.11				115168.412
Emporiki Bank of Greece		0.51							0.36			106824.435
Meinl Bank AG											0.41	85684.1339
GMAC Bank					0.07							40266.0618
Bank of Moscow								0.39				31873.1118
Egnatia Bank									0.18			27933.0444
Total foreign assets	65.06	90.4	97.4	61.19	86.25	44.1	73.97	45.9	22.62	91.98		

Source : BankScope and authors' calculations

Table 2. Number of greenfield, takeover and domestic banks in the sample for each country, 1995-2003

	1995	1996	1997	1998	1999	2000	2001	2002	2003
Bulgaria									
Greenfield			3	3	4	5	5	5	5
Takeover				1	3	5	7	8	10
Domestic	5	6	10	19	14	16	13	13	11
Total	5	6	13	23	21	26	25	26	26
Czech Republic									
Greenfield	6	11	12	10	12	12	11	10	8
Takeover				2	2	3	5	6	6
Domestic	7	11	12	10	12	12	10	9	8
Total	13	22	24	22	26	27	26	25	22
Estonia									
Greenfield									
Takeover					2	2	3	3	3
Domestic	7	9	11	4	2	3	2	3	4
Total	7	9	11	4	4	5	5	6	7
Hungary									
Greenfield	5	12	14	12	17	17	12	13	13
Takeover		4	7	8	8	10	11	12	11
Domestic	7	10	10	7	8	9	9	7	7
Total	12	26	31	27	33	36	32	32	31
Lithuania									
Greenfield									
Takeover					3	3	6	7	7
Domestic	2	2	10	10	6	6	3	2	2
Total	2	2	10	10	9	9	9	9	9
Latvia									
Greenfield			1	1	1	1	2	2	2
Takeover			3	3	4	4	5	5	5
Domestic	5	10	19	17	15	15	12	14	14
Total	5	10	23	21	20	20	19	21	21
Poland									
Greenfield	2	9	11	12	12	10	12	12	11
Takeover		1	4	5	7	11	14	14	14
Domestic	20	29	28	23	24	19	15	13	12
Total	22	39	43	40	43	40	41	39	37
Romania									
Greenfield	1		1	7	9	8	8	9	9
Takeover				1	2	2	4	5	8
Domestic	4	3	5	12	12	15	13	12	9
Total	5	3	6	20	23	25	25	26	26
Slovenia									
Greenfield	2	4	5	4	4	4	4	4	4
Takeover				1	1	1	1	2	2
Domestic	6	14	23	15	15	15	13	10	11
Total	8	18	28	20	20	20	18	16	17
Slovakia									
Greenfield	1	6	8	8	7	8	6	6	6
Takeover		1	1	2	2	2	5	7	8
Domestic	3	9	9	8	8	9	6	4	3
Total	4	16	18	18	17	19	17	17	17
Total	83	151	207	205	216	227	217	217	213

Source: authors' calculations.

Table 3. Correlation matrix of variables

	Roa	Loan growth	Capital	Host inflation	REER	Private credit	Stock market
loan growth	-0.0455* 0.1046	1.0000					
capital	0.1954*** 0.0000	0.0701*** 0.0124	1.0000				
host inflation	0.0857*** 0.0022	-0.0028 0.9216	0.0615*** 0.0284	1.0000			
reer	0.0298 0.2889	0.0155 0.5815	0.0245 0.3820	0.1563*** 0.0000	1.0000		
private credit	-0.0297 0.2895	0.0408 0.1461	-0.3176*** 0.0000	-0.1185*** 0.0000	-0.1117*** 0.0001	1.0000	
stock market	-0.1228*** 0.0000	0.0311 0.2673	-0.3144*** 0.0000	-0.1488*** 0.0000	-0.0183 0.5140	0.4926*** 0.0000	1.0000
share	0.0749*** 0.0075	-0.0177 0.5288	-0.0960*** 0.0006	0.0021 0.9396	0.0009 0.9753	-0.0389 0.1661	0.0471* 0.0934
HHI	-0.0329 0.2409	0.0121 0.6661	0.0538** 0.0551	0.1150*** 0.0000	-0.0340 0.2261	-0.0594** 0.0343	0.1151*** 0.0000
EBRD	0.0550** 0.0499	-0.0435 0.1212	-0.2501*** 0.0000	-0.1507*** 0.0000	-0.0509* 0.0696	0.3320*** 0.0000	0.511*** 0.0000
host gdp	0.0255 0.3630	0.0080 0.7756	0.0766*** 0.0063	-0.2684*** 0.0000	-0.0681** 0.0152	-0.1743*** 0.0000	-0.0948*** 0.0007
host interest rate	-0.0519* 0.0645	0.0435 0.1206	-0.0136 0.6279	-0.6361*** 0.0000	-0.3264*** 0.0000	0.0430 0.1252	0.1893*** 0.0000
crisis	0.0177 0.5288	0.0827*** 0.0032	-0.0397 0.1568	0.1843*** 0.0000	-0.0114 0.6833	0.2909*** 0.0000	0.1173*** 0.0000
foreign	0.1004*** 0.0003	0.0279 0.3208	-0.0232 0.4093	-0.0356 0.2050	-0.0450 0.1090	0.1025*** 0.0003	0.1900*** 0.0000
greenfield	0.1265*** 0.0000	0.0429 0.1264	0.0062 0.8261	0.0057 0.8397	0.0052 0.8536	0.1401*** 0.0000	0.1319*** 0.0000
takeover	-0.0635** 0.0235	-0.0071 0.8016	0.0272 0.3324	-0.0161 0.5668	0.0387 0.1678	-0.0857*** 0.0022	-0.0161 0.5663

Source: authors' calculations.

The table presents correlation coefficients and p-values (below).

Table 3. (continued)

	share	HHI	EBRD	host gdp	host interest rate	crisis	Foreign	greenfield
share	1.0000							
HHI	0.3822*** 0.0000	1.0000						
EBRD	-0.0329 0.2412	-0.2341*** 0.0000	1.0000					
host gdp	0.0278 0.3214	-0.1222*** 0.0000	0.1389*** 0.0000	1.0000				
host interest rate	-0.0785*** 0.0051	-0.0902*** 0.0013	0.0276 0.3249	-0.0019 0.9467	1.0000			
crisis	-0.0110 0.6958	0.1310*** 0.0000	-0.3724*** 0.0000	-0.3010*** 0.0000	0.1423*** 0.0000	1.0000		
foreign	-0.0696*** 0.0131	-0.1217*** 0.0000	0.2289*** 0.0000	-0.0557** 0.0471	0.0913*** 0.0011	-0.0204 0.4662	1.0000	
greenfield	-0.2072*** 0.0000	-0.1319*** 0.0000	0.1071*** 0.0001	-0.1237*** 0.0000	0.0636** 0.0233	0.0640** 0.0224	0.6814*** 0.0000	1.0000
takeover	0.1038*** 0.0002	0.0556** 0.0473	-0.0342 0.2232	-0.0113 0.6883	-0.0078 0.7817	-0.0601** 0.0321	-0.1817*** 0.0000	-0.1343*** 0.0000

Source: authors' calculations.

The table presents correlation coefficients and p-values (below).

Table 4. ROA summary statistics across countries for domestic, takeover, and greenfield banks

		Obs	Mean	SE	p
BG					
	Domestic	107	.6558566	.2829711	
	Takeover	34	1.454849	.2518847	0.1285 ¹⁾
	Greenfield	31	.6938736	.5527204	0.9499 ²⁾
CZ					
	Domestic	91	-.5750697	.3040346	
	Takeover	24	.5741756*	.1385942	0.0572
	Greenfield	92	.6921108***	.0819694	0.0001
EE					
	Domestic	45	.5181833	.3577561	
	Takeover	13	1.988132**	.4150511	0.0415
HU					
	Domestic	74	.3601863	.3733726	
	Takeover	71	.645355	.2614683	0.5356
	Greenfield	117	1.338424***	.1797593	0.0094
LT					
	Domestic	43	.0716656	.4323982	
	Takeover	26	.1032947	.3850739	0.9603
LV					
	Domestic	121	.4463572	.3413123	
	Takeover	29	.2353111	.5803292	0.7798
	Greenfield	11	-.0749772	1.032353	0.6579
PL					
	Domestic	183	.9150912	.1581944	
	Takeover	70	.608775	.1605317	0.2656
	Greenfield	92	1.013181	.212223	0.7158
RO					
	Domestic	85	.1464177	.4669642	
	Takeover	22	-2.253989**	1.286483	0.0352
	Greenfield	53	1.359179*	.2994528	0.0592
SI					
	Domestic	122	.9818168	.0945078	
	Takeover	8	-.2025359***	.6308978	0.0037
	Greenfield	35	.5784625*	.1979756	0.0518
SK					
	Domestic	59	-.6027444	.3899188	
	Takeover	28	.1523465	.3145403	0.2171
	Greenfield	56	1.444385***	.1807485	0.0000
All					
	Domestic	930	0.4471487	0.0943517	
	Takeover	325	0.5124488	0.1284826	0.7062
	Greenfield	487	1.041758***	0.0854614	0.000

Source: authors' calculations.

¹⁾ p-value represents the result of t-test on equality of means between domestic and takeover banks

²⁾ p-value represents the result of t-test on equality of means between domestic and greenfield banks

*** significant at 1%

** significant at 5%

* significant at 10%

Table 5. ROA summary statistics across countries for foreign banks in CEECs and their parent banks

		Obs	Mean	SE	P
BG	foreign	41	1.292071	0.2728769	
	parent	41	0.5854339**	0.1718999	0.0371 ¹⁾
CZ	foreign	95	0.6265304	0.0746778	
	parent	95	0.434994**	0.0418511	0.0194
EE	foreign	13	1.988132	0.4150511	
	parent	13	0.5709944***	0.0504242	0.0045
HU	foreign	138	1.019599	0.1497359	
	parent	138	0.273358***	0.1083372	0.0001
LT	foreign	16	-0.4189024	0.5848849	
	parent	16	0.6338209*	0.1126193	0.0938
LV	foreign	37	0.1594823	0.5377949	
	parent	37	1.04959	0.2513095	0.1208
PL	foreign	134	0.8201421	0.1245334	
	parent	134	0.397583***	0.0378949	0.0012
RO	foreign	57	-0.209271	0.582619	
	parent	57	0.7302416	0.1338082	0.1109
SI	foreign	39	0.369124	0.2162902	
	parent	39	0.3672993	0.0386734	0.9936
SK	foreign	78	1.073234	0.16756	
	parent	78	0.4983467***	0.0654325	0.0064
All countries	foreign bank	648	0.7612859	0.0788324	
	parent bank	648	0.4790887***	0.0334284	0.001

Source: authors' calculations.

¹⁾ p-value represents the result of t-test on equality of means between parent and foreign banks

*** significant at 1%

** significant at 5%

* significant at 10%

Table 6. Definitions of variables

Symbol	Description	Source of data
$year_of_takeover_{ijt}$	dummy variable taking the value 1 only in year t if bank i was acquired by foreign investor in year t	<i>De Haas & Lelyveld + own research</i>
ROA_{ijt}	return on assets of bank i in host country j in year t , calculated as ratio of profit after taxes to total assets	<i>BankScope</i>
$loan_gr_{ijt}$	real rate of growth of total loans of bank i in country j in year t	<i>BankScope</i>
h_cap_{ijt}	capitalization of bank i in host country j in year t , calculated as a ratio of registered capital to total assets	<i>BankScope</i>
h_inf_{jt}	rate of inflation in host country j in year t	<i>IFS</i>
$REER_{jt}$	change in real effective exchange rate in host country j in year t	<i>IFS</i>
h_gdp_{jt}	real rate of growth of GDP in host country j in year t	<i>IFS</i>
h_irate_{jt}	real short-term interest rate in host country j in year t	<i>IFS</i>
$credit_{jt}$	ratio of credit to the private sector to GDP in host country j in year t	<i>BSCEE</i>
$EBRD_{jt}$	EBRD index of banking sector reforms in host country j in year t	<i>EBRD transition report</i>
$stock_{jt}$	ratio of stock market capitalization to GDP in host country j in year t	<i>National stock exchanges</i>
$share_{ijt}$	share of assets of bank i in host country j in year t in total assets of banking sector in host country j in year t	<i>BankScope</i>
HHI_{jt}	Herfindahl index in host country j in year t , calculated as the sum of squared shares of assets	<i>BankScope</i>
$foreign_{ijt}$	dummy variable taking the value 1 if bank i in host country j in year t was owned by a foreign institution	<i>De Haas & Lelyveld + own research</i>
$takeover_{ijt}$	dummy variable taking the value 1 in year t and consecutive years if bank i was acquired by foreign investor in year t	<i>De Haas & Lelyveld + own research</i>
$greenfield_{ijt}$	dummy variable taking the value 1 in year t and consecutive years if bank i was established by foreign investor in year t	<i>De Haas & Lelyveld + own research</i>
$crisis_{jt}$	dummy variable taking the value 1 if country experiences a banking crisis or recapitalization of banks	<i>Caprio & Klingebiel</i>
p_NIM_{ijt}	net interest margin of parent bank in year t , calculated as a ratio of the difference between interest income and interest expenses to total assets	<i>BankScope</i>
p_cap_{ijt}	capitalization of parent bank of the bank i in country j in year t calculated as a ratio of registered capital to total assets	<i>BankScope</i>
p_gdp_{ijt}	real rate of growth of GDP in home country of the bank i in country j in year t	<i>IFS</i>
p_irate_{ijt}	real short-term interest rate in home country of bank i in country j in year t	<i>IFS</i>
η_i	dummy variable taking the value 1 for each bank i	
μ_j	dummy variable taking the value 1 for each host country j	
γ_t	dummy variable taking the value 1 for each time period t	
$home'_{ijt}$	a vector of dummy variables taking the value of 1 if parent banks comes from country $home$, which includes Austria, Belgium, Denmark, Finland, Germany, Greece, Hungary, Japan, Latvia, Italy, Netherlands, Portugal, Russia, Sweden, UK, and US	<i>BankScope + own research</i>

Table 7. Estimation results for logit model.

year_of_takeover	Year of takeover	One year before takeover	Two years before takeover
	(1)	(2)	(3)
ROA	-0.096** (0.050)	-0.069 (0.061)	0.111* (0.058)
loan growth	-0.001 (0.002)	0.0003*** (0.000)	-0.007** (0.003)
host inflation	-0.026** (0.011)	-0.007 (0.013)	-0.008** (0.004)
REER	0.032 (0.02)	0.009 (0.032)	-0.08** (0.036)
credit private	-0.04* (0.021)	-0.027* (0.015)	-0.037* (0.019)
stock market	-0.007 (0.019)	0.046** (0.021)	0.032 (0.028)
host GDP	-0.127* (0.074)	0.018 (0.05)	-0.144* (0.088)
host interest rate	-0.0002 (0.024)	-0.028 (0.027)	-0.076** (0.037)
EBRD	-0.039 (0.597)	-0.87* (0.468)	-0.788 (0.848)
HHI	0.974 (1.424)	-1.298 (1.776)	-3.685 (3.574)
crisis	-1.52 (1.273)	0.058 (.529)	0.789 (0.679)
share	0.026*** (0.009)	0.03*** (0.009)	0.021* (0.013)
cons	-1.213 (1.651)	0.099 (1.42)	1.627 (2.548)
Number of obs.	912	714	517
Log likelihood	-197.03	-170.71	-117.56
Pseudo R2	0.064	0.058	0.082

Source: authors' calculations.

Dependent variable is takeover, which takes the value 1 if a bank was acquired by a foreign owner, and 0 otherwise. Greenfield banks are excluded from the estimation.

Table 8. Panel estimation of determinants of banks' ROA with individual home country macro variables

	All banks	All banks	Domestic	Foreign	Greenfield	Takeover
	(1)	(2)	(3)	(4)	(5)	(6)
loan growth	-0.00004***	-0.00004***	-0.0003***	-0.00003***	-0.00003***	0.0004
capital	0.000005	0.000005	0.0001	0.000003	0.000003	0.0009
host inflation	0.096***	0.096***	0.122***	0.041*	0.047**	0.010
REER	0.022	0.022	0.035	0.023	0.019	0.071
host GDP	0.005**	0.004**	0.002	0.007***	0.007***	-0.127
host interest rate	0.002	0.002	0.002	0.001	0.001	0.160
credit private	0.028***	0.028***	0.051***	0.021**	-0.001	0.079**
EBRD	0.010	0.010	0.020	0.011	0.011	0.034
stock market	0.078**	0.077**	0.121***	-0.037	-0.091*	0.202
share	0.030	0.030	0.045	0.051	0.047	0.138
HHI	0.002	0.001	0.0001	0.014	0.015	-0.023
foreign	0.014	0.014	0.020	0.016	0.014	0.083
greenfield	0.021*	0.021*	-0.001	0.023*	0.011	0.010
takeover	0.011	0.011	0.020	0.013	0.011	0.028
parent NIM	1.531***	1.545***	1.784***	1.094*	0.329	3.202**
parent capital	0.439	0.439	0.674	0.574	0.415	1.533
parent GDP	-0.045***	-0.046***	-0.062***	-0.039**	-0.031**	-0.094**
parent int. rate	0.013	0.013	0.023	0.016	0.016	0.042
crisis	-0.019	-0.019	-0.027	-0.157*	-0.017	-0.232
crisis*takeover	0.029	0.029	0.040	0.088	0.068	0.192
crisis*greenfield	6.352***	6.379***	7.878***	3.184	-0.949	19.973
crisis*parent int. rate	2.382	2.384	3.022	4.270	3.067	14.105
crisis*parent GDP	0.263					
crisis*parent capital	0.255	3.296				
crisis*parent int. rate		2.065				
crisis*crisis		0.254				
crisis*crisis*takeover		0.255				
crisis*crisis*greenfield				-0.413*	-0.363***	-0.674
crisis*crisis*parent int. rate				0.237	0.141	0.567
crisis*crisis*parent GDP				-0.028	0.081	-0.104
crisis*crisis*parent capital				0.083	0.060	0.140
crisis*crisis*parent int. rate				0.026	0.052	-0.037
crisis*crisis*parent GDP				0.054	0.072	0.120
crisis*crisis*parent capital				-0.007	-0.005	0.010
crisis*crisis*parent int. rate						
crisis*crisis*parent GDP				0.026	0.055	0.029
crisis*crisis*parent capital	0.614	0.581	0.989*	0.509		
crisis*crisis*parent int. rate	0.418	0.417	0.514	0.596		
crisis*crisis*parent GDP	0.192	0.238				1.910
crisis*crisis*parent capital	0.507	0.505				1.359
crisis*crisis*parent int. rate	0.106	0.267		-0.604	0.035	
crisis*crisis*parent GDP	0.450	0.450		0.641	0.246	
Observations	1270	1270	688	582	358	224
R ²	0.16	0.15	0.16	0.27	0.37	0.42
Hausman test	61.36	66.88	64.14	43.04	52.64	39.14

Source: authors' calculations.

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