Foreign bank entry and net interest margins: evidence from Southeast Europe

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Abstract

This paper investigates the impact of foreign bank entry, home and host country conditions on net interest margins (NIMs), using a newly collected panel dataset with ownership information for 265 banks operating in nine Southeast European countries over the period 1995-2011. We do not find evidence of foreign bank entry having a beneficial effect for host countries in terms of reducing the cost of financial intermediation in the long run, as foreign banks change their behaviour over time. We show that foreign banks have initially lower NIMs compared to domestic banks, however this effect weakens the larger the foreign presence and the more established foreign banks become. We find that differentials in home-host country regulation and supervision have an effect on bank behaviour, with foreign banks coming from countries with stricter regulation having higher NIMs in host countries.

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1. Introduction

In this paper, we investigate the impact of foreign bank entry on the cost of financial intermediation in domestic (host) markets. We focus on the net interest margin (NIM) as a high differential between deposit and lending interest rates is commonly associated with decreased credit availability and inefficient financial intermediation.[1] High NIMs may hinder the efficient allocation of resources and reduce the effectiveness with which the financial system channels funds from borrowers to lenders, more so for emerging economies with under-developed capital markets that rely mostly on bank financing. This may in turn slow down economic growth as there is ample evidence about the importance of finance for economic development (Levine, 1997; 2005). The literature has associated high NIMs with inefficient banks exploiting dominant positions in their home markets, as well as an inefficient regulatory environment (Demirgüç-Kunt and Huizinga, 1999; Demirguc-Kunt *et al.*, 2004). In this context, the entry of foreign banks becomes relevant, although their role in domestic economies remains controversial. Arguments in favour rely on the premise that foreign bank entry may improve access to international capital markets; enhance the availability and quality of financial services by increasing competition and transferring of know-how and expertise (Bruno and Hauswald, 2013). In addition, foreign banks' presence may improve the regulatory framework, overall financial system development and economic growth. Arguments against posit that foreign bank entry may facilitate capital outflows; foreign banks may service only the most profitable market segments and increase banking system fragility (Gormley, 2008; Giannetti and Ongena, 2009). Although the impact of increased foreign presence is controversial in the academic literature, one key step of many emerging markets' reform process involves the privatization of state-owned banks and the opening the financial sector to foreign investors. The rapid expansion of foreign bank presence in recent years has raised many questions about the costs and benefits of this process for domestic banks, borrowers and governments. This process has been even more remarkable in transition economies. The proportion of assets owned by foreign banks increased from virtually zero in the early 1990s to 73.5 % in Central and Eastern Europe

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[1] NIM is a measure of the ex post (realized) bank interest spread. The ex ante spread would be the difference between the contractual rates charged on loans and rates paid on deposits. The ex post spreads, or margins, are the actually received interest revenue minus the interest costs on deposits. Margins are usually lower than spreads because of the lost interest on non-performing loans. Data about ex ante rates is less readily available and if it is, it comes from different sources (i.e. not comparable) and at the aggregate level, therefore the use of ex post spreads is preferred (Demirgüç-Kunt and Huizinga, 1999).

(CEE) and 84.7 % in South East Europe (SEE).[2] This can be attributed to two related phenomena. First, the desire of these transition countries to qualify for EU membership was a strong catalyst for reform and improvements in bank regulation and supervision. Second, the prospects of EU membership, made these under-banked markets attractive to foreign investors.

Despite the growing trend among transition economies to allow greater foreign bank entry, the question of whether this process lead to an overall reduction of NIMs in domestic markets remains controversial. In this paper we study the impact of foreign bank entry on the cost of financial intermediation in SEE countries (Albania, Bosnia-Herzegovina, Bulgaria, Croatia, Kosovo, Macedonia, Montenegro, Romania and Serbia). SEE countries experienced considerable political, economic and financial sector reforms over the past two decades as they moved from centrally planned to market oriented economies. A particularly difficult aspect of the transition process was the transformation of their banking systems. After more than two decades of reforms, although considerable progress has been made, SEE countries are still lagging behind Western European countries. The SEE banking system is small, both in absolute terms and in relation to its GDP. The average credit to GDP ratio in 2011 amounted to 63% in SEE, compared to 168% in the EU-15 countries.[3] Furthermore, SEE has an even lower intermediation in the private sector: the average private sector credit to GDP ratio in 2011 was 54% compared to 152% in the EU-15 countries. In addition, the SEE banking sector has high liquidity and capitalization ratios, while the level of non-performing loans has often been a cause of concern. In terms of market structure, the number of banks operating in the SEE banking sector is large compared to its size. As of 2011, there were 217 banks operating in SEE countries. The total number of banks has however declined over the years and the sector is moderately concentrated.[4] Notwithstanding the successful reforms[5], and the substantial presence of foreign banks, the region is characterised by very high NIMs.

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[2] CEE countries are: Estonia, Latvia, Lithuania, Slovenia, Hungary, Poland and Slovakia. These countries became EU member states in 2004 (Fourth Enlargement, Part 1). SEE countries are: Albania, Bosnia-Herzegovina, Bulgaria, Croatia, Kosovo, Macedonia, Montenegro, Romania and Serbia. Bulgaria and Romania became EU member states in 2007 (Fourth Enlargement, Part 2), whereas Croatia joined the EU in 2013. Albania, Bosnia-Herzegovina and Kosovo have applied for EU membership; Macedonia, Montenegro and Serbia are official candidate countries.

[3] The EU-15 refers to the number of member countries in the European Union prior to the accession of ten countries on 1 May 2004. The EU-15 is still used to define the 'old' EU member states and comprises the following countries: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, Portugal, Spain, Sweden, United Kingdom.

[4] A detailed overview of the SEE banking sector is provided by Bonin et al (2009).

[5] The EBRD index of banking sector reform shows that most SEE countries have a score of 3, which indicates substantial progress in liberalizing interest rates and allocating credit to private enterprises, privatizing the banking sector, establishing of bank solvency and of a framework for bank supervision and regulation.

Average NIMs over the period 1998-2008 amounted to 6.75% in SEE, compared to 6.17% in Latin America, 4.01% in Central and Eastern Europe and to 3.84% in the EU-15.[6] This empirical observation motivates us to examine the impact of foreign bank entry of NIMs in SEE. In particular, we aim to answer the following questions: (i) Do foreign banks operate with lower NIMs compared to domestic banks? (ii) Has foreign bank entry lead to an overall reduction of NIMs in domestic markets? (iii) Does the mode of foreign bank entry matter? and (iv) Do home country conditions matter?

To answer these questions we collect detailed information on bank ownership for 265 banks operating in nine SEE countries over the period 1995-2011. The SEE region presents a considerable degree of heterogeneity in terms of progress towards EU membership: Bulgaria and Romania became EU member states in 2007; Croatia joined the EU in 2013. Albania, Bosnia-Herzegovina and Kosovo have applied for EU membership while Macedonia, Montenegro and Serbia are official candidate countries. These differences should allow us to tease out the variation in NIMs associated with differences in home-country regulatory environments. In addition, this data set is particularly suited to investigate the impact of foreign bank entry for several reasons. First, the banking sector of the SEE area has attracted among the highest foreign bank presence in the world (on average, across the region, around 80 per cent of bank assets is foreign owned). Second, we hand-collected ownership information for all banks in the sample, and for foreign banks we also collected information to includes the mode of entry, the country of origin and the name of the parent bank. This allowed us to match the home and host country characteristics, as well as parent bank and foreign affiliates characteristics to analyze which entry modes (acquisition *vs.* greenfield) impact the relation between foreign bank ownership and NIMs in host countries. This latter information is supplemented with balance sheet and income statement data from Bankscope, making it one of the most comprehensive data sets of bank ownership for the sample of SEE banks. Accounting for these differences will allow us to more precisely disentangle the relationship between foreign bank ownership and NIMs in host countries. Third, the long sample period allows us to exploit the time-series dimension of foreign bank entry, by focusing on the evolution of NIMs in two different periods: the first one characterized by the rapid expansion of foreign bank presence and the second one with a banking sector almost saturated in terms of foreign bank entry with a high percentage of banking assets owned by foreign banks. Finally, the high degree of heterogeneity in the country origin of foreign banks

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[6] Figures from Bankscope.

allows us to identify if home country conditions influence foreign bank NIMs. Specifically, we collect information of the regulatory and supervisory standards in the home and host countries, as there is evidence that these influence the behaviour of foreign banks.

Our results show that foreign banks' behaviour changes over time. When foreign banks enter a host country, they initially do so with lower NIMs compared to their domestic counterparts. However, as they become more established and the foreign presence in a host country increases, so do foreign bank NIMs. As a consequence, over time, we do not find evidence of foreign bank entry having a beneficial effect for host countries in terms of reducing the cost of financial intermediation. These results are consistent with the analysis of the mode of entry: up to 2004 foreign banks entered the SEE market via greenfield investment, after which acquiring existing banks became more common. We find that while entry both via acquisitions and greenfield is associated with foreign banks operating with significantly lower NIMs than domestic banks in the first part of the sample period, only entry via greenfield remains significant in the second part of the sample period. However, the relation with NIMs becomes positive, indicating a shift towards higher margin lending, possibly to SMEs. We also find evidence that foreign banks from countries with more restrictions on bank activities and ownership that limit diversification opportunities have higher NIMs in host countries compared to domestic banks. This might indicate possible regulatory arbitrage, as bank seek profit opportunities to compensate forgone profits and higher regulatory costs at home. This is particularly relevant in emerging markets, as the process of financial liberalization often (but not always) implies a more lenient regulatory structure. However, we also find evidence of regulatory spillovers: stricter supervisory standards at home, possibly extending to the supervision of foreign subsidiaries, seem to translate into lower NIMs in host countries. This may suggest that stronger home country supervision can limit risk-taking abroad if foreign banks are supervised by authorities in the country of origin.

Our analysis contributes to the literature along different directions. First, we exploit the heterogeneity of foreign bank entry and home country conditions, to investigate whether this impacts NIMs in host countries. Second, by using the newly hand-collected panel data set of bank ownership we are able to explore the dynamics of foreign banks' NIMs over a relatively long transition period, encompassing relevant regulatory changes, as well as changes in market structure and industry characteristics. Our paper also adds to the strand of the literature on multinational bank profitability by analyzing the cost of financial intermediation in host countries as a function of both domestic and multinational factors. Finally, our study

also relate to the strand of literature on the impact of distance on bank activities, such as loan rationing (Petersen and Rajan, 2002), lending constraints (Mian, 2006), and loan rates (DeGryse and Ongena, 2005) by considering the impact of geographical and institutional distance between home and host countries. More generally, we contribute to the debate of weather the rapid expansion of foreign banks has been beneficial for host countries in terms of reducing the cost of financial intermediation and generating economic growth. In addition, we contribute to the debate on EU integration, by investigating possible cross-border spillover effects of bank regulation through the behaviour of foreign banks in host countries. A successful EU integration will depend on the degree to which reforms have contributed to a sound financial sector which will in turn fund a sustainable growth and ensure economic convergence. The general framework for evaluating the success of financial sector reforms in SEE, more specifically the liberalization of the banking sector to foreign entry, relies largely on the evaluation of the impact this process has had on reducing the gap between the economic development of EU and new or potential EU member states.

The rest of the paper is organized as follows. Section 2 describes the banking sector of the SEE area. Section 3 reviews the relevant literature. Section 4 describes the data and the methodology. Section 5 presents the results. Section 6 shows several robustness tests. Finally, Section 7 concludes.

2. Literature Review

A number of studies (Ho and Saunders, 1981; McShane and Sharpe, 1985; Allen, 1988; Angbazo, 1997) have investigated the cost of financial intermediation (as measured by bank NIMs) in both developed and developing countries. However, only recently research focused on the impact of foreign bank entry on NIMs. As foreign bank entry has been more pronounced in emerging economies, such studies have mostly focused on these countries. Theoretically, the relation between foreign bank entry and NIMs in host countries has been modelled as an information asymmetry problem between incumbent (domestic banks) and new entrants (foreign banks). Incumbent banks have better "soft" information, while foreign banks are better at processing "hard" information (Dell'Ariccia and Marquez, 2004). The main channels through which foreign bank entry influences interest margins in host countries are the spillover channel and the competition channel (Goldberg, 2007; Lehner and Schnitzer, 2008). In both cases, evidence seems to indicate that foreign entry reduces NIMs in the host

countries. The spillover effect results from the transfer of better screening technology, better utilization of resources and "know-how" from foreign to domestic banks. The competition channel results from an increase in the number of banks in the domestic banking market. This effect is stronger if foreign entry is done via greenfield investments as opposed to foreign acquisition (Claeys and Hainz, 2014). This literature identifies the following testable prediction:

HP1: Foreign bank entry lowers NIMs in the host countries.

Studies that empirically investigate this issue find mixed results. For Latin American countries, Martinez Peria (2004) find that foreign banks are able to charge lower spreads than domestic banks, however, they do not find consistent evidence regarding the direct impact of foreign bank participation on domestic bank spreads. For CEE countries, Claeys (2008) find that foreign bank entry has contributed to the reduction of interest margins. Other studies have found a less favourable effect of foreign bank entry for NIMs in host countries. Claessens (2001) using bank-level data from 80 countries find that foreign banks in developed countries have lower interest margins than domestic banks, whereas the opposite is true for foreign banks in developing countries. Similarly, (Demirgüç-Kunt and Huizinga, 1999) find that foreign ownership is associated with higher interest margins, especially in developing countries. These mixed empirical results can be due either to different sample periods corresponding to different stages of foreign bank entry, different control variables or to treating foreign banks as a homogeneous group. The importance of treating foreign banks as a heterogeneous group has been highlighted by a number of studies investigating the modes of foreign bank entry (DeGryse *et al.*, 2012; Claeys and Hainz, 2014) and the behaviour of foreign banks as a function of both domestic and multinational factors (Williams, 2003; Claessens and van Horen, 2012). Theory suggests that the behaviour of foreign banks in host countries depends on whether banks enter domestic markets via greenfield investment or by acquiring existing domestic banks. Banks entering by acquiring existing domestic institutions may inherit inefficient organizational structures and a low quality loan portfolio, but they also obtain information on existing customers and bank personnel. Greenfield banks have higher efficiency advantage and higher informational disadvantage compared to domestic banks and banks entering via acquisition (DeGryse *et al.*, 2012). The ultimate impact on host market NIMs will depend on which effect dominates. Martinez Peria (2004) find that greenfield banks were able to charge lower spreads compared to banks that entered through acquisition. Havrylchyk (2011) find that greenfield banks have

higher profitability relative to other banks, but this higher profitability stems from lower costs rather than from higher interest margins. This literature identifies the following testable prediction:

HP2: The negative effect of foreign bank entry on NIMs is stronger when entry takes place through greenfield than through acquisitions.

Another source of foreign bank heterogeneity comes from the country of origin of the foreign bank. Based on the multinational bank profitability literature, we use three groups of home country factors: parent bank NIMs, home country regulatory conditions and home-host country distance (geographical and regulatory).The relation between parent bank profits and profits in the host country can be ambiguous. Williams (2003) argues that more profitable parent banks can devote more resources to foreign subsidiaries and they do so only if they expect to earn a higher return than they would in the home country. Furthermore, a more profitable parent bank signals a more stable foreign bank in the eyes of depositors resulting in a lower cost of deposited funds. Therefore a positive association between parent bank profitability and the profitability of their affiliates abroad is expected. Alternatively, parent banks operating in competitive home countries where the opportunity for high bank margins is low, may be willing to invest resources in foreign subsidiaries where higher profit margins are expected to compensate for the low margins at home. This would yield a negative relation between parent bank profitability and the profitability of the host nation affiliate. Kosmidou et al (2007) find that the profitability of the parent bank has a robust and positive impact on the profits of Greek banks abroad. Williams (2003) on the other hand, does not find support for the hypothesis that parent NIM is positively related to Australian bank profits. Following this literature we test the prediction below:

HP3: Foreign banks with lower parent bank profitability charge higher NIMs in the host countries.

The second group of factors relate to home country regulatory conditions. A number of studies have shown that the performance of foreign banks depends on the characteristics of their home countries. Berger et al (2000) find that the relative cost and profit efficiency of foreign *vs.* domestic banks depends on home and host country conditions. They test two main hypotheses: the global advantage hypothesis and the home field advantage hypothesis and find support for the limited form of the global advantage hypothesis. According to this hypothesis only efficient institutions from home countries with certain favourable market or

regulatory conditions can operate more efficiently than their domestic counterparts. These favourable home country conditions may include a more competitive home market forcing banks to use more advanced technologies, an active market for corporate control that prevents investments abroad that reduce shareholder value, access to an educated labour force able to employ new technologies and risk management techniques. Furthermore, home countries with favourable regulatory or supervisory conditions may be able to enjoy stronger safety net guarantees that will allow them to make high risk-high return investments. Alternatively, home countries with relatively tough supervision or regulation may give their banks operating abroad an advantage by certifying their quality or reducing counterparty risk. Lensink et al (2008) find that on average foreign banks are less cost efficient than domestic banks. However, taking home country conditions into account they find that higher quality of the institutions in the home country reduce foreign bank inefficiency. Claessens and Van Horen (2012) find that foreign banks in developing countries tend to perform better when from a high income country and when regulation in the host country is relatively weak. Furthermore, they find that foreign banks from home countries with similar regulation and the same language as the host country perform better. These studies focus either on bank profitability or efficiency and do not explicitly account for the cost of financial intermediation in host countries. A recent paper by Ongena et al (2013) finds that bank regulation is associated with cross-border spillover effects through the lending behaviour of multinational banks. Following the above literature we test the prediction below:

HP4: Foreign banks coming from countries with stricter regulation in banking activity charge higher NIMs in the host countries.

Besides home country characteristics and parent bank profitability, distance can also have an influence on foreign bank's performance. Foreign banks may face additional costs due to distance such as informational and agency costs when they enter the host country. As Mian (2006) points out, working in an environment with a different corporate culture and a different legal and regulatory framework makes it more difficult for foreign banks to tailor policies specifically for the developing country due to increased information asymmetries. Hauswald and Marquez (2006) present a model in which banks enter new markets and invest resources to collect borrower-specific information. They assume that the quality of the information-generation process is a decreasing function of the distance between bank and borrower and therefore both the availability and the pricing of credit depends on the distance between banks and borrowers. They find that borrowers located further away from the bank

that has screened them benefit from lower rates as the quality of information banks obtain for more distant loan applicants decreases. These distant borrowers become less informationally captured (that is, a more distant bank becomes less able to exploit the informational advantage it has acquired over its competitors) and therefore benefit from greater competition from other banks, leading to lower lending rates. This result is consistent with the empirical findings of Degryse and Ongena (2005) who find that loan rates decrease with bank-borrower distance. This would imply that foreign banks charge lower rates in countries that are more geographically distant. Mian (2006) shows that not only geographical distance but also cultural distance makes it more difficult for foreign banks to lend to "informationally difficult" yet fundamentally sound firm as greater distance may make it more costly for foreign banks to collect and communicate soft information. As distance increases foreign banks may charge higher NIMs to compensate for increased information asymmetries and increased costs of collecting soft information. The expected relation between the relative NIM level of foreign banks and the distance between home and host countries is therefore ambiguous. Following this literature we test the prediction below:

HP5: Foreign banks coming from countries with higher regulatory and geographical distance charge higher NIMs than their domestic counterparts.

4. Data and Methodology

In this section we illustrates our data sources and provide a discussion of our dataset.

4.1. Foreign banks in SEE countries

As we wish to determine the impact of foreign bank entry on NIMs in SEE countries, we start by building a database of commercial banks operating in Albania, Bosnia-Herzegovina, Bulgaria, Croatia, Kosovo, Macedonia, Montenegro, Romania and Serbia over the period 1995-2011. We include all commercial banks active in at least one year over the period 1995-2011 in one of the nine SEE countries. We exclude savings houses, microcredit organisations, entities established by the government for the purpose of promoting the development of the economy (such as for e.g. the Croatian Bank for Reconstruction and Development). The final sample consists of a total of 265 banks, divided by countries as follows: Albania (14 banks); Bosnia-Herzegovina (33 banks); Bulgaria (34 banks); Croatia (59 banks); Kosovo (7 banks); Macedonia (21 banks); Montenegro (12 banks); Romania (42 banks) and Serbia (43 banks).

The 2515 bank-year observations over the sample period 1995-2011 are shown by year in Table 1. The total number of banks has steadily increased up to 2003 after which the number remains stable or declines. This is consistent with the fact that the dominant form of foreign bank entry up to 2004 was via greenfield investment, after which acquiring existing banks became more popular.[7]

[Insert Table 1 around here]

The next step required coding bank ownership. To this end, we examined each bank individually, for each year it was active over the sample period. Sometimes more than one data source had to be used for tracking the ownership of a single bank. The starting point was the Bankscope database, which provides ownership history at each closing date for a certain number of banks and years (usually the most recent years). For banks and years where this information was not available other sources were used, including individual banks' annual reports and websites, central banks' publications, parent banks' websites and reports as well as databases such as Zephyr and Factiva for information on bank mergers and acquisitions. Following the standard practice in the literature, a bank is coded as foreign (*fb*) if 50% or more of its shares are owned by foreigners (Claessens *et al.*, 2001).

We also identify the country of origin as follows: if a bank is foreign owned (as defined above), the nationality of the foreign shareholder with the highest percentage ownership is used as the country of origin. This foreign shareholder can be the largest shareholder of the whole company or the largest shareholder among foreign shareholders only. In both cases its nationality is used as the country of origin of the bank. Unlike Claessens and van Horen (2012), we define ownership and country of origin based on ultimate (indirect) rather than immediate (direct) ownership. For example, if a bank in Bulgaria is 70% foreign owned (30% domestic), of which 20% is owned by an Italian subsidiary in Austria as the largest foreign shareholder, the bank will be coded as foreign with Italy as the country of origin. This is so, despite the fact that the percentage share ultimately owned by Italian shareholders (20%) is lower than domestic ownership (30%).

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[7] Appendix 4 shows the number of banks and total assets. This information is provided by the respective central banks. The coverage ratios vary by countries and years, however, on average Bankscope provides about 85% coverage of the SEE banking system, which allows us to make valid inferences about the region

Foreign banks are further categorised by mode of entry: banks that entered the host country by acquiring existing banks (*fb_acq)* versus those that entered via greenfield investment (*fb_green)*. Finally, for each foreign bank the name of the parent bank is recorded.

Of the 2515 bank-year observations in our sample, 1289 observations (51.25%) are foreign banks. The number of foreign banks has rapidly increased over the years, as has the share of the foreign banks in the total banking assets. Foreign bank share *(foreignshare)* increased from 6.34% in 1997 to 81.6% in 2011. The most rapid increase in foreign bank share occurred up to 2004, after which foreign bank participation in the domestic banking sector of the countries under analysis levelled off at a high level (around 80%). This gives us an interesting opportunity to investigate the behaviour of foreign banks in two financial sector environments, one in which financial liberalization is at its infancy and foreign bank presence is limited but increasing rapidly, and the other in which foreign bank presence has become predominant.[8]

4.2 Net Interest Margins in SEE countries

Our main variables of interest are the bank NIMs, measured as the ex post (realized) bank interest spread (the difference between the contractual rates charged on loans and rates paid on deposits, net of the lost interest on non-performing loans). Bank specific information (balance sheet and income statement data) are from Bankscope.[9]

[Insert Table 2 around here]

Table 2 shows average values of NIMs over time, average net interest margins are reported for all banks, and separately for foreign and domestic banks. Looking at the whole SEE region, NIMs remain persistently high until recent years. The average bank NIM was 6.2% for the period 1995-2011; the average NIM of foreign banks was 5.47% and that of domestic banks, 6.91%. While foreign bank NIMs were substantially lower than domestic banks in the 1990s and early 2000s, these difference reduce from 2005 onwards, possibly indicating greater market integration and a shift in the activities of foreign banks.

[Insert Table 3 around here]

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[8] In addition to relying on the visual inspection of the time series plots to detect the change in the trend of the foreign bank presence we conduct a more formal structural break test based on the modified Chow test. As anticipated we find that the break date occurs in 2004. The details of the Chow test are given in Appendix 2.

[9] To avoid double counting bank financial information unconsolidated statements are used. When unconsolidated statements were not available consolidated ones were used, whereas for parent banks financial information is taken from their consolidated statements.

Overall, SEE bank profitability has been low over the sample period, with Montenegro and Serbia displaying negative average Return on Asset values (net income over total earning assets). NIMs were the main components of banks' net income, more so for domestic banks than for foreign banks, as illustrated in Table 3, with the region average equalling 6.2%. Country differences are apparent: Serbia has the highest level of bank NIMs with an average of 8.2%, followed by Romania with 7.6%. Albania, on the other hand, has the lowest average NIM, 3.7%, followed by Croatia with 4.8%. Serbian banks not only have the highest spreads, both for interest and non-interest income, but also have high overhead costs and loan loss provisions, indicating an inefficient banking system, with high margins, high costs and low asset quality.

Looking at difference between domestic and foreign banks in terms of income composition, on average, foreign banks have lower NIMs and lower overhead costs and loan loss provisions. However, foreign banks are also on average less profitable than domestic banks. This is in line with the finding of Claessens et al (2001), who argue that foreign banks may be willing to accept a lower profitability to the extent that their cost of capital is lower compared to that of domestic banks or to the extent that they can benefit from a foreign tax credit.

Next, we look more closely at which banks have entered the SEE market over the sample period and match them with their respective host countries.[10] Figure 1 shows the map of home and host countries: the SEE banking sector is mainly owned by banks from EU countries, Turkey and the United States. These countries of origin represent different levels of economic development, regulatory environments and geographical and cultural proximity to host countries. This heterogeneity may imply different incentives for the behaviour of foreign banks in host countries.

[Insert Figure 1 around here]

Table 4, Panel A illustrates the number of banks which have entered each of the SEE countries (foreign banks) and the respective countries of origin (home countries). It also shows the average differences in NIM between the parent bank (in the home country) and the foreign bank (the subsidiary in the host country) as well as average differences between home and host country NIMs. Table 4, Panel B shows the number of foreign subsidiaries each home country has set up during the sample period and in how many different host countries

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[10] Although foreign banks originate from a number of different countries, in this part of the analysis we consider only home countries whose banks are present in two or more countries in the SEE region.

in the SEE region. It also shows the average differences in NIM between the parent bank (in the home country) and the foreign subsidiaries (in the different host countries) as well as average differences between NIM at the country level.

[Insert Table 4 around here]

Looking at the number of entries, Bulgaria, Croatia and Romania have attracted the highest number of foreign banks from a larger number of countries. This is in line with the fact that these three countries have become EU member states during the sample period. At the country level, the average NIMs in Albania is only marginally higher than the average NIMs in the home countries (+0.35%). In all other SEE countries, the average NIM is higher than in the countries of origin, with Kosovo, Romania and Serbia having the highest differences. Similarly, at the bank level (that is the difference in NIMs between the parent bank and the foreign subsidiaries), foreign banks going to Albania do not charge substantially higher NIMs than they would in their home countries (+074% on average). Foreign banks going to Kosovo, Romania and Serbia, on the other hand, charge NIMs much higher than they do in their home countries. In the remaining SEE countries, foreign banks NIMs are, on average, between 1-3 percentage points higher than those of their parent bank.

Looking at foreign expansion from the countries of origin, we notice that Austrian and Italian banks have been the most active in the SEE region, closely followed by Germany and Greece. Not only banks originating from these countries have set up the highest number of subsidiaries in the region, but they have also expanded in a large number of countries. For example, Austrian banks are present in nine out of the eleven countries in our sample. This might be explained by geographical and cultural proximity and close trade relations.

When we consider differences in NIMs at the country level, in all countries of origin (except from Turkey) the NIMs are lower than the average in the SEE countries. In Turkey, the average NIM is 2.78% higher than in the SEE countries where Turkish banks are present. This might be explained by country specific conditions, whereby the Turkish banking sector is more inefficient, in terms of NIMs, than the SEE countries. This is also reflected in the fact that Turkish subsidiaries abroad have substantially lower NIMs than their parent banks (-1.30%). In addition, Hungarian banks have lower NIMs in SEE countries than they have at home (parent bank). This could be explained by the fact that, similar to Turkish banks, Hungarian banks might have to offer better rates than domestic (host countries) banks to obtain market share as they might be perceived as risky and therefore lack the competitive

advantage of banks originating from, for example, Italy, France and the US, which have the highest NIM differentials between parent bank and foreign subsidiary.

4.3 Regulation and supervision

The analysis of the dynamics of NIMs has highlighted a considerable heterogeneity among countries, both in the SEE region and in terms of country of origin. To better understand the effect of the impact of country specific characteristics on banks' intermediation function, we focus on the impact of bank regulation and supervision in home and host countries. To this end, we collect information on regulatory and supervisory variables which have been identified in the literature as relevant in the setting of bank rates and therefore affecting bank NIMs. Our aim is to identify how differences in home-host country regulation and supervisory practices can impact bank behaviour.

We draw on the database compiled by Barth, Caprio and Levine (2013) based on the Banking Regulation and Supervision Survey (BRSS) carried out by the World Bank. We build six different indices reflecting the regulatory conditions at different points in time, based on specific survey questions. Given that the country level regulatory data is collected in four survey exercises (1999, 2002, 2006 and 2011) as described in Barth et al (2013), we match the data for the regulatory variables as follows: the 1999 survey data is used for the period 1995-2001; the end-2002 data for the period 2002-2005; the end-2006 data for the period 2006-2010 and the end-2011 data for the last year, 2011. This should allow us to map the relevant changes during the sample period, both for the country of origin (home) and host country of foreign banks. The advantage of using the Barth et al (2013) version of the dataset, as opposed to the raw data from the surveys, is that the authors have corrected any inconsistencies between the four rounds of the survey, have filled in missing values where possible and have aggregated several questions into useful indices. The survey questions behind the indices used in this study are shown in Appendix 3. All indices are normalized to take values in the interval [0, 1]. This normalization also has the intuitively appealing property of a percentage interpretation on initial analysis.

In choosing the indices we focus on those aspects of regulation and supervision that theory highlights as affecting bank behaviour. More specifically we focus on three indicators of bank regulation (*Activity restrictions, Ownership restrictions* and *Capital regulations*) and three indicators of bank supervision (*Official supervisory power, External Auditing and Transparency).* The extant literature finds that various aspects of regulation and supervision

can be important determinants of bank performance. It must be pointed out that we are interested in how differences in regulatory and supervisory standards in home and host countries affect bank behaviour. Table 5 illustrates the average value for the indices in the host and selected home countries respectively. These indices indicate a large cross-country variation, which needs to be put into context of the different characteristics of banking systems (in terms of size, type of institutions, competitive conditions, etc.) as well as differences in the organization of bank regulatory and supervisory institutions.

[Insert Table 5 around here]

4.3.1 Activity restrictiveness

Activities restrictions *(act_restr)* measure the degree to which national regulations restrict banks from engaging in (a) securities activities (underwriting, brokering, dealing in securities and all other aspects of the mutual fund industry), (b) insurance activities (underwriting and selling insurance) and (c) real estate activities (real estate investment, development and management). Higher values indicate more restrictions on banks in performing these activities. Bank ownership restrictions *(ownership_restr),* measures the degree to which banks and nonbanks may combine to form financial conglomerates. This index captures the extent to which national regulations restrict (a) banks from owning non-financial firms, (b) non-financial firms from owning banks as well as (c) nonbank financial firms from owning banks. Both *act_restr* and *ownership_restr* specify the scope of permissible bank activities. Some countries restrict banks to a narrow range of activities, others allow them to engage in a broad array; these differences can affect banks' ability to diversify revenue streams. There are conflicting views on the impact of activity restrictions on bank behaviour. Regulations which limit the range of activities banks can engage in may limit the exploitation of economies of scale and scope in obtaining information about borrowers, building reputational capital and providing different services (Barth *et al.*, 2004; Laeven and Levine, 2009). Conversely, regulations allowing banks to engage in a broad range of activities might intensify moral hazard (Boyd *et al.*, 1998) and lead to the creation of large and complex entities which are difficult to monitor (Laeven and Levine, 2009) providing more opportunities for banks to increase risk taking. Demirguc-Kunt, Laeven, and Levine (2004) find that activity restrictions increase net interest margins while Barth, Caprio, and Levine (2011) report mixed results for their impact on margins and overheads. The impact of activity restrictiveness on bank NIMs remains therefore unclear.

4.3.2. Capital regulation

Capital regulation *(cap_reg)* measures the nature of capital in terms of policies concerning the definition of capital banks must hold beyond cash or government securities as well as regulations that govern the sources of regulatory capital. This index does not measure statutory capital requirements, instead it measures the rules and policies used in assessing and verifying the degree of capital at risk in a bank. If bank capital requirements are seen as a mechanism to align the incentives of bank owners with depositors and other creditors, the more capital at risk they are required to hold the more prudent they should become in their lending behaviour. This would imply a negative relation between the capital regulatory index and bank NIMs, as more prudent lending behaviour should imply lower lending rates to less risky projects. On the other hand, several studies (Saunders and Schumacher, 2000) show that banks which are required to hold more capital tend to demand higher NIMs to lower the cost of holding more equity. Finally, Barth, Caprio, and Levine (Barth *et al.*, 2004) suggest that capital regulation do not seem to have a clear impact on bank margins, although they find that more stringent capital regulations are associated with lower levels of non-performing loans.

4.3.3. Official supervisory power

Official supervisory power *(sup_power)* measures the degree to which a country's bank supervisory agency has the authority to obtain sufficient information from banks to assess their financial soundness and to impose changes to banks' behaviour, if necessary. It measures whether a country's supervisory authority has the power to take specific actions to prevent and correct problems. To the extent that a powerful supervisory agency has the incentive and expertise to overcome market failures due to imperfect information as argued in Beck et al. (2006) and Barth et al (2013), it boosts bank efficiency, hence it should lead to lower NIMs. However as Beck et al. (2006) argue, if bank supervisors use their power for private or political benefits rather than overcoming market failures they will contribute to bank inefficiency, hence higher NIM. In addition, Barth et al (2004) show that the presence of more powerful government supervisors is linked to higher levels of non-performing loans.

4.3.4. Private monitoring

Transparency measures the extent to which regulatory policies encourage private monitoring. For example, the extent to which supervisory agencies require banks to disseminate comprehensive information about their activities can influence the quality of private sector

scrutiny by forcing information disclosure. Similarly, the degree to which regulation holds bank directors legally liable for erroneous or misleading information can influence the quality of information that banks provide to investors, which impacts investor's ability to monitor and govern the banks. Similar to the *transparency* index, the strength of external audit *(ext_audit)* measures the extent to which regulations facilitate external governance of banks. For instance, the degree to which supervisory agencies require banks to obtain certified audits can influence the quality of information disclosed, hence the quality of external governance. Private sector monitoring can be more efficient than official supervision of banks, as supervisors do not have an ownership stake in banks, which can lead to different incentives when monitoring and disciplining banks. Barth et al (2013) find that private monitoring of banks in terms of strength of external audit and information disclosure is positively associated with bank operating efficiency, which should imply lower NIMs. Similar results are found by Delis et al (2011) who report that that regulations and policies that promote private monitoring have a positive impact on bank performance

4.4. Control variables

Other factors are likely to impact bank NIMs, such as differences in bank level characteristics, market structure and macroeconomic variables.

4.4.1. Bank-specific factors

The literature identifies a comprehensive set of bank specific characteristics that are likely to significantly affect spreads, including size, leverage, capitalisation. We include proxies for size (*share*); equity ratio *(equityratio)*; liquidity *(liquidity)* and cost to income ratio (*cti*).

A common factor used in the empirical analyses of bank NIMs is the liquidity ratio *(liquidity)*. Banks with high liquidity ratios face an opportunity costs since they have to forego holding higher-earning assets. They may in turn pass this opportunity cost to borrowers increasing the interest rate spreads. Martinez Peria and Mody (2004) and Brock and Suarez (2000) find that liquidity has a positive and significant impact on bank spreads. A second variable is the equity ratio (*equityratio*). As holding high equity ratios is costly for banks, they are likely to demand higher interest margins, hence inducing a positive relation between equity ratios and NIMs. Similarly, banks with higher equity ratios are perceived as less risky, with a low risk of insolvency which reduces the cost of borrowed funds hence boosts margins. In contrast, a negative relation between equity ratios and NIMs is expected if

the equity ratio is taken as a proxy for bank's risk aversion (Poghosyan, 2013). More risk-averse banks with high equity ratios tend to invest in safer assets which yield lower returns hence a reduction in bank interest margins. Saunders and Schumacher (2000) find that banks tend to lower the cost of holding more equity (regulatory or endogenously determined) by demanding higher NIMs. Bank size as proxied by market share (*share*) is another relevant factor. There are conflicting hypothesis regarding the impact of this variable on bank NIMs. Banks with a high market share may be able to exercise market power and charge higher loan rates (Relative Market Power hypothesis). On the other hand, banks with high market share can benefit from economies of scale and transfer this benefit to their customers in the form of lower spreads. The loan loss provision ratio *(llp_tea)* captures the quality of the loan portfolio and is expected to be positively related to NIMs as a poor loan quality induces banks to charge customers a premium for these loans. Several studies find a positive association between the non-performing loan ratio and NIMs. Degryse et al (2012)for instance, find that banks with higher credit risk, as measured by the deviations from the median non-performing loans, are more likely to charge higher lending rates. Other studies, however, do not find a significant relation (Martinez Peria and Mody, 2004) or find a negative relation (Brock and Suarez, 2000) between non-performing loans and NIMs, the latter being explained as a result of inadequate provisioning for loan losses by banks in some countries. Bank efficiency (*cti*) is another variable impacting bank NIMs. Most studies include efficiency variables as controls and find significant correlation with NIMs.

4.4.2. Market structure factors

Important factors in determining bank NIMs are the market conditions in which banks operate. The theoretical predictions relating NIMs and the bank market structure stem from the extensive literature studying the impact of concentration on bank profitability (Berger, 1995). Most studies use the paradigm of Structure-Conduct-Performance to explain the positive association between profitability and concentration. In the context of the NIM-market structure relationship, this predicts a negative association between levels of concentration and NIMs. Martinez Peria and Mody (2004) find a significant positive association between concentration and spreads. They interpret high concentration levels as implying less competition in the banking sector. Research however shows that concentrated markets are not necessarily uncompetitive (Matutes and Vives, 1996; Beck, 2008). The

primary measure of market structure used in our specifications, the Herfindahl-Hirschman index (*hhi*).[11]

2.3.Macroeconomic factors

Macroeconomic indicators commonly used in empirical analyses of NIMs are the GDP growth rate, inflation and real interest rates.[12] The relation between GDP growth rates (*gdpgrowth*) and NIMs can be ambiguous. High GDP growth rates imply more investment opportunities for banks which may in turn increase the deposit rate to attract more funds for these new investment opportunities; in contrast, during times of declining GDP rates loan quality deteriorates forcing companies to borrow at higher rates, hence a negative expected relationship between GDP growth and interest spreads (Bernanke and Gertler, 1989). The impact of inflation *(inflation)* on interest spreads depends on which of the bank costs or revenues increase faster than the other. Perry (1992) points out that the influence of inflation on bank margins depends on whether inflation is anticipated or not. If inflation is not fully anticipated and banks react slowly to adjusting the interest rates, bank costs may increase faster than revenues hence reducing bank margins (Demirgüç-Kunt and Huizinga, 1999; Brock and Suarez, 2000). Finally, the real market interest rates (*real_ir)* represent opportunity cost for banks and are expected to be positively associated with NIMs. So if the marginal cost of funds increases (decreases) the bank margins will also increase (decrease). Finally, we consider the geographical distance between home and host countries. Data for geographic distance *(geo_dist)* between home and host countries is taken from the CEPII database. [13]

Table 6 illustrates the descriptive statistics for our variables and shows the pair-wise correlation matrix for the variables used in the estimations.

[Insert Table 6 around here]

From Table 6 we can see that foreign banks have higher market share (*share*) and higher liquidity ratios *(liquidity)*, whereas their equity ratio *(equityratio)* is lower compared to domestic banks. In terms of efficiency measures, foreign banks appear less efficient than

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[11] Alternative measures of market structure, including the CR-3 ratio, as well as the Lerner Index and the Rosse-Panzar H-statistics are used for robustness checks.

[12] Macroeconomic variables are from the World Development Indicators database. Table A1 provides detailed variable definitions and their sources.

[13] Geographical distance is measured as the logarithm of the number of kilometres between the capital cities of bank's host and home country.

domestic banks based on the cost to income ratio (*cti*). In terms of sample periods, all banks had higher NIMs during the first sample period (1995-2004). Compared to the first period all banks have increased their liquidity, while the equity ratio and the loan loss provisioning ratio *(llp_tea)* have declined. Macroeconomic and market structure indicators also show variation between the two subsamples. Overall, summary statistics evidence different characteristics between foreign and domestic banks, which may partly explain their different NIMs.

4.3. Methodology

The relationship between foreign bank ownership and NIMs in host countries is evaluated using the following specification:

$$NIM_{ict} = \alpha_0 + \alpha_1 fb_{ict} + \theta'_j X_{ict} + \mu'_k Y_{ct} + \omega'_n Z_t + \varepsilon_{ict} \tag{1}$$

where, NIM_{ict} is the net interest margin of bank i in country c and at time t. fb_{ict} is the ownership dummy variable equal to one if the bank is foreign-owned and zero otherwise. X_{ict} is a vector of bank-specific variables: liquidity ratio *(liquidity)*, the equity ratio *(equityratio)*, the loan loss provision ratio *(llp_tea)*, bank market share *(share)* and the cost to income ratio *(cti)*. Y_{ct} *is* a vector of two country variables describing the overall banking industry, namely its degree of market concentration as measured by the Herfindahl-Hirschman index *(hhi)* and the share of foreign over total assets *(foreignshare)*. Z_{ct} is a vector of country macroeconomic variables: the rate of GDP growth *(gdpgrowth)*, the inflation rate *(inflation)* and the real interest rates *(real_ir)*.

We estimate the model using OLS with both country and year fixed effects. In this way we compare foreign and domestic banks within a given host country. The coefficient α_1 compares the NIMs of foreign and domestic banks within a country.

To investigate the impact of the mode of foreign bank entry on NIMs, in a second step, we decompose our main variable of interest, the foreign ownership dummy *(fb)*, into to dummy variables corresponding to two different modes of foreign entry: foreign greenfield banks *(fb_green)* and foreign acquisition banks *(fb_acq)*. The specification takes the following form:

$$NIM_{ict} = \alpha_0 + \alpha_1 fb\_acq_{ict} + \alpha_2 fb\_green_{ict} + \theta'_j X_{ict} + \mu'_k Y_{ct} + \omega'_n Z_{ct} + \varepsilon_{ict} \tag{2}$$

where, fb_acq_{it} is a dummy variable equal to one if a foreign bank entered the market acquiring an existing bank, and zero otherwise and fb_green_{it} is a dummy variable equal to one if a foreign bank entered the market via greenfield investment, and zero otherwise. The remaining variables are the same as in equation (1).

Finally, to evaluate the impact of home country factors like the regulatory setting and the geographical and regulatory distance between host and home countries on NIMs in host countries, we estimate the following specification:

$$NIM_{ict} = \alpha_0 + \alpha_1 fb_{ict} + \alpha_2 fb_{ict} * F_{ct} + \theta'_j X_{ict} + \mu'_k Y_{ct} + \omega'_n Z_{ct} + \varepsilon_{ict} \qquad (3)$$

where, F_{ct} represents home country factors. We include parent bank NIMs *(NIM_parent)*, home country regulatory indices and home-host country distance measures as described in section 4.3. The coefficient α_2 measures whether a particular home country attribute significantly impacts foreign bank NIMs compared to domestic banks in host countries.

5 Results

This section presents the results of our multiple regression analysis. In particular, Subsection 5.1 looks at the impact of foreign bank entry on NIMs. Subsection 5.2 investigates whether the mode of entry (greenfield versus acquisition) does matter in explaining the cost of financial intermediation, while Subsection 5.3 focuses on the role of home-country characteristics.

5.1. Foreign ownership

Table 7 shows the results of estimating our baseline specification (Equation 1). The coefficient of the foreign entry variable (*fb)* is not significant when we consider the full sample period (column 1) but it is negative and significant in the first sub-sample period 1995-2004 (column 2) and positive and significant in the second sub-sample 2005-2011 (column 3). These results seems to suggest that foreign banks change their behaviour over time. At the beginning of the foreign bank entry process, foreign banks operate with lower NIMs than domestic banks, consistently with our preliminary analysis and with several emerging market studies.[14] However, as the presence of foreign banks increases, foreign banks operate with higher NIMs than their domestic counterparties. Our results are confirmed when we interact our foreign bank entry variable with the time trend (column 4): foreign

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[14]Martinez Peria and Mody (2004), Claeys and Vander Vennet (2008), among others.

banks operate with lower NIM than domestic banks but over time the gap between foreign and domestic NIM goes down.

In the last column of Table 7, we interact our foreign entry variable with a proxy of foreign bank presence at the country level to see whether the NIM charged by foreign banks also depends on the ownership composition of the overall banking industry. Foreign bank entry can force domestic banks to become more efficient or give up some of the revenues they were able to realize before; hence a reduction in the overall level of bank spreads in host countries. Alternatively, foreign bank entry may force domestic banks to tilt their loan portfolios towards less transparent market segments, where they have informational advantages and can charge higher interest rates, making the overall impact on host country bank NIMs less clear cut.

The results of column 5 in Table 7 show that *foreignshare* alone (as measured by the share of total banking assets in the hand of foreign owners) has a positive and statistically significant coefficient on NIMs, suggesting that on average foreign bank presence increases the average NIM of the banking sector. Moreover the interacted term between (*fb*) and (*foreignshare*) is again positive and significant, suggesting that when the presence of foreign bank increases foreign bank start charging higher rates leading to higher NIMs than their domestic counterparties (notice that the interacted coefficient is larger than the coefficient of *fb* alone).

[Insert Table 7 around here]

Overall this evidence suggests that in the long term foreign bank entry does not have the beneficial effect of reducing transaction costs.

5.2. Mode of foreign bank entry

Table 8 shows the results from estimating equation (2) and provide evidence consistent with the one shown in the previous table. The mode of foreign entry seems to have no impact on NIMs when we consider the full sample (column 1). When looking at the two sub-sample periods separately, we find that both foreign acquisition and foreign greenfield banks operate with significantly lower NIMs than domestic banks in the first sample period (column 2), with foreign greenfield having a stronger effect (about 1.0% lower than those for domestic banks, compared with a 0.6% differential between foreign acquisition and domestic banks). However, in the second sample period, only foreign entry through greenfield remains significant but with positive sign, suggesting that in the long run foreign entry is associated

with increasing NIMs, consistently with Degryse et al (2012), showing that during the later stages of foreign bank entry there is a growing interest among foreign greenfield banks to lend to SMEs which provide higher NIMs.

This evidence is confirmed when we interact the mode of entry with a time trend (column 4) or with the foreign bank presence (column 5).

[Insert Table 8 around here]

5.3. Home-country characteristics

In this section we incorporate home-country factors into the analysis. In particular, we test whether parent bank NIMs (Table 9) and characteristics of the country of origin, like regulatory indicators (Table 9), have effects on NIMs charged by foreign banks in the host country.

[Insert Table 9 around here]

Table 9 shows the results from estimating equation (3) with parent bank NIMs as the main variable of interest. We find that foreign banks have lower NIMs than their domestic counterparties but foreign banks, with parent banks charging higher NIMs, operate with higher NIMs than domestic banks (column 1). The interaction term is particularly strong in the later sample period (column 3). Our findings are consistent with Kosmidou et al (2007) and Chen and Liao (2011)who find a strong positive relation between the profitability of the parent bank and the profitability of their subsidiaries/branches abroad. The positive relation may indicate that more profitable parent banks (i.e. with high NIMs) enter host countries because they can realize higher margins than in their home markets and possibly attract cheaper funding because of reputational benefits.

In Table 10, we interact our foreign entry variable (fb) with regulatory indicators and with the home-host country distance. Because some of the home country regulatory indices are highly correlated they have been included in the specification one at a time. The control variables are the same as the ones reported in previous tables, but have not been reported. The coefficients of the interaction terms with the restrictiveness of bank activity (*act_rest*) and bank ownership index *(ownership_restr)* and with the capital regulatory index *(cap_reg)* are positive and significant (and larger than the coefficient of *fb* alone), indicating that foreign banks whose countries of origin impose stricter requirements on bank activity and on the

ownership of non-financial firms and stricter capital regulation operate with larger NIMs compared to their domestic counterparts (Panel A). This evidence is consistent with the idea that foreign subsidiaries compensate the more limited profits opportunities in the country of origin, due to extensive restrictions imposed, by charging high NIMs in host countries. Another plausible explanation for the positive association of stricter home country regulation and foreign bank NIMs in host countries is the argument put forward by Berger et al (2000) that home countries with relatively tough regulation reduce the counterparty risk or certify the quality of their banks operating abroad. This allows them to get access to cheaper funding relative to other foreign banks, hence their higher margins. Similar results were reported by Ongena et al (2013) who find that home-country regulation is associated with higher risk-taking and lower lending standards abroad.

On the other hand, the coefficients of the interaction term with the two other indices (*sup_power*) and *(ext_audit)* are negative, suggesting that foreign banks charge lower NIMs than domestic banks when the countries of origin have stricter external audit and supervisory powers.[15] This evidence may suggest that stronger home country supervision can limit risk-taking activities also in the host country as long as foreign subsidiaries keep being under the control and scrutiny of home country supervisors. Finally, we incorporate geographical *(geo_dist),* but this variable does not significantly affect the NIMs charged by foreign banks (results not reported).

Overall our results show the importance of taking into account both host and home country factors when analysing the determinants of bank NIMs. Moreover, they suggest that there are cross-border regulatory spillovers through the behaviour of foreign banks in host countries. As emerging market regulation and supervision can be more lenient when countries are embarking in periods of financial liberalisation, foreign banks may engage in regulatory arbitrage in order to maximize their profits.

5.5. Control variables

Important insights about factors influencing NIMs can be gained from the control variables included in the specifications. Banks with higher liquidity ratios *(liquidity)* have higher NIMs. Higher liquidity ratios impose a cost on banks as they forego investing in more

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[15] Whether this leads to welfare gains is unclear. As a result of stricter regulation at home foreign banks may become more prudent and target the most transparent market segments only, which provide lower margins, aspect which we can only speculate on but not test due to lack of loan portfolio composition data.

profitable investments which cost they are able to pass on to their customers by increasing margins. The findings are consistent with Martinez Peria and Mody (2004), Brock and Suarez (2000) and others. The equity ratio *(equityratio)* is both positively and significantly related to NIMs. As with liquidity ratios, holding a high equity ratio is costly for banks, which makes them seek higher interest margins. Furthermore, well capitalized banks are seen as less risky attracting lower deposit rates hence boosting the net interest margins. The loan loss provisioning ratio (*llp_tea*) has also shown a strong positive association with NIMs. As expected, high loan loss provision ratio is an indicator of the low quality of the loan portfolio, which includes riskier but more profitable lending, which in turn reflects into higher NIMs. Bank efficiency is a significant determinant of NIMs. Results show that banks with higher cost to income ratios (*cti*) have lower NIMs. With regards to bank market structure, results show that it has a significant impact on NIMs: the primary measure of market structure used in our specifications, the Herfindahl-Hirschman index (*hhi*), is significantly associated with lower NIMs. This result supports the efficient-structure hypothesis according to which banks with larger market shares i.e. operating in more concentrated banking systems may be more efficient and gain from economies of scale thus reducing NIMs. Finally, among macroeconomic variables the GDP growth rate *(gdpgrowth)* and the rate of inflation *(inflation)* are the most important determinants of NIMs.

6. Robustness

In this section we address some concerns regarding the robustness our results. First, we address a possible endogeneity problem. Second we show that our results still hold when we use alternative measures for bank profitability and market structure.

6.1 Endogeneity concern

An obvious concern with studies that investigate foreign bank entry is that the decision to enter the host country can be endogenous. Foreign banks may decide to enter countries where NIMs are particularly high, as the profit opportunities are higher in these markets. Conversely, foreign banks may view high NIMs markets as riskier and be more prone to enter the markets with the lower NIMs. Therefore, the direction of the bias caused by endogeneity is a priori not clear. One way to address this problem is to rely on the instrumental variables (IV) approach. The challenge is to find valid instruments that are highly correlated with the bank decision to enter a foreign market and that influence NIMs through foreign bank presence only and not through other channels. We consider three instruments to model the

decision of a foreign bank to enter a country at the first stage: the population size of the host country as a measure of market size *(population)*, a measure of financial freedom *(financial_freedom)* and finally whether the host country is EU member *(eu_member)*. The rationale behind the first instrument is that foreign bank entry is significantly associated with the size of the host country. As Abiad et al (2010) argue, foreign banks entering small countries have an advantage as they need a relatively small investment to gain a significant market share in host countries. In addition by investing in several countries they can diversify their exposure to specific country risks. Foreign banks may also be inclined to enter larger countries as the opportunities for economies of scale are much higher. Therefore, a significant relation between population and foreign bank entry is expected. To be a valid instrument population should not affect NIMs through other channels. It can be argued that because the countries in our sample are relatively small, it can be easier for banks to gain market share which would in turn impact NIMs. We therefore, run separate regressions, and find that population size is not a significant determinant of bank market share which means that this channel is not operative in our sample.

The second instrument, *financial_freedom*, is the Heritage Foundation's index which measures, among others, the restrictiveness of bank regulation and supervision, the ease of foreign bank entry and the extent to which their operations are restricted in host countries. The identification strategy is similar to that of Jayaratne and Strahan (1996) who use the relaxation of bank branch restrictions in the US as an instrument to show that the quality of bank lending is positively related to economic growth.[16] It seems plausible that regulation on foreign bank entry alone should not affect the NIMs in host countries, satisfying the exclusion assumption. In a similar vein, we include the dummy variable indicating whether the host country is member of the EU. The rationale is that foreign banks are more likely to enter countries that are institutionally similar.

We have run our IV regression analysis using various combinations of the three instruments, all three at the same time, or a combination of two instruments at a time, or each instrument individually. We confirm all the results of our main analysis without IV, when we use the population size of the host country as our instrument (results not reported).

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[16] A similar identification strategy is used by Giannetti and Ongena (2009); Bruno and Hauswald (2013); Ongena et al (2013).

6.2 Alternative measures of bank profitability and market structure

We also run a set of robustness tests using alternative measures of bank efficiency. First, we use the overhead costs to total earning assets ratio (*overh_tea*). Given that related literature shows that the traditional cost ratios are not suitable measures of bank efficiency and that methods such as Data Envelopment Analysis (DEA) deliver better insights into bank efficiency and productivity, we also use the non-parametric DEA approach and calculate scale efficiency *(scale)* and technical efficiency *(technical).* Results remain qualitatively unchanged with alternative measures of bank efficiency.

Our results robust to different measures of market structure. We obtain very similar results if we use the three bank concentration ratio (*cr3*), the Lerner index or the Panzar-Rosse H-statistics.

Finally, our results remain qualitatively unchanged when we measure foreign bank presence by the number of foreign banks to total number of banks (*foreignshare_nr*), rather than the relative share of assets. This distinction is important as Claessens et al (2001) find that foreign bank share (in terms of the number of foreign banks) is significantly associated with competitive conditions in host countries, but that this is not the case when the alternative definition of foreign bank share is used (in terms of the assets of foreign banks).

In conclusion, our results seem not to be driven by the endogeneity of foreign bank entry and are robust to different measures of bank efficiency, market structure and foreign bank presence.

7. Conclusions

In this paper we investigate the impact of foreign bank entry on net interest margins in South East Europe over the period 1995 -2011. During this time frame, SEE countries experienced considerable political, economic and financial sector reforms, as they moved from centrally planned to market oriented economies. One of the key financial liberalisation policies during the transition period was increasing the presence of foreign investors, which lead to the proportion of assets owned by foreign banks to increase from virtually zero in the early 1990s to over 80% by 2011. However, whether the presence of foreign banks has been beneficial for the local economies remains controversial. Theory presents conflicting predictions on the role of foreign banks in emerging markets and the empirical evidence is equally inconclusive.

Our analysis contributes to the literature along different directions. We hand collect a new data set of bank ownership, which allows us to explore the dynamics of foreign banks' NIMs over the transition period. We carefully match parent banks with foreign affiliates and home and host countries, to exploit the heterogeneity of foreign bank entry and home country conditions and evaluate the resulting impact NIMs in host countries. Finally, our study also relates to the strand of literature on the impact of distance on bank activities. We show that foreign banks initially enter host countries' banking markets with lower NIMs compared to domestic incumbents. However, we also find evidence that foreign banks change their behaviour over time and as they become more established they tend to increase their margins. This possibly reflects a change in their lending portfolios towards more profitable but riskier investment opportunities. This finding is particularly significant for greenfield entry.

We also find that regulatory conditions in the home and host country influence bank behaviour. Foreign banks from countries with more stringent restrictions on bank activities have higher NIMs compared to domestic banks; this can be explained by banks seeking increased profit opportunities on activities which are restricted in their country of origin. This might also indicate that banks tend to engage in regulatory arbitrage. As home country regulation becomes more stringent, banks shift riskier activities abroad. This is particularly significant for emerging markets undergoing financial liberalization, as reforms might entail a more lenient regulatory structure that can be exploited by large multinational banks seeking profit opportunities in a less regulated environment. However, we also find evidence of regulatory spillovers: stricter supervisory standards at home, possibly extending to the supervision of foreign affiliates, seem to translate into lower NIMs in host countries. This may suggest that stronger home country supervision can limit risk-taking abroad if foreign banks remain under the supervision of the country of origin. This has particular relevance in a EU context as regulatory authorities are implementing a more stringent and unified supervisory framework. Our findings seem to suggest that the process of EU integration has lead to positive regulatory spillovers, particularly driven by a combination of increased supervisory power and private sector monitoring. Indeed the countries that have attracted the highest number of foreign bank entry are those countries which have become EU member states during the sample period, which had to adhere to the EU regulatory framework.

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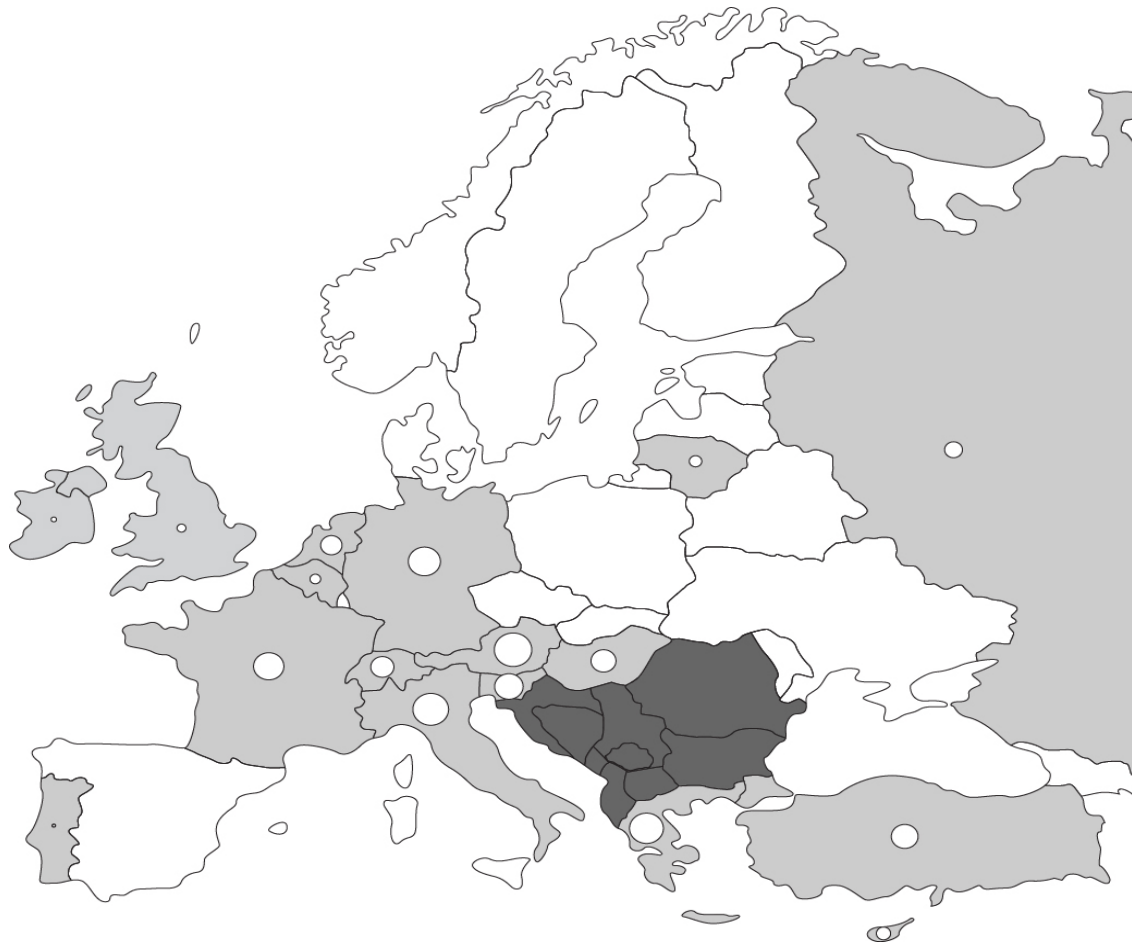
Figure 1.Host and home countries.
The map shows nine South-east European countries as host countries (in dark grey) and the home countries of foreign banks operating in this region (in light grey). The size of the circles shows the relative importance of home countries in the total South-east European banking system. The larger the circle the higher the number of foreign banks in SEE coming from that country.(Note: United States also belongs to home countries, although it does not appear on the map)

Table 1.Number of banks over time

This table shows the breakdown of the total number of banks and foreign banks in the sample by years. The distinction between foreign greenfield banks and foreign M&A banks is also made. Foreign bank share (assets) represents the presence of foreign banks in terms of total banking assets. The last column 1995-2011 shows aggregate values for the entire sample period.

Variables	1995	1996	1997	1998	1999	2000	2001	2002	2003
Total number of banks	36	65	106	120	136	146	158	176	189
Number of foreign banks	1	5	19	28	44	60	71	82	96
- M&A	0	0	4	6	10	26	29	35	46
- Greenfield	1	5	15	22	34	34	42	47	50
Foreign Bank share (assets)	0.0027	0.0103	0.0634	0.1140	0.1951	0.4347	0.4733	0.5525	0.6065

Variables	2004	2005	2006	2007	2008	2009	2010	2011	1995-2011
Total number of banks	186	178	176	174	176	178	173	142	2515
Number of foreign banks	92	105	113	120	121	120	119	93	1289
- M&A	43	56	69	79	78	79	78	59	697
- Greenfield	49	49	44	41	43	41	41	34	592
Foreign Bank share (assets)	0.6195	0.7850	0.8214	0.8392	0.8469	0.8377	0.8364	0.8160	0.5973

Table 2. Average NIMs over time
This table shows the evolution of average NIMs of all banks, foreign and domestic banks over time. It also shows the average difference in NIMs between domestic and foreign banks over time. The last row 1995-2011 shows aggregate values for the entire sample period.

Variables	NIM-all banks	NIM-domestic banks	NIM-foreign banks	Δ NIM
1995	0.062	0.063	0.036	0.027
1996	0.089	0.095	0.028	0.067
1997	0.071	0.074	0.062	0.012
1998	0.082	0.087	0.066	0.020
1999	0.080	0.087	0.067	0.020
2000	0.068	0.073	0.061	0.011
2001	0.061	0.071	0.050	0.021
2002	0.056	0.066	0.045	0.021
2003	0.061	0.069	0.053	0.016
2004	0.064	0.072	0.057	0.014
2005	0.060	0.065	0.056	0.009
2006	0.056	0.061	0.053	0.007
2007	0.053	0.054	0.053	0.001
2008	0.058	0.060	0.057	0.003
2009	0.062	0.054	0.065	-0.011
2010	0.045	0.048	0.044	0.004
2011	0.049	0.045	0.051	-0.006
1995-2011	0.062	0.069	0.055	0.014

Table 3. Average NIMs and Profits by countries and bank ownership type (1995-2011).
This table shows the decomposition of bank Net Income (after tax) according to the following accounting identity: Net Income (NI) ≡ Net interest income (NIM) + Noninterest Income (NII) - Overhead Costs (OC) – Loan Loss Provisions (LLP) - Taxes. The figures are shown over Total Earning Assets.

Country	NIM	NII	OC	LLP	Taxes	NI
Albania	3.7%	1.2%	3.5%	0.7%	0.3%	0.7%
Bosnia-Herzegovina	5.8%	5.6%	7.8%	2.5%	0.1%	0.6%
Bulgaria	5.0%	6.5%	8.3%	2.1%	0.5%	1.3%
Croatia	4.8%	2.8%	5.2%	1.4%	0.3%	0.8%
Kosovo	6.7%	2.4%	5.8%	1.4%	0.4%	1.5%
Macedonia (FYROM)	6.7%	4.6%	8.1%	2.5%	0.3%	0.6%
Montenegro	6.2%	4.8%	8.5%	2.5%	0.1%	-0.2%
Romania	7.6%	5.7%	16.9%	1.8%	0.8%	-6.1%
Serbia	8.3%	13.3%	14.6%	5.6%	0.1%	1.6%
All countries-by ownership						
All countries	6.2%	6.0%	9.7%	2.4%	0.4%	-0.2%
Domestic banks	6.9%	7.8%	9.7%	3.3%	0.5%	1.4%
Foreign banks	5.5%	4.2%	9.7%	1.7%	0.3%	-1.8%

Table 4 Home and Host Countries

This table shows, in Panel A, the number of banks which have entered each of the SEE countries (foreign banks) and the number of countries of origin (home countries). It also shows the average differences in NIM between the parent bank (in the home country) and the foreign bank (in the host country) as well as average differences between NIM at the country level. In Panel B, it shows the number of foreign banks each home country has set up during the sample period and in how many different host countries in the SEE region. It also shows the average differences in NIM between the parent bank (in the home country) and the foreign bank (in the host country) as well as average differences between NIM at the country level

Host Country	N. of foreign banks	N. of home countries	Foreign-Parent NIM	Host-Home Country NIM
Panel A				
Albania	12	8	0.74%	0.35%
Bosnia	18	6	1.76%	2.49%
Bulgaria	23	10	2.47%	1.62%
Croatia	31	5	1.97%	1.81%
Kosovo	5	4	4.91%	4.48%
Macedonia	8	7	3.54%	3.63%
Montenegro	9	7	2.85%	3.30%
Romania	38	9	5.07%	4.01%
Serbia	22	9	4.24%	5.56%
Home Country	**N. of foreign banks**	**N. of host countries**	**Foreign-Parent NIM**	**Host-Home Country NIM**
Panel B				
Austria	34	9	2.32%	3.72%
France	15	8	4.37%	4.06%
Germany	21	8	2.97%	3.20%
Greece	23	6	1.79%	3.64%
Hungary	7	5	-1.67%	1.88%
Italy	34	6	5.70%	2.82%
Netherlands	3	2	2.50%	4.39%
Slovenia	13	6	2.20%	4.72%
Turkey	9	4	-1.30%	-2.78%
USA	10	3	4.90%	2.12%

Table 5 Regulation and Supervision in Home and Host Countries

This table shows the average value for r on three indicators of bank regulation (*Activity restrictions, Ownership restrictions* and *Capital regulations*) and three indicators of bank supervision (*Official supervisory power, External Auditing and Transparency),* based on the Regulation and Supervision Survey (BRSS) carried out by the World Bank and the database compiled by the database compiled by Barth, Caprio and Levine (2013).

Host Country	*Regulation*			*Superivision*		
	act_restr	*ownership_restr*	*cap_reg*	*sup_power*	*ext_audit*	*transparency*
Albania	0.57	0.59	0.14	0.72	0.77	0.41
Bosnia-Herzegovina	0.56	0.54	0.33	0.84	0.93	0.46
Bulgaria	0.60	0.42	0.58	0.71	0.99	0.75
Croatia	0.43	0.31	0.24	0.72	1.00	0.87
Kosovo	0.86	0.79	0.62	0.86	0.89	0.44
Macedonia	0.62	0.53	0.24	0.76	0.73	0.59
Montenegro	0.40	0.43	0.60	0.16	0.48	0.50
Romania	0.82	0.46	0.27	0.63	0.75	0.43
Serbia	0.61	0.34	0.49	0.34	0.62	0.55
Average	*0.60*	*0.43*	*0.35*	*0.64*	*0.86*	*0.62*
Home Country	*Regulation*			*Superivision*		
	act_restr	*ownership_restr*	*cap_reg*	*sup_power*	*ext_audit*	*transparency*
Austria	0.25	0.33	0.54	0.73	0.99	0.49
Italy	0.75	0.64	0.23	0.44	0.54	0.87
Greece	0.55	0.34	0.34	0.66	0.90	0.81
Germany	0.21	0.36	0.50	0.53	0.85	0.55
France	0.44	0.35	0.53	0.50	0.83	0.68
Slovenia	0.68	0.48	0.58	0.85	1.00	0.96
Turkey	0.66	0.37	0.38	0.90	1.00	0.84
United States	0.76	0.72	0.41	0.86	0.75	0.75
Hungary	0.73	0.44	0.74	0.91	1.00	0.86
Netherlands	0.25	0.25	0.49	0.48	0.90	0.83
Average	*0.49*	*0.43*	*0.44*	*0.65*	*0.84*	*0.72*

Table 6 Descriptive statistics and correlation matrix

Panel A. Descriptive Statistics.- This table shows descriptive statistics for the variables used. Obs. denotes the number of observations; Std. Dev. the standard deviation; Summary statistics are shown for the whole sample, as well as separately for bank ownership types and two sample periods. Mean difference tests are based on the t-test with equal variances. * indicates significance at the 10% level. ** at the 5% level. *** at the 1% level. Table A1 contains variable definitions.

Variables	All banks			Foreign banks			Domestic banks			Mean Diff. For. vs Dom.	(1995-2004)			(2005-2011)			Mean Diff. (95-04) vs (05-11)
	Obs	Mean	Std. Dev.	Obs	Mean	Std. Dev.	Obs	Mean	Std. Dev.		Obs	Mean	Std. Dev.	Obs	Mean	Std. Dev.	
Dependent variable NIM	2487	0.062	0.054	1283	0.055	0.052	1199	0.069	0.056	0.014***	1291	0.068	0.055	1196	0.055	0.053	-0.013***
Independent variables																	
Bank characteristics fb	2515	0.513	0.500	1289	1.000	0.000	1221	0.000	0.000	-1.000	1318	0.378	0.485	1197	0.661	0.474	
fb_acq	2515	0.277	0.448	1289	0.541	0.499	1221	0.000	0.000	-0.541***	1318	0.151	0.358	1197	0.416	0.493	0.283***
fb_green	2515	0.235	0.424	1289	0.459	0.499	1221	0.000	0.000	-0.459***	1318	0.227	0.419	1197	0.245	0.430	0.265***
share	2515	0.052	0.087	1289	0.059	0.087	1221	0.043	0.085	-0.016***	1318	0.052	0.096	1197	0.053	0.077	0.018
liquidity	1910	0.218	0.155	976	0.234	0.151	930	0.201	0.156	-0.033***	1040	0.166	0.136	870	0.281	0.153	0.001
equityratio	2515	0.191	0.180	1289	0.163	0.195	1221	0.220	0.156	0.057***	1318	0.217	0.163	1197	0.162	0.192	0.115***
llp_tea	2382	0.024	0.073	1239	0.017	0.032	1139	0.033	0.099	0.016***	1227	0.031	0.093	1155	0.017	0.041	-0.055***
cti	2488	0.097	0.493	1281	0.097	0.654	1202	0.097	0.220	0.000	1294	0.092	0.208	1194	0.103	0.679	-0.014***
NIM_parent	1097	0.031	0.027	1097	0.031	0.027					385	0.030	0.027	712	0.031	0.026	2.411
Market structure foreignshare	2515	0.597	0.309								1318	0.389	0.287	1197	0.826	0.097	0.001
hhi	2515	0.146	0.083								1318	0.162	0.098	1197	0.128	0.058	0.437***
Macroeconomic gdpgrowth	2495	0.037	0.044								1298	0.044	0.045	1197	0.029	0.041	-0.034***
inflation	2473	0.193	0.958								1276	0.323	1.320	1197	0.054	0.037	-0.014***
real_ir	2396	0.055	0.118								1208	0.057	0.162	1188	0.054	0.034	-0.269***
Home Country Regulation act_restr	1247	0.493	0.249								497	0.446	0.265	750	0.524	0.233	-0.003
ownership_restr	1245	0.432	0.189								495	0.368	0.228	750	0.474	0.144	0.079***
cap_reg	1254	0.442	0.252								494	0.467	0.247	760	0.426	0.255	0.106***
sup_power	1286	0.647	0.187								497	0.657	0.187	789	0.640	0.187	-0.040***
ext_audit	1279	0.841	0.215								497	0.810	0.269	782	0.862	0.168	-0.017
transparency	1279	0.724	0.236								497	0.601	0.224	782	0.802	0.210	0.052***
Distance measures geo_dist	1288	6.751	0.784														0.201***
	2487	0.062	0.054	1283	0.055	0.052	1199	0.069	0.056	0.014***	1291	0.068	0.055	1196	0.055	0.053	

Table 6 Descriptive statistics and correlation matrix

Panel B. Correlation Matrix. This table shows pair-wise correlation coefficients between variables. * indicates significance at least at the 10% level.

		1	2	3	4	5	6	7	8	9	10	11
1	NIM	1										
2	fb	-0.1314*	1									
3	fb_acq	-0.0936*	0.6039*	1								
4	fb_green	-0.0558*	0.5411*	-0.3436*	1							
5	share	-0.0916*	0.0867*	0.1724*	-0.0797*	1						
6	liquidity	0.1215*	0.1061*	0.1221*	-0.0049	-0.0011	1					
7	equityratio	0.2958*	-0.1578*	-0.1529*	-0.0246	-0.2084*	-0.1069*	1				
8	llp_tea	0.1947*	-0.1107*	-0.0453*	-0.0821*	-0.0246	-0.0216	0.0604*	1			
9	cti	-0.0611*	0.0850*	0.026	0.0726*	-0.1758*	0.0678*	0.0177	-0.0241	1		
10	NIM_parent	0.1550*	.	-0.2392*	0.2392*	0.0315	-0.049	0.0700*	-0.0345	0.0261	1	
11	foreignshare	-0.1943*	0.3560*	0.3205*	0.0814*	-0.0231	0.2559*	-0.1974*	-0.1619*	0.0473*	0.0035	1
12	hhi	0.007	-0.0501*	-0.1079*	0.0548*	0.3802*	-0.1733*	-0.0031	-0.012	-0.0093	0.1332*	-0.2706*
13	gdpgrowth	-0.0452*	-0.0319	-0.0471*	0.0123	0.0579*	0.0233	0.0259	-0.032	-0.0311	0.0079	-0.0832*
14	inflation	0.0486*	-0.0683*	-0.0761*	0.0002	-0.0003	-0.0187	0.0000	0.2481*	-0.0485*	-0.0229	-0.2168*
15	real_ir	0.0063	-0.0048	0.0137	-0.0202	0.0550*	-0.0851*	0.0179	-0.1533*	0.0133	0.0721*	0.0354*
16	act_restr	0.0536*	.	0.1792*	-0.1792*	-0.0545*	0.0811*	-0.0014	0.0571*	0.0238	0.0451	0.1708*
17	ownership_restr	0.0898*	.	0.1312*	-0.1312*	0.0173	0.1706*	-0.0148	0.0563*	0.0123	0.0166	0.3172*
18	cap_reg	-0.0187	.	-0.0385	0.0385	-0.0243	-0.0462	-0.0247	0.0046	0.0515*	0.0356	-0.0809*
19	sup_power	-0.0193	.	-0.0146	0.0146	-0.0184	-0.1110*	0.0980*	0.0213	0.0056	0.0303	-0.0771*
20	ext_audit	-0.0768*	.	0.0504*	-0.0504*	0.0649*	0.0364	-0.0055	-0.0276	-0.0078	0.0275	0.0913*
21	transparency	0.0281	.	0.2288*	-0.2288*	-0.011	0.1943*	-0.0185	0.0635*	-0.0215	0.0203	0.3639*
22	geo_dist	0.1071*	.	-0.2368*	0.2368*	-0.0991*	0.0844*	0.0298	0.0325	0.0411	0.0437	-0.0427

Table 6 Descriptive statistics and correlation matrix

Panel B continued. Correlation Matrix. This table shows pair-wise correlation coefficients between variables. * indicates significance at least at the 10% level.

		12	13	14	15	16	17	18	19	20	21	22
1	NIM											
2	fb											
3	fb_acq											
4	fb_green											
5	share											
6	liquidity											
7	equityratio											
8	llp_tea											
9	cti											
10	NIM_parent											
11	foreignshare											
12	hhi	1										
13	gdpgrowth	0.0348*	1									
14	inflation	0.0979*	-0.1376*	1								
15	real_ir	0.0360*	0.1376*	-0.7638*	1							
16	act_restr	-0.013	-0.0304	-0.0242	-0.0002	1						
17	ownership_restr	-0.0343	-0.0789*	-0.0418	0.0096	0.6063*	1					
18	cap_reg	0.0398	0.036	-0.0014	0.0174	-0.0866*	-0.2809*	1				
19	sup_power	0.0182	0.0346	0.0208	-0.0068	-0.0035	-0.2388*	0.3921*	1			
20	ext_audit	-0.0578*	0.0493*	-0.0246	-0.0016	-0.3330*	-0.4507*	0.2556*	0.5952*	1		
21	transparency	-0.0931*	-0.0458	-0.1032*	0.0321	0.5632*	0.4389*	-0.2363*	0.0638*	-0.1124*	1	
22	geo_dist	0.0178	0.0404	0.0608*	-0.0635*	0.0881*	0.2244*	-0.0697*	0.0824*	-0.1706*	0.0471*	1

Table 7 The impact of foreign bank ownership on bank NIMs

This table shows regression results of the impact of foreign bank ownership on host country NIMs while controlling for bank specific, market structure and macroeconomic factors. The dependent variable is bank NIM. Table A1 contains definitions of all variables. The model is estimated using OLS with both country and year fixed effects. All the estimations are made for the whole sample (1995-2011), for the first sample period only (1995-2004) and for the second sample period only (2005-2011). Robust standard errors appear in brackets. * indicates significance at the 10% level. ** at the 5% level. *** at the 1% level.

| | (1) | (2) | (3) | (4) | (5) |
	(1995-2011)	*(1995-2004)*	*(2005-2011)*	*Trend interact.*	*Foreignshare Inter.*
fb	-0.003	-0.008***	0.004*	-0.015***	-0.010*
	(0.002)	(0.003)	(0.002)	(0.005)	(0.005)
fb*trend				0.001***	
				(0.000)	
fb*foreignshare					0.012*
					(0.007)
foreignshare					0.022**
					(0.011)
share	-0.000	-0.008	-0.012	-0.006	-0.004
	(0.012)	(0.017)	(0.011)	(0.011)	(0.012)
liquidity	0.045***	0.039*	0.051***	0.046***	0.045***
	(0.010)	(0.021)	(0.011)	(0.010)	(0.011)
equityratio	0.116***	0.115***	0.116***	0.116***	0.117***
	(0.017)	(0.021)	(0.026)	(0.017)	(0.017)
llp_tea	0.065***	0.080***	0.055	0.063***	0.065***
	(0.018)	(0.020)	(0.043)	(0.018)	(0.018)
cti	-0.000***	-0.000***	-0.000***	-0.000***	-0.000***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
hhi	-0.079***	-0.064	-0.114*	-0.074***	-0.070**
	(0.027)	(0.050)	(0.064)	(0.027)	(0.027)
gdpgrowth	-0.155***	-0.164**	-0.038	-0.156***	-0.141**
	(0.058)	(0.079)	(0.051)	(0.059)	(0.057)
inflation	-0.002	-0.002	0.134***	-0.001	-0.003
	(0.003)	(0.003)	(0.048)	(0.003)	(0.003)
real_ir	-0.008	-0.001	-0.001	-0.008	-0.021
	(0.030)	(0.034)	(0.050)	(0.030)	(0.031)
constant	0.082***	0.059	0.051***	0.083***	0.080***
	(0.024)	(0.039)	(0.014)	(0.023)	(0.023)
N	1694	860	834	1694	1694
R-sq	0.324	0.343	0.417	0.327	0.329

Table 8. The impact of the mode of foreign bank entry on bank NIMs in host countries

This table shows regression results of the impact of the mode of foreign bank entry on host country NIMs while controlling for bank specific, market structure and macroeconomic factors. The dependent variable is bank NIM. Table A1 contains definitions of all variables. The model is estimated using OLS with both country and year fixed effects. All the estimations are made for the whole sample (1995-2011), for the first sample period only (1995-2004) and for the second sample period only (2005-2011). Robust standard errors appear in brackets. * indicates significance at the 10% level. ** at the 5% level. *** at the 1% level.

	(1)	(2)	(3)	(4)	(5)
	(1995-2011)	*(1995-2004)*	*(2005-2011)*	*Trend interact.*	*Foreignshare Inter.*
fb_acq	-0.003	-0.006**	0.003	-0.015***	-0.003
	(0.002)	(0.003)	(0.003)	(0.005)	(0.006)
fb_green	-0.002	-0.010***	0.005**	-0.016**	-0.014**
	(0.002)	(0.003)	(0.002)	(0.007)	(0.006)
fb_acq*trend				0.001***	
				(0.000)	
fb_green*trend				0.001**	
				(0.001)	
fb_acq*foreignshare					0.001
					(0.007)
fb_green*foreignshare					0.019**
					(0.008)
foreignshare					0.023**
					(0.011)
share	0.001	-0.011	-0.010	-0.004	-0.003
	(0.012)	(0.017)	(0.010)	(0.011)	(0.012)
liquidity	0.045***	0.038*	0.051***	0.046***	0.044***
	(0.010)	(0.021)	(0.011)	(0.011)	(0.011)
equityra~o	0.116***	0.114***	0.115***	0.116***	0.116***
	(0.017)	(0.021)	(0.026)	(0.017)	(0.017)
llp_tea	0.065***	0.079***	0.055	0.063***	0.065***
	(0.018)	(0.020)	(0.043)	(0.018)	(0.018)
cti	-0.000***	-0.000***	-0.000***	-0.000***	-0.000***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
hhi	-0.079***	-0.065	-0.116*	-0.075***	-0.068**
	(0.027)	(0.050)	(0.064)	(0.027)	(0.028)
gdpgrowth	-0.155***	-0.165**	-0.039	-0.156***	-0.140**
	(0.058)	(0.079)	(0.051)	(0.059)	(0.057)
inflation	-0.002	-0.002	0.133***	-0.001	-0.003
	(0.003)	(0.003)	(0.048)	(0.003)	(0.003)
real_ir	-0.008	-0.001	0.001	-0.008	-0.022
	(0.030)	(0.034)	(0.051)	(0.030)	(0.031)
constant	0.081***	0.062	0.051***	0.083***	0.080***
	(0.024)	(0.039)	(0.014)	(0.023)	(0.023)
N	1694	860	834	1694	1694
R-sq	0.324	0.343	0.417	0.327	0.330

Table 9. The impact of parent bank NIMs on bank NIMs in host countries

This table shows regression results of the impact of parent bank NIMs on foreign bank NIMs in host countries while controlling for bank specific, market structure and macroeconomic factors. The dependent variable is bank NIM. Table A1 contains definitions of all variables. The model is estimated using OLS with both country and year fixed effects. All the estimations are made for the whole sample (1995-2011), for the first sample period only (1995-2004) and for the second sample period only (2005-2011). Robust standard errors appear in brackets. * indicates significance at the 10% level. ** at the 5% level. *** at the 1% level.

	(1)	(2)	(3)
	(1995-2011)	*(1995-2004)*	*(2005-2011)*
fb	-0.006***	-0.009***	-0.002
	(0.002)	(0.003)	(0.003)
fb*NIM_parent	0.155***	0.035	0.229***
	(0.043)	(0.080)	(0.047)
share	-0.002	-0.008	-0.014
	(0.012)	(0.017)	(0.010)
liquidity	0.046***	0.039*	0.052***
	(0.010)	(0.021)	(0.011)
equityratio	0.117***	0.115***	0.119***
	(0.017)	(0.021)	(0.026)
llp_tea	0.065***	0.080***	0.059
	(0.018)	(0.020)	(0.042)
cti	-0.000***	-0.000***	-0.000***
	(0.000)	(0.000)	(0.000)
hhi	-0.076***	-0.064	-0.120**
	(0.027)	(0.050)	(0.061)
gdpgrowth	-0.154***	-0.165**	-0.013
	(0.059)	(0.079)	(0.050)
inflation	-0.002	-0.002	0.144***
	(0.003)	(0.003)	(0.045)
real_ir	-0.008	-0.001	0.017
	(0.030)	(0.034)	(0.048)
constant	0.082***	0.059	0.048***
	(0.023)	(0.039)	(0.014)
N	1694	860	834
R-sq	0.329	0.343	0.443

Table 10. The impact of home-country regulatory indicators and home-host country distance on bank NIMs in host countries

This table represents the impact of home-country banking regulation and supervision indicators and home-host country distance on foreign bank NIMs in host countries while controlling for bank specific, market structure and macroeconomic factors (control variables have not been reported to conserve space). As the home country variables are highly correlated they have been included in the regressions one at a time. Each column represents a single regression for different home-country variables. All the estimations are made for the whole sample (1995-2011), for the first sample period only (1995-2004) and for the second sample period only (2005-2011). The dependent variable is bank NIM. Table A1 contains definitions of all variables. The model is estimated using OLS with both country and year fixed effects. Robust standard errors appear in brackets. * indicates significance at the 10% level. ** at the 5% level. *** at the 1% level.

PANEL A	act_restr			ownership_restr			cap_reg		
	(1995-2011)	*(1995-2004)*	*(2005-2011)*	*(1995-2011)*	*(1995-2004)*	*(2005-2011)*	*(1995-2011)*	*(1995-2004)*	*(2005-2011)*
fb	-0.013***	-0.015***	-0.004	-0.014***	-0.017***	-0.008**	-0.005**	-0.007	-0.000
	(0.002)	(0.003)	(0.003)	(0.003)	(0.004)	(0.003)	(0.002)	(0.005)	(0.002)
fb*home country var.	0.017***	0.014**	0.012***	0.024***	0.022***	0.022***	0.002	-0.004	0.007*
	(0.003)	(0.006)	(0.003)	(0.005)	(0.007)	(0.005)	(0.004)	(0.006)	(0.004)
controls	yes	yes	yes	yes	yes	yes	yes	yes	yes
constant	0.066***	0.037	0.055***	0.068***	0.042	0.056***	0.061**	0.036	0.056***
	(0.024)	(0.041)	(0.015)	(0.024)	(0.041)	(0.015)	(0.025)	(0.041)	(0.015)
N	1603	838	765	1601	836	765	1603	836	767
R-sq	0.348	0.360	0.469	0.349	0.362	0.470	0.344	0.359	0.462

PANEL B	sup_power			ext_audit			transparency		
	(1995-2011)	*(1995-2004)*	*(2005-2011)*	*(1995-2011)*	*(1995-2004)*	*(2005-2011)*	*(1995-2011)*	*(1995-2004)*	*(2005-2011)*
fb	-0.004	-0.001	-0.003	0.006	0.000	0.013***	-0.011***	-0.014***	-0.003
	(0.003)	(0.006)	(0.003)	(0.004)	(0.005)	(0.005)	(0.003)	(0.005)	(0.004)
fb*home country var.	-0.001	-0.012	0.008**	-0.012**	-0.012**	-0.012**	0.009***	0.008	0.007*
	(0.004)	(0.008)	(0.004)	(0.005)	(0.006)	(0.005)	(0.003)	(0.008)	(0.004)
controls	yes	yes	yes	yes	yes	yes	yes	yes	yes
constant	0.063***	0.039	0.054***	0.065***	0.039	0.059***	0.063***	0.034	0.058***
	(0.024)	(0.041)	(0.014)	(0.024)	(0.042)	(0.015)	(0.024)	(0.041)	(0.015)
N	1633	838	795	1626	838	788	1626	838	788
R-sq	0.345	0.359	0.468	0.347	0.360	0.468	0.346	0.359	0.467

Appendices

Appendix A1.- Variable Definitions and Sources

Variable	Definition	Source
Bank characteristics		
NIM	(Interest Income-Interest Expense)/Total Earning Assets.	Bankscope
fb	A dummy variable equal to 1 if the bank is at least 51% foreign owned.	Hand collected
fb_acq	A dummy variable equal to 1 if at least 51% of the bank is owned by foreign investors which entered the market acquiring an existing bank.	Hand collected
fb_green	A dummy variable equal to 1 if at least 51% of the bank is owned by foreign investors which entered the market by establishing a new bank.	Hand collected
share	Share of total assets held by each bank to the country's total bank assets.	Bankscope
liquidity	Cash and due from other banks including the central bank over total assets.	Bankscope
equityratio	Total equity (bank capital plus reserves) over total assets.	Bankscope
llp_tea	The ratio of loan loss provisions over total earning assets.	Bankscope
overh_tea	The ratio of overheads over total earning assets.	Bankscope
cti	Cost to income ratio.	Bankscope
technical	Technical Efficiency estimated using DEA.	own calculations
scale	Scale efficiency estimated using DEA.	own calculations
Banking sector characteristics		
foreignshare	Share of assets held by foreign banks.	Hand collected
foreignshare_nr	The number of foreign banks to total number of banks.	Hand collected
hhi	Sum of the squared bank market shares (total assets).	Bankscope
cr3	Share of total assets held by the top 3 banks in the system.	Bankscope
Lerner	A non-structural measure of competition as measured by the Lerner index.	Bankscope
hstat	A non-structural measure of competition as measured by the Panzar Rosse H-stat.	Bankscope
Macroeconomic variables		
gdpgrowth	Gross Domestic Product growth rate (in %).	World Development Indicators
inflation	Consumer Price Index growth rate (in %).	World Development Indicators
real_ir	The real market interest rate (in %).	World Development Indicators
Banking regulation and supervision		
act_restr	Index relating to restrictions on bank activities.	Barth et al (2013)
ownership_restr	Index relating to restrictions on bank ownership.	Barth et al (2013)
cap_reg	Index relating to bank capital requirements.	Barth et al (2013)
sup_power	Index relating to bank supervisory powers.	Barth et al (2013)
ext_audit	Index relating to the effectiveness of the bank external audit.	Barth et al (2013)
transparency	Index relating to the measure of bank transparency.	Barth et al (2013)
Distance measures		
geo_dist	A mesure of geographic distance between home and host countries calculated following the great circle formula which uses the geographic coordinates of the capital cities.	CEPII (2011)
brs_dist	The Euclidian distance between the banking regulation and supervision indicators of the home and host country.	own calculations

Appendix 2. Testing for structural breaks in *foreignshare* variable

The Chow test (Chow, 1960) pre-supposes that we know the date at which the structural break occurs. More realistically, in our case the exact structural change can happen at years shortly before or after the year 2005 suggested by the visual inspection of the time series plot. Because we cannot state with accuracy the year of the structural change, a modified Chow test- the Quandt likelihood ratio (QLR) statistics is used (also known as the sup-Wald statistics) (Quandt, 1960). The QLR statistic is a modified Chow test which tests for breaks at all possible dates within a sub-sample range, and then using the largest of the resulting F-statistics to test for a break at an unknown date. Since the QLR statistics is the largest of many F-statistics, its critical values are obtained from a special distribution which is different from that of an individual F-statistic. This distribution depends on the number of restrictions, i.e. the number of coefficients (including the intercept) that are allowed to break (change) under the alternative hypothesis as well as on the subsample range over which the F-statistics are computed. A common choice is a 15% trimming, which means that the F-statistics are computed for break dates within the central 70% of the sample. The critical values for different trimming percentages, number of restrictions and significance levels are given in Stock and Watson (2012, Table 14.6) and Andrews (2003). In our case the critical value with 15% trimming, 2 degrees of freedom (one lag and the intercept) and 5% significance level is $F_{2,5\%} = 5.86$. Results are shown in Table A1. We note that the largest of the F-values is realized in 2004 and exceeds the 5% critical value, suggesting that this is an estimator of the break date.

Table A2. QRL test for break in *Foreignshare* series with 15% trimming

Year	QLR statistics
1995	.
1996	.
1997	2.8443
1998	3.9448
1999	10.9186
2000	4.8190
2001	5.4693
2002	4.3989
2003	4.6363
2004	385.2596
2005	5.9758
2006	7.6145
2007	5.2487
2008	4.8765
2009	.
2010	.
2011	.

Fig A1. QRL test for break in *Foreignshare* series
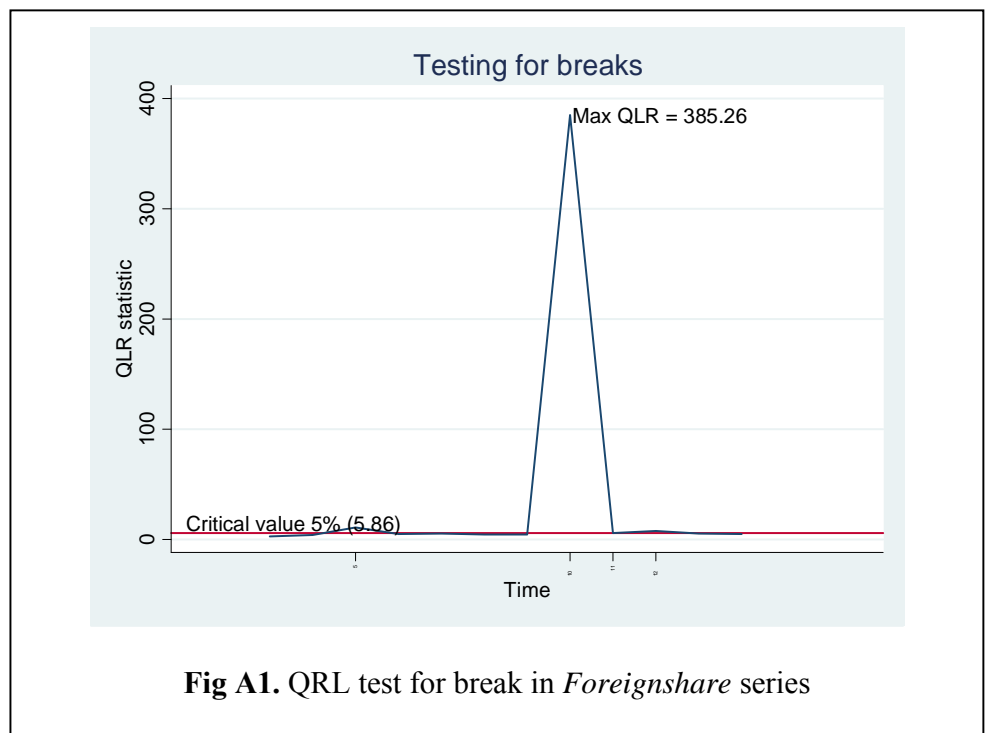
Appendix 3.-Definition of Banking Regulation and Supervision indices*

Index (notation)	Definition	Survey Questions
Restrictions on banking activities (act_restr)	The extent to which banks may engage in securities, insurance and real estate activities.	What are the conditions under which banks can engage in securities/insurance/real estate activities?
Restrictions on bank ownership (ownership_restr)	The extent to which banks may own nonfinancial firms and the extent to which nonfinancial firms and nonbank financial firms may own and control banks.	What are the conditions under which banks can engage in nonfinancial businesses? Can nonfinancial firms own voting shares in commercial banks? Can nonbank financial firms own voting shares in commercial banks?
Capital regulatory index (cap_reg)	Whether capital requirements reflect certain risk elements and deduct certain market value losses from capital before minimum capital adequacy is determined and whether certain funds may be used to initially capitalize a bank.	Is the capital ratio risk weighted in line with Basel guidelines? Does the minimum ratio vary with an individual bank's credit risk? Does the minimum ratio vary as a function of market risk? Before minimum capital adequacy is determined which items are deducted from the book value of capital? Are the sources of funds to be used as capital verified by the regulatory/supervisory authorities? Can the initial disbursement or subsequent injections of capital be done with assets other than cash or government securities? Can the initial disbursement of capital be done with borrowed funds?
Official supervisory power (sup_power)	Whether supervisory authorities have the authority to take specific actions to prevent and correct problems.	Can supervisors meet external auditors to discuss report without bank approval? Are auditors legally required to report misconduct by managers/directors to supervisory agency? Can legal action against external auditors be taken by supervisors for negligence? Can supervisors force banks to change internal organizational structure? Are off-balance sheet items disclosed to supervisors? Can the supervisory agency order directors/management to constitute provisions to cover actual/potential losses? Can the supervisory agency supercede bank shareholder rights and declare bank insolvent? Does banking law allow supervisoy agency to suspend some or all ownership rights of a problem bank?
Strength of external audit (ext_audit)	The effectiveness of external audit of banks.	Is an external audit a compulsory obligation for banks? Are specific requirements for the extent or nature of the audit spelled out? Are auditors licensed or certified? Do supervisors get a copy of the auditor's report? Does the supervisory agency have the right to meet with external auditors to discuss their report without the approval of the bank? Are auditors required by law to communicate directly to the supervisory agency any presumed involvement of bank directors or senior managers in illicit activities, fraud, or insider abuse? Can supervisors take legal action against external auditors for negligence?
Financial statement transparency (transparency)	The transparency of bank financial statements practices.	Does accrued, though unpaid, interest/principal enter the income statement while the loan is still performing? Are banks required to prepare consolidated accounts for accounting purposes? Do banks disclose to the public: off-balance sheet items; risk management procedures? Are bank directors legally liable if information disclosed is erroneous or misleading? Does accrued, though unpaid, interest/principal enter the income statement while the loan is still non-performing?

Source: Barth et al (2013), * higher values indicate more restrictive banking regulation and supervision indicators.

Appendix 4.-Data coverage for selected years

Countries	Variables	1999	2001	2003	2005	2007	2008	2009	2010	2011
Albania	Total number of banks	13	13	16	17	16	16	16	16	16
	Number of banks in Bankscope	6	6	11	9	11	9	10	11	8
	Total banking assets	249484.6	318456.9	373600	496561.49	742900	834100	886300	990600	1120200
	Total banking assets in Bankscope	208586.1	278154.3	344399.1	441840.9	621820.4	682222.3	763821.5	870270.2	816190.3
	Coverage(nr. of banks)	46.15%	46.15%	68.75%	52.94%	68.75%	56.25%	62.50%	68.75%	50.00%
	Coverage(total assets)	83.61%	87.34%	92.18%	88.98%	83.70%	81.79%	86.18%	87.85%	72.86%
Bosnia-Herzegovina	Total number of banks		48	36	33	32	30	30	29	29
	Number of banks in Bankscope	18	19	29	23	23	23	24	24	21
	Total banking assets	3904.3	5574.9	7688	11874.6	19603.2	21118.3	21009.6	21177.7	21898.1
	Total banking assets in Bankscope	1778.309	3486.057	6768.336	11591.72	18876.34	20331.31	20191.68	19881.2	16697.8
	Coverage(nr. of banks)		40%	81%	70%	72%	77%	80%	83%	72%
	Coverage(total assets)	45.55%	62.53%	88.04%	97.62%	96.29%	96.27%	96.11%	93.88%	76.25%
Bulgaria	Total number of banks	34	35	35	34	29	30	30	30	31
	Number of banks in Bankscope	23	28	28	30	22	24	24	22	19
	Total banking assets	8,186	12,221	17,324	32,851	59,090	69,560	70,868	73,726	76,811
	Total banking assets in Bankscope	7969.55	11890.03	16609.92	32543.08	56038.09	65896.96	67429.38	69373.12	65233.99
	Coverage(nr. of banks)	67.65%	80.00%	80.00%	88.24%	75.86%	80.00%	80.00%	73.33%	61.29%
	Coverage(total assets)	97.36%	97.30%	95.88%	99.06%	94.84%	94.73%	95.15%	94.10%	84.93%
Croatia	Total number of banks	53	43	41	34	33	34	34	33	32
	Number of banks in Bankscope	35	37	38	28	28	31	30	30	26
	Total banking assets	93522.9	148428.3	204115	260277.2	345081.4	370093	378370.6	391071.2	406965
	Total banking assets in Bankscope	91667.3	149560	202508.8	247904.9	339824.6	367443.1	375371.5	387950.9	401105.1
	Coverage(nr. of banks)	66.04%	86.05%	92.68%	82.35%	84.85%	91.18%	88.24%	90.91%	81.25%
	Coverage(total assets)	98.02%	100.76%	99.21%	95.25%	98.48%	99.28%	99.21%	99.20%	98.56%
Kosovo	Total number of banks		7	7	7	7	8	8	8	8
	Number of banks in Bankscope		2	2	5	5	4	4	4	4
	Total banking assets		519	589.198	984.412	1435	1808.1	2204.1	2455.2	2660
	Total banking assets in Bankscope		379.3	370.6	868.332	1282.586	1568.3	1630.7	1758.5	1828.2
	Coverage(nr. of banks)		28.57%	28.57%	71.43%	71.43%	50.00%	50.00%	50.00%	50.00%
	Coverage(total assets)		73.08%	62.90%	88.21%	89.38%	86.74%	73.98%	71.62%	68.73%
Macedonia	Total number of banks	23	21	21	20	18	18	18	18	17
	Number of banks in Bankscope	13	14	15	13	16	16	15	14	11
	Total banking assets	72254.61	105633	104875	140436	223659	250704	268543	305290	331176
	Total banking assets in Bankscope	64368.7	93921.4	95318.1	130506.6	220957.2	247340.1	264089.2	298039.9	270894.4
	Coverage(nr. of banks)	56.52%	66.67%	71.43%	65.00%	88.89%	88.89%	83.33%	77.78%	64.71%
	Coverage(total assets)	89.09%	88.91%	90.89%	92.93%	98.79%	98.66%	98.34%	97.63%	81.80%
Montenegro	Total number of banks			10	10	11		11		
	Number of banks in Bankscope			6	9	10	10	10	7	7
	Total banking assets			349.761	695.757	2976.363	3309	3025	2,944	2,810
	Total banking assets in Bankscope			231.8	739.058	2966.579	2868.499	2540.516	1989	2096
	Coverage(nr. of banks)			60.00%	90.00%	90.91%	NA	90.91%	NA	NA
	Coverage(total assets)			66.27%	106.22%	99.67%	86.69%	83.98%	67.57%	74.60%
Romania	Total number of banks	41	41	38	39	41	42	41	41	40
	Number of banks in Bankscope	28	28	29	30	29	29	31	31	21
	Total banking assets			60458.1	128089.6	250,782.8	313,745.4	329,399.5	341,150.0	353,057.0
	Total banking assets in Bankscope	32090.41	38888.51	57473.2	120363.8	242747.3	302438.8	311093.8	324601.1	299252.3
	Coverage(nr. of banks)	68.29%	68.29%	76.32%	76.92%	70.73%	69.05%	75.61%	75.61%	52.50%
	Coverage(total assets)	NA	NA	95.06%	93.97%	96.80%	96.40%	94.44%	95.15%	84.76%
Serbia	Total number of banks		49	47	40	35	34	34	33	33
	Number of banks in Bankscope	13	24	31	31	30	30	30	30	25
	Total banking assets	146548	291460.1	367486	775413	1561822	1776919	2160411	2534000	2650000
	Total banking assets in Bankscope	143179	205309.1	314459.6	731286.2	1540405	1741612	2141086	2514295	2451556
	Coverage(nr. of banks)		48.98%	65.96%	77.50%	85.71%	88.24%	88.24%	90.91%	75.76%
	Coverage(total assets)	97.70%	70.44%	85.57%	94.31%	98.63%	98.01%	99.11%	99.22%	92.51%