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FOREIGN OWNERSHIP AND MARKET POWER: THE SPECIAL CASE OF EUROPEAN BANKS

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Abstract

The paper examines the nexus of foreign ownership and market power in 26 European banking sectors, for the period 1997-2013. The sample comprises 11,761 bank-year estimates of marginal cost and market power, which are then matched with data on the foreign ownership status and presence across all host countries. The analysis reports strong evidence over the significant effect of well-capitalised foreign-owned banks on their monopolistic conduct. There is also a weaker indication that foreign presence leads to higher margins in large-sized foreign banks in fast-growing economies and markets of stricter regulation on capital, in which foreign penetration lies above 14% of the host banking industry.

JEL-classifications: C14; D40; G2; L40

Keywords: Market power, European banks, foreign banking; semiparametric modeling

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1. Introduction

Over the last decades, Europe has experienced a significant increase in globalization, particularly in the financial services sector. Especially since the 2007 financial crisis, many banking institutions from developed and developing economies have been doing business through both cross-border capital flows and their physical presence in foreign markets. Given that the consolidation process has evolved in almost all markets, foreign ownership has altered the conditions of access to credit and financial stability. This process reflects the intensity of information asymmetries in lending as well as the strategic restructurings of cross-border banks.

Policy makers have raised financial stability as the key issue of what is socially desirable by means of harmonized policy implementation by different European authorities. Admittedly, bank regulation within a centralised framework of single resolution schemes overlooks the mandate for greater coordination with competition policy (Samantas, 2017). Hence, towards a European Banking Union (EBU), policy makers should balance potential ineffectiveness of financial regulation through the integration of European banking markets. To this end, there has been considerable attention to whether markets are overbanked in response to low efficiency and profitability levels, and how the concomitant concentration does not operate at the expense of higher market power of national champions.

From a theoretical perspective, foreign banks may enhance competition through the diffusion of cost-efficient technologies with respect to risk pricing and screening in host countries (Jeon et al., 2009; Wu et al., 2010). In contrast, monopolistic tendencies are possible according to the cherry-picking or, in other words, cream skimming hypothesis. It states that foreign banks target the most credible and wealthy clients to realise increased profits against domestic competitors, which strive to keep up a credit portfolio of diversified risk (Detriache et al., 2008; Beck and Martinez Peria, 2010). Hence, it is a matter of research how market power of the average European bank has evolved in response to foreign penetration at the bank and country level.

Admittedly, the nascent literature on the nexus between market power and foreign ownership has provided mixed results. In this context, we utilise the latest

available data of European banks from the Bankcope database, as well as ownership data from Claessens and Horen (2014). The matching of data is a challenge for empirical analysis, taking into account the available framework of regulatory compliance and supervision by the World Bank, which should also be quantified, as well as other institutional variables from the Heritage Foundation. The available data are helpful in analyzing bank ownership, which turns out to be turns an important factor affecting the effectiveness of policies designed to prevent and resolve future banking crises.

The methodology hereby follows a two-stage analysis. First, we follow Robinson's (1988) *double residual* semiparametric methodology to derive marginal costs at the bank level through a log linear cost function. We then estimate the effect of foreign ownership on the market power of individual banks, and that of foreign penetration on the pricing behavior of the average European bank. We come up with a significantly positive effect of foreign ownership, and a relatively weaker U-shaped relationship between market power and foreign presence. With a battery of robustness checks, the results remain persistent after employing different dependent variables, and sub-samples concerning the structural break of the 2007 financial crisis and the developing region of Southeastern Europe. We also shed light on the heterogeneity of the aforementioned effects due to various characteristics that encompass balance sheet features, institutional developments, economic conditions and market structure.

The topic of our study is closely related to Classens and Laeven (2004), Jeon et al. (2011) and Delis et al. (2015). The first two studies conclude that foreign entry leads to competition, whereas Delis et al. (2016) find monopolistic tendency in markets of higher foreign presence, failing thereby to trace significance at the bank level. From a methodological perspective, there are stark differences: With respect to the first two studies, competition is proxied by country-year estimates of Panzar-Rosse methodology while foreign ownership is expressed in terms of country-level proxies across countries of Asia and Latin America. In addition, their studies aim at a more general investigation of competition determinants.

First, departing from Delis et al. (2016), our study contributes to the literature

with an updated sample covering the European Union during the period 1995-2013. *Second*, we find robust evidence on the effect of foreign ownership in banking at the bank level, and indicative conditions under which foreign ownership at the country level also appears significant. *Third*, the model allows for potential heterogeneity due to institutional, structural, economic and bank-specific effects. *Fourth*, we investigate how the origin of foreign ownership plays a role in the pricing policy across European host countries, and draw remarks on the entry mode of foreign banks through M&As and greenfield investments at the bank level. Last, we provide policy implications towards a level-playing field for financial institutions in Europe.

The remainder of this study is structured as follows. Section 2 presents a brief review of the literature, section 3 delineates key methodological aspects regarding the model and the estimation procedure of Lerner indices, followed by the presentation of data and model determinants in section 4. Section 5 presents the discussion over the results and section 6 concludes.

2. Literature on bank ownership

Foreign ownership is an important aspect of banking literature as it is linked to economic outcomes and bank performance amid conditions of rapidly changing global markets. Foreign-owned financial institutions may enhance social welfare if credit supply is able to meet domestic demand of corporations and households through intensified competition and a solvent financial system. However, it is a matter of strategy how a bank may enter a foreign market, viz. either through mergers and acquisitions, branches and subsidiaries, among others. In addition, structural changes in the European banking sector have rendered M&As imperative, intensifying also their operation in off-balance sheet activities (e.g. commission, fees).

Hence, foreign banks may enjoy higher market power as compared to the domestic banks. This is attributed to the cost-efficient technologies that a foreign bank may utilise from the parent bank to provide sophisticated and tailor made products and services (Degryse, et al., 2012); especially so, if the latter operates in a

developed European market. In contrast, Sengupta (2007) argues that foreign banks may bear the cost of information asymmetry, as exclusive information constitutes a competitive advantage of incumbent banks at least in the short term. Thus, such handicap drives banks to impose lower profit margins and downgrade loan covenants in order to grasp larger market shares. Increased competition due to foreign entry is also found by Beck et al. (2013), especially in cases of increased market participants due to greenfield entry, whereas the effect is lower in acquisitions of incumbent banks. The former is also evident, according to Claeys and Hainz (2014), when the cost of acquiring information is lower than the advantage of utilizing more sophisticated screening technologies. On the other hand, the foreign bank acquirer has access to exclusive information through the credit portfolio of the acquired domestic bank, in which customers are evaluated according to their creditworthiness.

There might also be the case of a positive bearing of foreign ownership on market power. That is contingent on behavioural strategic choices of foreign banks and, in particular by a) exploiting their cost efficiency advantage through higher margins and not through lower marginal cost that passes on to lower prices, b) providing innovative financial products in a way to dominate the domestic market. Economies of scope may lead to monopolistic pricing in the short run, beyond which all banks adapt their business lines accordingly.

Another aspect that may appear to differentiate the effect of foreign ownership on market power is equity capital alongside the ongoing regulatory reform over the European region. In cases where foreign-owned banks have access to the cost of capital of their parent banks abroad, while domestic institutions are not well-capitalised or capital markets fall short of providing sufficient funding, price markups are higher due to increased efficiency. On the contrary, if domestic banks ensure loanable funds out of deposits, instead of other cheaper means on which foreign banks may rely (e.g. interbank market), monopolistic pricing is bound to reach higher levels. The latter is also conducive to increased profitability of foreign banks that face stricter regulation and supervision policies in host countries and home countries, respectively (Chen and Liao, 2011).

The literature has investigated foreign ownership on various fronts. First, foreign banks tend to establish long-term relationships with transparent firms (Berger et al., 2008), while they impose higher margins in concentrated markets where the size of their operations is large in the domestic market (Fungáčová and Poghosyan, 2011). Second, foreign banks appear to cherry-pick transparent customers and rely more on financial information and collaterals in retail banking than state-owned institutions (Beck and Brown, 2015). In addition, foreign presence seems to enhance the availability and access to credit for all sizes (Beck et al., 2013) and, especially, for SMEs (Giannetti and Ongena, 2012).

On the other hand, foreign banks may lend opaque businesses, being at the same time reluctant to extend their credit portfolio to SMEs. Hence, the banking sector turns out shallow and incapable of promoting economic growth in cases of large geographical and cultural differences between the home country of a foreign bank and the host country of its operations (Detriache et al., 2008), and also in poor jurisdictions where the number of deposits and loans has declined (Beck and Peria, 2010).

Our study is closely related to Claessens and Laeven (2004), Jeon et al. (2011), Delis (2012) and Delis et al. (2015). The first two studies employ the Panzar-Rosse H-statistic as a proxy of bank competition, while Delis (2012) and Delis et al. (2015) employ a semiparametric methodology to analyse competition through alterative measures.

3. Methodology

3.1. Empirical model

The analysis utilizes the following model to investigate the correlation between ownership and market power among financial institutions in Europe.

$$L_{ict} = \alpha + \beta_1 L_{ict-1} + \beta_2 For\_own_{ict-1} + \beta_3 For\_pres_{ct-1} + \beta_4 B_{ict} + \beta_5 V_{ct-1} + \varepsilon_{ict} \quad (1)$$

Where *L* denotes the lagged market power of bank *i* at country *c* and year *t*, the *For_own* is the dummy variable that distinguish between foreign banks (value 1)

and domestic banks (value 0), *For_pres* an indicator of the degree of foreign presence in a market, a vector of bank-specific controls, *B,* a vector of country-level variables, *V*, and e the standard error.

The variables for foreign ownership (*For_own*, *For_pres*) and all the rest of the country-level drivers are lagged one period as macroeconomic and institutional changes take time to have an impact on market power. Hence, such treatment mitigates the problem of endogeneity due to reverse causality. The *B* vector is allowed to enter the model contemporaneously although even in first lags the results do not change significantly.

The sections below discuss the proxies of market power used in the empirical analysis along with the ownership and control variables that best capture heterogeneity among banks and banking markets. Variance inflation factors also do not verify potential multicollinearity that stems from correlated independent variables.

3.2. Measures of market power

The literature has extensively studied different methodologies to gauge competition after the mandate to look at the pricing conduct, rather than structural conditions. The Lerner index is the most widely applied measure of competition as it denotes the price markup over a standard competitive benchmark, marginal cost. It is schematically the following:

$$L_{cit} = \frac{P_{cit} - MC_{cit}}{P_{cit}} \qquad (2)$$

where *P* and *MC* denote the price of total bank output and its marginal cost. The subscripts of each variable correspond to banks *i*, time *t* and country *c* over the whole sample. The index takes values between zero (competition) and one (monopoly), while the range in-between reflects a varying degree of monopolistic pricing. The reason behind our choice to employ this proxy consists in its variation at the bank level, an indispensable feature for panel data analysis. It also takes account of the cost structure and revenues that materialize in cross-border activity of banks

irrespective of their asset-liability size.

The analysis also utilizes another version of the standard Lerner index which is adjusted for profit inefficiencies. It takes the final form according to Koetter et al. (2012):

$$Adjusted\_L_{ict} = \frac{\Pi_{ict}+TC_{ict}+MC_{ict}*TA_{ict}}{\Pi_{ict}+TC_{ict}} \quad (3)$$

Where *Π* denotes banks' profits and *TA* the total output of banks proxied by total assets.

The analysis employs this particular index as it might be the case of financial institutions that incur inefficiencies, which make them forego potential, if any, monopolistic rents.

3.3. Estimation of market power through a semiparametric approach

The cost function employed follows the intermediation approach for the definition of bank output and inputs, and takes the following form:

$$TC_{ict} = f\left(q_{ict}, w_{1,ict}, w_{2,ict}, w_{3,ict}\right) \quad (4)$$

where TC denotes the sum of total interest and non-interest expenses of bank *i*, at time *t*, in country *c*, *q* the natural logarithm of total assets, w_1 the price of deposits (total interest expenses divided by total customer deposits), w_2 the price of labour (total personnel expenses over total assets), and w_3 the price effect of physical capital (other operating expenses over fixed assets). We impose standard homogeneity restrictions on input prices by dividing all variables by w_3, and employ the log-linear form of the cost function, as follows:

$$lnTC_{ict} = a + b_{1,ict}lnq_{ict} + b_{2,ict}lnw_{1,ict} + b_{3,ict}lnw_{2,ict} + e_{ict} \quad (5)$$

The semiparametric (partial linear) regression is used in the literature in parametric models in which the functional form of a part of the vector of the independent variables is unknown and/or for the distribution of the standard error no *ex ante* assumption can be made. The most well-known reciprocal models are the partial linear models, which are generally defined as follows:

$$y_i = \alpha + \beta x_i + f(z_i) + \varepsilon_i \qquad i = 1, \dots, N \tag{6}$$

where *y* the value of the dependent variable for each unit *i*, X a characteristic vector of each unit *i*, *a* is a constant term and with the standard error *i.i.d.* N(0,1). The *z* variable is an interpretive variable that enters the equation non-linearly according to a function f that is not known in advance. In this very flexibility of the functional form lies also the advantage of the methodology used in this study. This model can be estimated using Robinson's *double residual* methodology (1988), applying conditional expectation to both sides (1). Therefore,

$$E(y_i|z_i) = a + E(x_i|z_i)\beta + f(z_i) \quad i = 1, \dots, N \tag{7}$$

By subtracting (7) from (6), we have

$$y_i - E(y_i|z_i) = [x_i - E(x_i|z_i)]\beta + \varepsilon_i \quad i = 1, \dots, N \tag{8}$$

If conditional expectations are known then the parameter vector *β* of (8) can be estimated using the least squares method (OLS). If they are not known then these parameters are calculated with the help of some consistent estimators $y_i = f_{yzi} + \varepsilon_{1i}$ and $x_{ki} = f_{xkzi} + \varepsilon_{2ki}$, where *k = 1,...,K* is an index of the interpretive variables entering the model parametrically. Robinson's *double residual* estimator (1988) is therefore the OLS estimate of the following model:

$$y_i - \hat{f}_y(z_i) = \left[x_i - \hat{f}_x(z_i)\right]\beta + \varepsilon_i \quad i = 1, \dots, N \tag{9}$$

The vector of the estimated parameters is therefore,

$$\hat{\theta} = \left\{\sum_i \left[x_i - \hat{f}_x(z_i)\right]'\left[x_i - \hat{f}_x(z_i)\right]\right\}^{-1} \sum_i \left[x_i - \hat{f}_x(z_i)\right]'\left[y_i - \hat{f}_y(z_i)\right] \tag{10}$$

The variance of the standard error is estimated as:

$$Var(\hat{\theta}) = \sigma_\varepsilon^2 \left\{\sum_i \left[x_i - \hat{f}_x(z_i)\right]'\left[x_i - \hat{f}_x(z_i)\right]\right\}^{-1} \tag{11}$$

where σ_ε^2 is in 2 the variance of the standard error. If errors are not *i.i.d.*, then ways of correcting such as standard sandwich variation in clusters can be used. Having therefore appreciated the parameters ϑ, we can investigate the nonlinear relation between y_i and z_i estimating equation (7) non-parametrically:

$$y_i - x_i\hat{\theta} = \alpha + f(z_i) + \varepsilon_i \qquad i = 1, \dots, N \tag{12}$$

Non-parametric estimation comes through a local polynomial fitting that

follows the *Epanechnikov* functional form within a local sliding window. No assumptions are required about *f* as a whole, but only locally, that *f* is well defined and therefore estimated. For each *z* point, a bandwith *h*, which regulates smoothness and fit, and a smoothing window [z-h_z, $z + h_z$], is defined. Therefore, to approximate *f*, only the observations in this 'neighborhood' are taken into account. For each fitting point, we adopt a local weighted least squares criterion that has the following format:

$$\sum_{i=1}^{n} W\left(\frac{z_i - z}{h}\right)\left[\left(y_i - x_i\hat{\theta}\right) - \left(\alpha_0 + \alpha_1(z_i - z)\right)\right], \quad i = 1, \dots, N \qquad (13)$$

where *W* is a weighting function that gives the greatest weights in observations near *z*, it takes the form:

$$W(u) = \begin{Bmatrix} \frac{3}{4\sqrt{5}}(1 - \varepsilon^2/5) & if\ |\varepsilon| \leq 1 \\ 0 & otherwise \end{Bmatrix} \qquad (14)$$

This criterion of equation (8) is minimized to produce the estimated parameters α_0 and α_1 for each observation. Finally for the local regression, it is important to choose the optimal bandwidth *h*, as it is bound to affect *β* through the convergence rates for $\hat{f}_x(z_i)$ and $\hat{f}_y(z_i)$. We, therefore, adopt the generalized *'cross validation*' method (Loader, 1999).

4. Sample and model determinants

4.1. Data

The sample covers 949 banks of different productive activity that base their operation on 26 European countries[1] for the period 1997-2013. The analysis covers commercial, cooperative and savings banks since they share a relatively common cost function. The rest of the banking sector[2] does not engage in traditional interest

[1] EU-15: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxemburg, Netherlands, Portugal, Spain, Sweden and UK. EU-12: Cyprus, Czech R., Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Slovakia, Slovenia, Bulgaria and Romania.

[2] Bank holding and holding companies, Clearing institutions and custody, Commercial banks, Cooperative banks, Finance companies (Credit card, Factoring and Leasing), Group finance companies, Investment and Trust corporations, Investment banks, Islamic banks, Micro-financing institutions, Other non-banking credit institutions, Private banking and Asset management companies, Real estate and mortgage banks, Saving banks, Securities firms and Specialised governmental credit institutions.

and non-interest income activities and, thus, is not included in the final sample. We also clean up the dataset to exclude bank-holding companies with aggregated data from various banking markets, and parent banks or subsidiaries in order to avoid aggregation bias. To this end, we collect data from consolidated accounts and when that is not possible the sample includes unconsolidated entities. The validity of our results depends crucially on the underlying task and we therefore have been very scrupulous in every single case regarding the possibility of domestic banks owning subsidiaries in the domestic market or in foreign regions. We also exclude all active banks with the same name operating in different countries except the parent bank with a consolidated statement; if the latter is not available, we opt for unconsolidated statements of subsidiaries.

As a next step, we match the above dataset with data of Classens and Horen (2014) on the bank-ownership status with the only common factor available: the consolidated index number. This matching procedure concluded to a set of 949 individual banks with 11,761 observations. We make sure that all bank deals are taken into account considering all banks engaging into a merger or an acquisition and only the new entity is reported after the deal. The last step before variables are ready for further analysis is to remove banks with unreasonable low, high or negative values (in the case of input prices), and winsorise all variables at 1^{th} and 99^{th} percentile of their respective distribution.

Tables 1 and 2 provide definitions and descriptive statistics for all variables used in the estimation of the cost function and the second-stage analysis of market power. All variables are GDP deflated and banks' output is proxied by total assets. Total earning assets is another alternative of defining output of traditional intermediation. However, such specification would understate the level of production output as it omits OBS activities, which are best expressed by non-earning assets in technical terms. In our sample of commercial, cooperative and savings banks, a broader indicator of financial output is necessary to encompass the business line of acceptances, guarantees, credit lines and other contingent liabilities.

4.2. Model determinants

The analysis makes use of bank-specific controls that the pertinent literature has already picked as significant drivers of market power[3]. The underlying vector (*B*) comprises proxies of bank *size*, *capitalization* and *liquidity*, namely the natural logarithm of total assets, the ratio of total equity over total assets and gross loans over total assets, respectively. It is expected that financial institutions of higher asset and equity size are likely to enjoy higher profit margins due to lower cost of funding and information asymmetries according to Delis (2012) and Delis et al. (2016). The share of gross loans to total revenues (*Loans/TA*) is indicative of the asset-liability structure towards traditional intermediation and higher deposits base.

At the country level, we follow Lensink and Hermes (2004), who argue that the level of economic development in host countries formulates the interaction between foreign and domestic banks. Hence, the model controls for the macroeconomic conditions that can partially explain banks' market power, viz., the level of GDP growth (GDPGR) and prices (*Inflation*). On the other hand, we allow for the potential impact of fiscal policy in terms of government expenditures (*Government Spending*) and taxation (*Tax burden),* since the sovereign crisis has called for fiscal contraction and indispensable reforms in countries under strain.

Sensitivity analysis of the potential impact of foreign ownership allows for the evolution of institutional development in terms of various policy initiatives as put forth by Basel directives. In particular, we use the index of restrictions on securities, insurance and real estate activities (*Activity restrictions*), regulation on equity capital (*Capital regulation*), the power of official authorities to intervene to bank managers' decisions (*Official supervision*), and last the transparency of accounting information for public purposes (*Private monitoring*). The data are collected from Barth et al. (2004; 2005; 2008; 2013), and the appendix provides in more detail all technical details of the quantification method.

[3] We are very cautious of the control variables vector as it might induce bias in our results. We have tested more than 120 variables comprising stock market turnover, stock capitalization, GDP per capita, foreign direct investments, political data, and indices of economic freedom, among others. Given their insignificance to give further insights to the analysis, we constrain ourselves to parsimonious specifications.

We also use the level of institutional developments with respect to the independence of the financial sector from government control (*Financial freedom*). The measure expresses the easiness of access to funding through lower state intervention to financial services (regulation or ownership) and the efficient allocation of credit through the operation of foreign competition. However, it is a matter of research as to whether this process materializes in the heterogeneous pricing behavior between domestic and foreign banks.

Last, the model allows for the effect of bank concentration (*Concentration*), given that the literature does not use it interchangeably with competition anymore as it tends to reflect market characteristics other than the pricing conduct of banks (Claessens and Laeven, 2004). Moreover, concerning the possibility of attributing the effect of foreign ownership to the contemporaneous impact of private ownership, we also include both private and state ownership variables in alternative specifications, but results remain put.

5. Indentification and results

5.1. Identification strategy

In the analysis that follows we deal primarily with potential problems of endogeneity and omitted variable bias. On top of that, market power is treated as contingent on its dynamic nature, since previous bank specificities, like associate costs, non-interest bearing activities, information asymmetries, relationship banking, among others, are bound to induce the pricing conduct. To resolve this issue, we include the first lag of the dependent variable as a regressor, and up to two lags as instruments in the GMM dynamic model. The two-step procedure of the latter is employed as relatively more efficient and, in particular, the difference GMM estimator for potential implications of policy making.

We also check the underlying assumptions of no autocorrelation in second-differenced errors (in the case of first-lagged dependent variable), and the Sargan test of over-identifying restrictions for the validity of employed instruments. Another issue is whether the assumption of independent standard errors is valid when we

investigate the effect of country-level variables on micro units like banks (Moulton, 1990). In the case of various banks grouped at different countries of origin, standard errors are expected to be biased; thus, we cluster standard errors at the country level.

Furthermore, foreign ownership variables are expected to cause endogeneity problems. In fact, foreign banks may enter to markets providing monopolistic products and services at high prices in quest for profits. Hence, the vector of independent variables except bank-specific controls is lagged once as an appropriate means of alleviating endogeneity that stems from reverse causality. The use of lags is also theoretically justified on the grounds that banks are aware of their ownership status when it comes to make decisions over their pricing policy.

We also consider bank-specific controls as endogenous due to potential omitted variable bias, which is likely to induce erroneous results with respect to the coefficient of foreign ownership variables. GMM methodology also allows for the definition of the lag length bound for each endogenous variable in order to produce GMM-style instruments. For better results, we opt for a second lag in all bank-specific controls as the minimum, and maximum at the same time, length threshold after running the Sargan test of over-identifying model restrictions. However, we consider the possibility of poor performance of GMM estimators when instruments are too many according to the literature. Thus, the results are tested thoroughly with additional lags of the dependent and independent variables as instruments or even fewer instruments according to the approach proposed by Roodman (2009).

5.2. Baseline results

Table 3 reports evidence over the estimation of equation 2 after passing all the relevant tests of no AR2 autocorrelation and valid instruments. First, the lagged dependent variable of market power exhibits a persistent significant effect across all specifications at 1% level. All models include controls of bank characteristics and time fixed effects, corresponding to each column that gauges the sensitivity of parameters subject to various factors. The factors as each column title indicates, encompass various macroeconomic, fiscal, regulatory, institutional and structural conditions.

[Insert table 3 here]

In line with Yeyati and Micco (2007), the coefficient of bank foreign ownership appears quite significant indicating that higher market power is associated with the average foreign bank of our sample (column i).

Next, the model comprises only the variable of foreign presence without the dummy of bank foreign ownership (column ii). The results show no significance whatsoever, as the average bank does not consider the presence of foreign banks in a market to decide over its pricing policy. Another question that arises is what if the next model allows for the contemporaneous effect of both foreign ownership variables. The significance of the underlying coefficients changes, as the spillover effect now turns positive at 5% significance level. A closer look at the rest of the columns suffices to conclude about the robustness of the bank foreign ownership. Contrary to Delis et al. (2016), there is strong evidence in favor of the direct impact of foreign ownership on bank market power. Foreign presence seems of a rather unstable nature in line with the mixed results of previous studies (Claessens and Laeven, 2004; Delis et al., 2016; Jeon et al., 2011). In more detail, its bearing remains prevalent after controlling for the economic cycle, market concentration and fiscal policy. However, when the model accounts for regulation and institutional development (column v), such unstable tendency is primarily attributed to the non-linear constituent of the spillover effect and the interaction between the foreign ownership variables (see table 5 for more detail on this matter).

As for the bank-specific controls, the results come along as expected according to previous studies. In particular, well-sized financial institutions demonstrate a clear tendency of providing monopolistic products especially when they raise funding in the deposits markets at lower costs. In addition, this tendency becomes stronger when regulation forces them to keep up increased capital buffers. A relatively developed credit portfolio is correlated with lower market power possibly due to various reasons, e.g. contestability, information asymmetries, credit risk, OBS activities, among others.

Concerning the economic cycle (column iv), inflationary pressures turn out to increase the cost of lending and, thus, even more so the prices of bank products. In contrast, the course of the economic cycle enjoys different dynamics, since a negative association with market power could be indicative of the moderate significance of non-performing loans or income diversification during economic upturns, while a downhill path of GDP comes alongside risk-taking and coercive relationship banking. From the perspective of fiscal policy, a larger public sector as expressed by the imposition of high direct and indirect taxes is indicative of inefficient government, weak institutions and anticompetitive economy (column viii). Thus, higher markups are expected from a banking sector that operates under such conditions.

The financial freedom index as a proxy of institutional developments shows a positive effect on bank market power, while other indices (trade, business, investment) not reported bear no significance at all (column vi). This result might be pertinent to weaker institutions of Southeastern Europe, in which banks tend to exploit the independence of financial sector from government control. In this way, they enjoy increased profits at the expense of underfunded productive sectors. Delis (2012) argues that financial reforms fail to materialize in competitive banking markets where institutions are weak, while they tend to ease access to cheaper capital through lower credit ceilings. That made us re-estimate the regression model for the developing European region to verify whether the underlying effect is attributed to environments of weaker institutions. Unreported results show that this is not the case. Rather, strong institutions in the developed region formulate the

necessary conditions for incumbent banks to exploit their market shares.

Last, the impact of market concentration (column vii), as a structural variable, appears insignificant. This is quite expected as structural characteristics of the banking sector fall short of revealing their pricing strategy. Along the same lines, regulation has no direct impact on bank market power, except the close surveillance of banks from the private sector (investors, credit rating agencies, etc.) This comes in line with the transparency of financial information that banks are obliged to disseminate according to the pertinent regulatory directives. It is expected that differences in transparency between the home and host country of a foreign bank can justify lower market power of banks operating in the host countries when they bring in more efficient reporting techniques and monitoring technologies. Again, as an exercise we rerun the model for the SA European region, which could drive the inferences, with no significance whatsoever. That might indicate the increased burden that a large-sized bank is bound to bear in developed countries, in which portfolio diversification could also reveal extensive OBS activities.

[Insert table 4 here]

Table 4 refers to some additional tests on the validity of our previous results. First, the model allows for the effect of foreign presence, which is expressed in terms of foreign-owned total assets, not in terms of the percentage of foreign banks in a market (column i). The coefficient is insignificant and demonstrates the same sign but nonetheless lower level of significance across all the previous specifications (not reported for space reasons). This result is expected though as the assets owned by domestic institutions, the majority of which operate in most European countries, blur the effect of foreign-owned assets on market power.

The next column (ii) assesses the difference of marginal cost from price (*P-MC*). It is the only specification, where the coefficients have altered both in sign and significance. We should treat this outcome with caution as this variable fails to capture the cost structure and pricing conduct of banks, and therefore their asset size.

We also verify the persistent effect of bank foreign ownership even after

splitting the sample to *pre-crisis* and *post-crisis* period (columns iv and v)[4]. Evidently, the advent of financial crisis has not altered the significant bearing of corporate governance on banks' pricing policy, implying that reforms in the domestic banking sectors have failed to promote competition among domestic financial institutions. We also isolate *Southeastern Europe* considering that in developing countries like Mexico and Colombia foreign banks may follow a rent-seeking conduct through M&As (Moguillansky et al., 2004; Barajas et al., 2000). Column (vi) corroborates previous evidence in favor of monopolistic pricing among foreign banks. The effect of entry mode is analysed in the following section.

[Insert table 5 here]

5.3. Parameter heterogeneity

The first two columns of table 5 answer two important questions: 1) How the spillover effect materializes among foreign and domestic banks? 2) Are there any non-linear effects of foreign ownership? The results show that the impact of foreign presence on bank market power is clearly driven by foreign banks. This finding is in line with the literature that is concerned with the tendency of foreign banks to pursue a rent-seeking behavior through higher margins on customers of high credit rating. The last column is indicative of the role of foreign presence in banks' pricing conduct, albeit without the necessary robustness as we see in the case of bank foreign ownership.

In particular, foreign penetration leads to competitive conditions up to a certain level of foreign ownership in a market, above which there is a strong indication of increased price markups. This level implies that in European markets where the number of foreign banks is no more that 14%[5] of the whole banking sector the intensity of competition is higher, whereas above this threshold monopolistic conditions are prevalent. According to data, only Sweden, Denmark, Germany, Italy and Spain enjoy on average a low level of foreign presence, which seems to improve the efficiency of domestic banking and economic growth through

[4] However, for several non-core European countries, it was the sovereign crisis rather than the global financial crisis that was a turning point of the underlying effect for a subset of countries. Unfortunately, data does not suffice.

[5] See column (ii) of table 5: $-0.034 + 2 * 0.121 * Foreign\_pres = 0.14$

the provision of less costly financial services and more efficient resource allocation.

In the remainder, we stress the variation of the effect of foreign ownership variables on market power due to various bank-specific, economic, and institutional characteristics. The analysis comes along with the interaction terms of variables used in each column of table 5 and their contemporaneous linear effects of variables. These terms are mean-centered to mitigate multicollinearity among the underlying regressors. We report only the results that are statistically significant and economically relevant on the grounds of the theoretical discussion of section 4.2.

We also document an increased effect of foreign presence on the market power of large-sized banks (column iii), although its direct effect is insignificant. In addition, the linear effect of bank foreign ownership is much higher in well-capitalised banks (column iv). This strategy of higher markups indicates the tendency of a bank to exploit its competitive advantage for potential profit opportunities, since increased capital buffers make it secure vis-à-vis potential risks. The average bank is also more inclined to impose higher margins as foreign penetration to host countries makes incumbent domestic institutions keep pace with the strategic advantage of foreigners. That may pertain to better technology in monitoring clients, pricing risk, provision of monopolistic products, among others. Hence, the ability of a domestic bank to incorporate the diffused know-how in the operating procedures, and meet the demand of monopolistic products highlights the necessary scale economies of a bank to cope with the associated costs of convergence.

Turning to the economic conditions that might differentiate the effect of foreign ownership, banks are willing to impose higher margins in a market where foreign banks operate in a fast-growing environment (column v). That is expected since the upward course of the economic cycle generates potential profit opportunities that new entries are trying to exploit. Furthermore, regulation bears significance regarding the nexus between foreign presence and market power (column vi). Indeed, the intensity of capital regulation renders the effect of foreign penetration more severe on the average markup. The latter is reminiscent of the results in column 4, where high capitalization at the bank level is correlated with the market power of foreign banks. Besides, the restrictions on transparent accounting

information turn out to lower monopolistic pricing that is contingent on the intensity of foreign bank operation. That reflects the importance of credit information quality to the reduction of information costs, which foreign banks face when they seek to expand their operations (Tsai et al., 2011).

[Insert table 6 here]

Table 6 allows for the origin of foreign ownership at the bank level (column i). We decompose foreign ownership into two dummies, each of which denoting whether the foreign owner is European [*Foreign-own (EU)*], or non-European [*For_own (outside EU)*]. The results show higher market power in banks, which are foreign-owned by other Europeans. Still, it might be the case that some of the most prominent European banking sectors drive the results; we therefore exclude banks with owners headquartering in Germany, France and Italy. Evidently, the underlying effects remain the same (column ii).

Next, the analysis (column iii) allows for the entry mode of foreign banks through mergers and acquisitions (*M&As*), or through the establishment of a totally new institution (*Greenfield*). To this end, we split *For_own* and *For_pres* into their interaction terms with *M&A* and *Greenfield*. In line with Tsai et al. (2011), greenfield investment turns out the most significant driving force of the positive bearing of foreign ownership on market power, while foreign penetration leads the average (newly established) foreign bank to adopt competitive practices. Thus, foreign banks tend to charge higher margins due to relatively better monitoring technologies and risk management techniques that make them maintain traditional business lines (loan provisioning) even to marginal customers.

In practice, they do so by entering through the establishment of new branches and subsidiaries, albeit the degree of foreign presence seems to intensify competition among foreign players due to lower informational costs, especially in the developed Europe. The last column explores if, and to what extent, the same pattern is traced in the developing Southeastern Europe. Indeed, more efficient foreign banks entering via M&As may target institutions with limited profits in order to operate with high spreads by dropping marginal costs (Moguillansky et al., 2004). It is unclear though whether it is the case of exploring their comparative advantage

or of their aggressive strategy over competitors (de la Torre et al., 2010).

6. Conclusions

This study investigates the effect of foreign ownership on the market power of European financial institutions. The sample comprises bank-level data to derive the Lerner index, which is widely used as a good proxy of market power in the literature. The estimation of the cost function is followed through the Robinson's double-residual semi-parametric methodology, which relaxes the assumptions related to a specific functional form. Marginal cost is computed for all 11,761 observations corresponding to 949 banks over the period 1995-2013.

These data are matched with the dataset of Claessens and van Horen (2014), who provide detailed information on foreign ownership for a world sample of 137 countries during the period 1995-2013. The variables of interest are a) bank foreign ownership, and b) foreign presence in terms of percentage of the number of foreign banks over the total number of operating banks, and in terms of foreign-owned assets over total banks' assets in host countries. These variables gauge the direct effect of foreign ownership status of each bank on its pricing conduct, and the spillover effect of foreign penetration on the market power of the average bank.

The results show robustness in the impact of bank foreign ownership on the evolution of monopolistic pricing of well-capitalised foreign banks. On the contrary, the degree of market penetration from foreign banks fails to exhibit stability in the significance of its negative bearing. However, the underlying spillover effect does not seem to materialize through the domestic banking sector, but only through the operation of foreign banks. Regarding the direction of its impact, there is moderate indication that foreign presence leads to competitive conditions in markets where restrictions on information transparency are less stringent. In contrast, there might be occasions when this effect turns negative. Such heterogeneity is traced in the behavior of too-big-to-fail financial institutions, in times of higher GDP growth rates and in markets of tighter regulations on capital and increased foreign presence (above 14% of the banking sector).

The above evidence has clear policy implications for regulatory authorities. There are two potential desired outcomes authorities are going to face: towards either higher competition or higher price-markups. In any case, we should take into consideration the ongoing operation of incumbent banks and the parallel evolution of regulation trying to fill the void of previous suboptimal policies. In particular, more severe transparency standards of accounting books turn out to foster bank competition, especially in cases of lower foreign entry and capital buffers in place. On the other hand, if the level of market power should increase to safeguard financial stability, then the ongoing competition policy could lean towards a) the operation of big foreign banks with strong capital base, and b) the European integration through the operation of de novo banks in developed economies, and M&As in Southeastern Europe.

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Table 1: Definitions of variables and sources

Variables	Description	Source
	Variables used for the estimation of cost function	
TC	Natural logarithm of total expenses (total interest and non-interest	Bankscope
Q	Natural logarithm of total assets	Bankscope
w1	Natural logarithm of total interest expenses over total customer deposits	Bankscope
w2	Natural logarithm of personnel expenses over total assets	Bankscope
w3	Natural logarithm of other operating expenses over fixed assets	Bankscope
	Estimates of market power	
P	Total income over total assets	Bankscope
MC	Marginal cost	Own calculations
P-MC	Marginal profit	Own calculations
Lerner	Price markup over marginal cost	Own calculations
Adjusted Lerner	Another version of the Lerner index which allows for the possibility that firms do not maximise profits when it comes to set prices and input levels	Own calculations
	Foreign ownership variables	
For_own	Dummy variable equal to one if bank is foreign owned (50% or more of their assets)	Claessens and Van Horen (2014)
For_pres	The ratio of the number of foreign banks over the number of all banks	Claessens and Van Horen (2014)
For_pres (TA)	The ratio of the assets of foreign banks over the total assets of all banks.	Claessens and Van Horen (2014)
	Variables used in the analysis of model (1)	
Q	Natural logarithm of total expenses (total interest and non-interest expenses)	Bankscope
Equity/TA	Equity capital divided by total assets.	Bankscope
Loans/TA	Total loans divided by total assets	Bankscope
GDPGR	GDP growth rate	World Bank
Inflation	Inflation rate	World Bank
Activity restrictions	I assign values of 1, 2, 3, 4 if bank participation indicates 'unrestricted', 'permitted', 'restricted' or 'prohibited' responses to the following questions: What is the level of regulatory restrictiveness for a) bank participation in securities activities (the ability of banks to engage in the business of securities underwriting, brokering, dealing, and all aspects of the mutual fund industry), b) bank participation in insurance activities (the ability of banks to engage in insurance underwriting and selling)?, c) bank participation in real estate activities (the ability of banks to engage in real estate investment, development, and management)?, d) bank ownership of nonfinancial firms?	Barth et al. (2004; 2005; 2008; 2013)
Capital regulation	I assign '0' and '1' if the responses are 'no' and 'yes', respectively. The opposite holds for questions 8 and 9 (Yes:0, No:1) and we also assign '1' if 6 < 0.75. The questions are: 1) Is the minimum capital-asset ratio requirement risk weighted in line with the Basel guidelines?, 2) Does the minimum ratio vary as a function of market risk?, 3) Are market value of loan losses not realised in accounting books deducted? 4) Are unrealised losses in securities portfolios deducted, 5) Are unrealised foreign exchange losses deducted?, 6) What fraction of revaluation gains is allowed as part of capital?, 7) Are the sources of funds to be used as capital verified by the regulatory/supervisory authorities?, 8) Can the initial disbursement or subsequent injections of capital be done with assets other than cash or government securities?, 9) Can initial disbursement of capital be done with borrowed funds?	Barth et al. (2004; 2005; 2008; 2013)

Table 1: (continued)

Official supervision	I assign '0' and '1' if the responses are 'no' and 'yes' (respectively) and add them up. The questions are the following: 1) Does the supervisory agency have the right to meet with external auditors to discuss their report without the approval of the bank?, 2) Are auditors required by law to communicate directly to the supervisory agency any presumed involvement of bank directors or senior managers in elicit activities, fraud, or insider abuse?, 3) Can supervisors take legal action against external auditors for negligence?, 4) Can the supervisory authority force a bank to change its internal organizational structure?, 5) Are off-balance sheet items disclosed to supervisors?, 6) Can the supervisory agency order the bank's directors or management to constitute provisions to cover actual or potential losses?, 7) Can the supervisory agency suspend the directors' decision to distribute Dividends, 8) Bonuses, 9) Management fees?, 10) Can the supervisory agency legally declare-such that this declaration supersedes the rights of bank shareholders-that a bank is insolvent?, 11) Does the Banking Law give authority to the supervisory agency to intervene that is, suspend some or all ownership rights-a problem bank?, 12) Regarding bank restructuring and reorganization, can the supervisory agency or any other government agency supersede shareholder rights?, 13) remove and replace management?, 14) remove and replace directors?.	Barth et al. (2004; 2005; 2008; 2013)
Private monitoring	I assign '0' and '1' if the responses are 'no' and 'yes', respectively. We construct the index through the formula: {(1*2)+(1 if 3 equals 100%; 0 otherwise)+(1 if 4 and 5 equals zero; 0 otherwise)+((6-'1')*('-1')+7+8)+9+10+11}. The question are the following: 1) Is an external audit a compulsory obligation for banks? , 2) Are auditors licensed or certified?, 3) What percent of the top ten banks are rated by international credit rating agencies (e.g., Moody's, Standard and Poor)?, 4) Is there an explicit deposit insurance protection system?, 5) Were depositors wholly compensated (to the extent of legal protection) the last time a bank failed?, 6) Does accrued, though unpaid interest/principal enter the income statement while the loan is still non-performing?, 7) Are financial institutions required to produce consolidated accounts covering all bank and any non-bank financial subsidiaries?, 8) Are bank directors legally liable if information disclosed is erroneous or misleading?, 9) Are off-balance sheet items disclosed to the public?, 10) Must banks disclose their risk management procedures to the public?, 11) Is subordinated debt allowable (required) as part of capital?	Barth et al. (2004; 2005; 2008; 2013)
Financial freedom	Index of security and independence of the financial sector from government control	Heritage Foundation
Concentration	Hirschman-Herfindahl index of concentration in terms of total assets	World Bank
Tax burden		World Bank
Government spending		World Bank

Table 2: Descriptive statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
Variables used for the estimation of cost function					
TC	11,953	14.909	2.095	6.219	21.999
Q	12,490	14.892	2.073	10.393	20.453
W1	11,960	0.119	0.399	0	7.641
W2	11,991	0.012	0.017	0	1.472
W3	12,012	3.933	0.241	0	8.833
Estimates of market power					
P	12,327	0.060	0.035	0.012	0.237
MC	11,799	0.010	0.018	0	0.113
P-MC	11,761	0.063	0.028	-0.088	0.243
Lerner	11,761	0.188	0.190	-3.605	1
Adjusted Lerner	11,799	0.157	0.208	-0.057	0.999
Foreign ownership variables					
For_own	17,091	0.315	0.465	0	1
For_pres	18,250	38.189	32.152	1	155
For_pres (TA)	9,233	31.100	31.849	0	114
Variables used in the analysis of model (1)					
Q	12,490	14.892	2.073	10.393	20.453
Equity/TA	12,489	0.092	0.067	0.011	0.450
Loans/TA	12,352	0.556	0.248	0.005	0.986
GDPGR	20,192	2.307	3.349	-0.148	0.594
Inflation	20,192	4.381	33.195	-0.097	9.586
Activity restrictions	14,104	7.712	2.505	0	14
Capital regulation	14,104	4.670	2.354	1	9
Official supervision	14,104	9.698	2.627	3	16
Private monitoring	14,104	6.417	2.158	2	10
Financial freedom	19,913	69.389	13.914	30	90
Concentration	18,015	68.935	17.276	0.279	1
Tax burden	20,192	54.001	13.717	29.800	94
Government spending	20,192	29.547	17.268	0	79.700

Table 3: The effect of foreign ownership variables on market power

	Foreign ownership	Foreign presence	Combined Foreign effect	Economic cycle	Regulation	Financial Freedom	Concentration	Fiscal policy
	(i)	(ii)	(iii)	(iv)	(v)	(vi)	(vii)	(viii)
Lerner index	0.494***	0.421***	0.439***	0.412***	0.353***	0.424***	0.424***	0.422***
	(0.085)	(0.103)	(0.098)	(0.112)	(0.102)	(0.107)	(0.111)	(0.107)
lnTA	0.208***	0.182***	0.203***	0.189***	0.081***	0.143***	0.164***	0.169***
	(0.041)	(0.035)	(0.037)	(0.041)	(0.016)	(0.027)	(0.032)	(0.026)
Equity/TA	0.910**	0.782*	0.889**	0.754**	0.046	0.759**	0.793***	0.707**
	(0.466)	(0.428)	(0.414)	(0.387)	(0.231)	(0.313)	(0.289)	(0.314)
Loans/TA	-0.175*	-0.242***	-0.164*	-0.216**	-0.128*	-0.239***	-0.213**	-0.197**
	(0.105)	(0.091)	(0.095)	(0.091)	(0.072)	(0.089)	(0.099)	(0.086)
For_own_{t-1}	0.033***		0.039**	0.032**	0.049***	0.040***	0.043***	0.036**
	(0.012)		(0.017)	(0.013)	(0.014)	(0.013)	(0.013)	(0.014)
For_pres_{t-1}		-0.005	-0.026***	-0.018***	-0.008	-0.011	-0.021**	-0.028***
		(0.009)	(0.009)	(0.009)	(0.008)	(0.009)	(0.009)	(0.010)
$Inflation_{t-1}$				0.015**				
				(0.007)				
$GDPGR_{t-1}$				-0.001*				
				(0.000)				
ACT_{t-1}					-0.000			
					(0.001)			
CAP_{t-1}					-0.000			
					(0.001)			
OFF_{t-1}					0.000			
					(0.001)			
$PRIV_{t-1}$					0.002**			
					(0.001)			

Table 3: (continued)

Financial Freedom $_{t-1}$						0.048***		
						(0.021)		
Concentration $_{t-1}$							0.018	
							(0.019)	
Tax burden $_{t-1}$								0.001**
								(0.000)
Government Spending $_{t-1}$								-0.000
								(0.000)
Obs	8856	8097	8051	8051	6176	8051	8051	8051
Wald	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
AR(1)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
AR(2)	0.243	0.175	0.219	0.178	0.491	0.179	0.166	0.268
Sargan test	0.062	0.072	0.086	0.060	0.068	0.066	0.072	0.072

The table shows the coefficients and standard error (in parentheses) of the regression model 1. The dependent variable is the Lerner index as derived according to section 3.3. The title of each column indicates the particular variables employed in the analysis and their definition is presented in the appendix A.1. All regressions follow the two-step 'difference' GMM estimator of panel dynamic modeling allowing for robust standard errors clustered at the country level. The last rows shows the p-value of the Wald test for joint significance of the coefficient estimates, the p-values of Arellano-Bond tests for zero autocorrelation in first-differenced errors of order 1 and 2 (AR1; AR2), and the p-value of Sargan test for overidentifying restrictions. The signs *, **, *** denote statistical significance at 10%, 5% and 1% level.

Table 4: Robustness checks

	Foreign presence in terms of TA	(P – MC)	Adjusted Lerner index	Year ≤ 2007	Year > 2007	South-Eastern Europe
	(i)	(ii)	(iii)	(iv)	(v)	(vi)
Lerner	0.601***	0.518***	0.304***	0.326***	0.474***	0.500***
	(0.080)	(0.102)	(0.052)	(0.104)	(0.128)	(0.124)
lnTA	0.193***	-0.076	0.061***	0.128***	0.164***	0.112
	(0.039)	(0.089)	(0.007)	(0.043)	(0.048)	(0.108)
Equity/TA	0.751**	0.112***	0.054	0.262	0.709**	-0.578
	(0.315)	(0.037)	(0.132)	(0.405)	(0.343)	(0.508)
Loans/TA	-0.112*	0.236	-0.010	-0.040	-0.168*	-0.412***
	(0.062)	(1.032)	(0.046)	(0.142)	(0.088)	(0.114)
For_own_{t-1}	0.025**	0.260	0.049**	0.048**	0.046**	0.041**
	(0.013)	(0.834)	(0.019)	(0.022)	(0.021)	(0.019)
For_pres_{t-1}		0.584**	0.005	-0.015	-0.012	0.034
		(0.249)	(0.011)	(0.010)	(0.026)	(0.058)
$For\_pres\ (TA)_{t-1}$	-0.008					
	(0.016)					
Obs	6295	8757	8941	3546	4505	1449
Wald	0.000	0.000	0.000	0.000	0.000	0.000
AR(1)	0.000	0.000	0.000	0.000	0.000	0.009
AR(2)	0.719	0.255	0.076	0.527	0.682	0.633
Sargan test	0.233	0.394	0.359	0.066	0.266	0.972

The table shows the coefficients and standard error (in parentheses) of the regression model 1. The title of each column indicates the dependent (column 1) and independent (columns ii and ii) variable employed in the analysis and the specific subsample analysed for robustness. All regressions follow the two-step 'difference' GMM estimator of panel dynamic modeling allowing for robust standard errors clustered at the country level. The last rows shows the p-value of the Wald test for joint significance of the coefficient estimates, the p-values of Arellano-Bond tests for zero autocorrelation in first-differenced errors of order 1 and 2 (AR1; AR2), and the p-value of Sargan test for overidentifying restrictions. The signs *, **, *** denote statistical significance at 10%, 5% and 1% level.

Table 5: Identification through various characteristics

	Bank - Country foreign ownership interaction	Non-linear effect	Asset size	Capital	Economic cycle	Regulation
	(i)	(ii)	(iii)	(iv)	(v)	(vi)
Lerner	0.425***	0.440***	0.431***	0.423***	0.418***	0.355***
	(0.098)	(0.094)	(0.100)	(0.102)	(0.114)	(0.019)
lnTA	0.207***	0.209***	0.205***	0.206***	0.188***	0.087***
	(0.036)	(0.036)	(0.034)	(0.038)	(0.039)	(0.019)
Equity/TA	0.881**	0.893**	0.809**	0.851**	0.799**	0.067
	(0.387)	(0.378)	(0.409)	(0.392)	(0.374)	(0.241)
Loans/TA	-0.167*	-0.163*	-0.179*	-0.163	-0.202**	-0.117*
	(0.094)	(0.092)	(0.097)	(0.111)	(0.085)	(0.068)
For_own_{t-1}	0.027**	0.036**	0.031**	0.034**	0.033**	0.050***
	(0.013)	(0.015)	(0.014)	(0.016)	(0.014)	(0.014)
For_pres_{t-1}	-0.017	-0.034***	-0.010	-0.029***	-0.019*	-0.010
	(0.013)	(0.010)	(0.010)	(0.009)	(0.011)	(0.009)
$For\_pres^2_{t-1}$		0.121***				
		(0.046)				
For_own_{t-1}*For_pres_{t-1}	0.110***					
	(0.041)					
For_own_{t-1}*lnTA			-0.009			
			(0.009)			
For_pres_{t-1}*lnTA			0.020**			
			(0.009)			
For_own_{t-1}*Equity/TA				0.699***		
				(0.245)		
For_pres_{t-1}*Equity/TA				-0.282		
				(0.288)		
$Inflation_{t-1}$					0.029	
					(0.035)	
$GDPGR_{t-1}$					-0.119*	
					(0.065)	
For_own_{t-1}*$Inflation_{t-1}$					0.073	
					(0.149)	
For_pres_{t-1}*$Inflation_{t-1}$					-0.051	
					(0.296)	
For_own_{t-1}*$GDPGR_{t-1}$					-0.164	
					(0.103)	
For_pres_{t-1}*$GDPGR_{t-1}$					0.286**	
					(0.137)	
ACT_{t-1}						-0.000
						(0.001)
CAP_{t-1}						-0.000
						(0.000)
OFF_{t-1}						0.000
						(0.001)

$PRIV_{t-1}$	0.002**
	(0.001)

Table 5: (continued)

$For\_own_{t-1}*ACT_{t-1}$	0.003
	(0.002)
$For\_pres_{t-1}*ACT_{t-1}$	-0.003
	(0.003)
$For\_own_{t-1}*CAP_{t-1}$	-0.003
	(0.002)
$For\_pres_{t-1}*CAP_{t-1}$	0.006**
	(0.003)
$For\_own_{t-1}*OFF_{t-1}$	0.002
	(0.002)
$For\_pres_{t-1}*OFF_{t-1}$	0.000
	(0.003)
$For\_own_{t-1}*PRIV_{t-1}$	-0.000
	(0.003)
$For\_pres_{t-1}*PRIV_{t-1}$	-0.001*
	(0.056)
Obs	8051	8051	8051	8051	8051	6176
Wald	0.000	0.000	0.000	0.000	0.000	0.000
AR(1)	0.000	0.000	0.000	0.000	0.000	0.000
AR(2)	0.173	0.204	0.266	0.154	0.117	0.475
Sargan test	0.062	0.057	0.073	0.112	0.070	0.130

The table shows the coefficients and standard error (in parentheses) of the regression model 1. The dependent variable is the Lerner index as derived according to section 3.3. The title of each column indicates the variables used to construct interaction terms with the foreign ownership variables. All regressions follow the two-step 'difference' GMM estimator of panel dynamic modeling allowing for robust standard errors clustered at the country level. The last rows shows the p-value of the Wald test for joint significance of the coefficient estimates, the p-values of Arellano-Bond tests for zero autocorrelation in first-differenced errors of order 1 and 2 (AR1; AR2), and the p-value of Sargan test for overidentifying restrictions. The signs *, **, *** denote significance at 10%, 5% and 1% significance level.

Table 6: Origin of foreign ownership and mode of foreign entry

	Origin of foreign ownership	Excluding Germany-France-Italy	M&As versus Greenfield	M&As versus Greenfield in SA Europe
	(i)	(ii)	(iii)	(iv)
Lerner	0.438***	0.449***	0.438***	0.516***
	(0.102)	(0.095)	(0.099)	(0.116)
lnTA	0.202***	0.225***	0.197***	0.126***
	(0.039)	(0.037)	(0.034)	(0.037)
Equity/TA	0.894**	0.869*	0.840**	-0.623**
	(0.448)	(0.449)	(0.395)	(0.258)
Loans/TA	-0.190*	-0.192**	-0.168	-0.322**
	(0.102)	(0.095)	(0.103)	(0.146)
For_own $_{t-1}$		0.047**		
		(0.023)		
For_pres $_{t-1}$	-0.026**	-0.035***		
	(0.010)	(0.012)		
For_own (EU) $_{t-1}$	0.046**			
	(0.019)			
For_own (outside EU) $_{t-1}$	0.016			
	(0.032)			
For_own $_{t-1}$*Greenfield			0.040**	0.031
			(0.016)	(0.023)
For_own $_{t-1}$*M&A			0.043	0.177**
			(0.088)	(0.093)
For_pres $_{t-1}$*Greenfield			-0.028***	0.011
			(0.009)	(0.044)
For_pres $_{t-1}$*M&A			0.060	-0.075
			(0.101)	(0.186)
Obs	8051	7237	8051	1449
Wald	0.000	0.000	0.000	0.000
AR(1)	0.000	0.000	0.000	0.000
AR(2)	0.186	0.485	0.218	0.204
Sargan test	0.069	0.094	0.107	0.980

The table shows the coefficients and standard error (in parentheses) of the regression model 1. The dependent variable is the Lerner index as derived according to section 3.3. The title of each column indicates the new variables entering directly or as interaction terms with the foreign ownership variables. All regressions follow the two-step 'difference' GMM estimator of panel dynamic modeling allowing for robust standard errors clustered at the country level. The last rows shows the p-value of the Wald test for joint significance of the coefficient estimates, the p-values of Arellano-Bond tests for zero autocorrelation in first-differenced errors of order 1 and 2 (AR1; AR2), and the p-value of Sargan test for overidentifying restrictions. The signs *, **, *** denote significance at 10%, 5% and 1% significance level.

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