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Abstract

Ownership and competition in the banking sector are policy concerns around the world that are rarely comprehensively examined. For 131 countries and 13 years we match bank ownership with over 50,000 bank-year estimates of individual bank market power. At the individual bank level, ownership does not explain market power. At the country level, on the other hand, foreign bank ownership has a positive and significant impact on bank market power because foreign banks enter through mergers or acquisitions and not through greenfield investments. We also find that the positive effect of foreign bank presence on market power is considerably weaker in countries with well-capitalized banks.

Keywords: Bank market power, competition, foreign banks, world sample
JEL classification: G21; D40; F23

1. Introduction

Globalization is changing the ownership of firms around the world in many sectors, and the banking sector is no exception. Claessens and Van Horen (2014) for example report that the percentage of foreign banks present in a country on average increased from 21% in 1995 to 35% in 2009, and in certain developing countries this increase was substantially higher.

Foreign banks may not only enhance the availability of credit by directly lending to domestic firms or households, but also spur competition and strengthen the financial system, thus indirectly benefiting all borrowers (including those that do not directly borrow from foreign banks). At the same time, foreign banks often enter a market through a merger or an acquisition, in the process altering the market power of all banks involved.

Yet, despite the importance of foreign bank presence in many countries around the world, the impact of their presence on market power has not been investigated comprehensively. In this paper we therefore construct a new data set that includes comprehensive bank-year observations of market power of individual banks in most countries around the world. We then study the effects of foreign bank ownership on our newly-constructed estimates of individual bank market power.

Our paper addresses two crucial questions. First, we investigate if the ownership status, i.e., foreign or domestic, of individual banks has a direct impact on their *own* market power. We call this the *direct effect* of (foreign) bank ownership. Second, we analyze the extent to which foreign bank presence at the country (and year) level has an impact on the market power of all individual banks. That is we consider whether a banking system with a higher foreign bank presence in general induces changes in individual bank market power. We call this the *spillover effect*

To identify these effects we adopt a two-step procedure. First, we estimate the individual market power of virtually all banks in the world for which financial statements are available and comparable. For our analysis, we rely on both the Lerner index, which

measures deviations of prices from marginal cost, and on the adjusted-Lerner index, which is similarly calculated but relaxes the assumption that banks function in a fully efficient manner. For the calculation of both indices we first estimate the marginal cost with a semiparametric technique that allows for greater flexibility in the production technology of banks compared to the extant parametric techniques. Thus, changes in the structure of the production technology across banks, countries and time are better accounted for. In this way we improve on the estimation of marginal cost and provide a new index of market power for the maximum amount of time and number of banking systems possible.

In the second step, we examine the potency of the aforementioned direct and spillover effects. Using the database constructed by Claessens and van Horen (2014) we classify all banks in our sample at each point in time as either domestic or foreign-owned. Yet, despite the relevant and dynamic character of our ownership classification we fail to find in any of the empirical exercises we do a statistically significant (and/or economically relevant) direct effect of foreign ownership. It seems indeed there is no difference in market power between domestic and foreign-owned banks.

Next, we aggregate foreign bank presence in each country and for each year. In this case, and even when controlling for the (seemingly irrelevant) direct effect, we find that higher foreign bank presence (at the country-year level) increases the market power of the average bank in the industry (whether it is domestic or foreign-owned) in a statistically significant and robust manner. This effect is also economically relevant. For example, an increase in foreign bank presence from 17% in 1997 to 25% in 2009 (which is the increase observed for the average country) resulted in an increase in the Lerner index of 0.08 points (for the average Lerner index in our sample of 0.22 this is equivalent to a 36% increase). These findings are further robust to the measurement of market power using the country-level Lerner and Boone indicators from the World Bank's database as our measures of market power.

We also analyze some theoretically plausible heterogeneous effects in the identified positive relation between foreign bank presence and market power. We find that the positive effect of foreign bank presence on bank market power is smaller for better capitalized banks. Further, we show that the positive effect of foreign bank presence on banks' market power is primarily due to their entry through a merger or acquisition rather than through a greenfield investment. Indeed, in our sample, two out of three foreign banks are established in the host country through a merger or acquisition and this is seemingly the main channel leading to the positive impact of foreign bank presence on market power. The only country characteristic among those examined that somewhat reduces the potency of the positive impact of foreign bank presence on bank market power is the high difference in the financial-statement transparency between the host and the origin country.

Our study is the first to investigate the effect of foreign bank presence on individual bank market power, along certain bank and industry characteristics that affect the potency of this effect. Our finding on the positive spillover effect is in contrast with the only two existing empirical studies on this issue. Claessens and Laeven (2004), using a sample of 50 countries, and Jeon, Olivero, and Wu (2011), using a sample of only Asian and Latin American countries, analyze the impact of foreign bank presence on bank competition at the country (and year) level. Both studies find a negative (positive) relation between foreign ownership and market power (competition).

Yet, there are two differentiating characteristics of our study (*vis-à-vis* theirs) that may well explain our unique findings. First, the semiparametric approach used for the estimation of marginal cost and, thus, of market power, is less sensitive to the choice of a functional form for the technology of banks. That is, our method allows for a very flexible cost structure and, thus, increased econometric efficiency in our market power estimates. Second, and thanks to the foreign ownership data by Claessens and van Horen (2014) and our estimates of market power, we have a bank-level market power independent variable and the

broadest coverage compared to all existing studies, with observations from 131 countries over the period 1997 to 2009. In contrast, existing studies focus on the relation between foreign bank entry and competition/ market power at the country-year level.

The rest of the paper is structured as follows. Section 2 provides the theoretical arguments linking foreign bank ownership with bank market power and the explicit paths that can influence this relation. Section 3 discusses the data set on the banks' market power along with the way this is estimated, and also provides definitions and information on the foreign bank ownership and the control variables. Section 4 discusses the empirical identification procedure and the estimation results. Section 5 summarizes the results and provides policy implications.

2. Theoretical considerations

There are two main channels through which a relationship between foreign bank ownership and bank market power may work. The first is simply that foreign banks may have different levels of market power compared to domestic banks. We call this the "direct effect" of foreign ownership on market power. The second effect is related to the fact that foreign bank presence in general can cause changes to banks' market power. We call this the "spillover effect" of foreign bank presence on bank market power.

It is not *a priori* obvious whether the direct effect will be positive or negative. On the one hand, foreign banks have access to alternative sources of funds through their affiliates in their country of origin and could bring in more specialized and sophisticated banking products. Further, these banks are usually more cost-efficient (Bonin, Hasan, and Wachtel, 2005; Degryse, Havrylchyk, Jurzyk, and Kozak, 2012), as they have access to better technology, especially if their country of origin has a more developed banking sector compared to the one they penetrate. These attributes of foreign banks could allow them to exercise greater market power than domestic banks. On the other hand, foreign banks

entering a new market may face an informational handicap, at least in the initial period following their entry, that could force them to price their products more competitively and offer better loan terms to attract customers from existing banks (Sengupta, 2007). Such behavior would result in a lower price-cost margin, which is a common measure of market power.

The direction of the spillover effect is again *a priori* ambiguous. Foreign bank entry can stimulate competition in domestic markets in general and put downward pressure on prices and margins (Levine, 1996; Beck, Ioannidou, and Schafer, 2012). This effect is likely to be particularly strong in the case of greenfield entry, which adds competitors, and less so in the case of acquisitions, where a foreign bank takes over an existing domestic bank.

However, there are also forces leading to a positive relation between foreign bank presence and bank market power. First, if the efficiency advantage of foreign banks forces domestic banks to become more efficient themselves, this could lead to higher margins for all banks if the cost savings are not passed on through lower prices. The same effect could arise if foreign banks are able to exploit their superior know-how and come to dominate domestic markets in new innovative financial products. If this is accompanied by a large scale and rapid penetration of foreign banking, this mechanism will naturally result to a monopolistic behavior of many banks in the industry and the loss of competitive pricing of the monopolistic products, at least for some period of time.

Clearly, the nexus between foreign bank ownership and market power could be affected by a number of bank- and market-specific characteristics. At the bank level, a comparative advantage of the foreign banks usually comes from their access to capital from their parent companies in the origin country. Given that capital requirements are now in place in virtually all countries, this advantage of foreign banks can translate into lower cost of capital and improved efficiency. However, if the capital market in the domestic banking

system is deep and domestic banks are well-capitalized, this will weaken the implied positive relation between foreign ownership and market power.

The opposite effect could prevail if there is a big difference between foreign and domestic banks in the way they finance their own lending. Usually, domestic banks have established long-term relationships with their depositors and they tend to have higher deposits to assets ratios. In contrast, foreign banks have access to potentially less expensive liquid funds from their parent companies or the international interbank market. The practical implication of this *status quo* is that the banks with high ratios of deposits to total assets and limited access to cheaper sources of funds, will have a disadvantage in providing competitive terms of lending. In other words, a potentially positive link between foreign bank ownership and market power should be exacerbated when domestic banks rely mainly on deposits as their source of loanable funds.

As discussed above, a natural differentiating factor in the impact of foreign ownership on competition is the mode of foreign bank entry. Greenfield entry increases the number of banks in the domestic banking industry, which by itself promotes competition, while penetration through an acquisition leaves the number of banks unchanged (Martinez Peria and Mody, 2004). Claeys and Hainz (2014) further highlight that a foreign bank enters through a greenfield investment only if its advantage in screening new applicant firms, due to e.g. better screening technology, compensates its disadvantage of having no information about incumbent firms. If a foreign bank enters *via* an acquisition, it acquires a credit portfolio that contains information about the quality of incumbent firms. In addition, the acquired bank can generate information by screening applicants and this generates an informational advantage for foreign banks entering *via* acquisitions. The mode of entry, thus, determines the distribution of information between foreign and domestic banks, which affects the degree of competition in the banking industry. For example, in Mexico during the so-called tequila crisis, foreign banks entered almost entirely through the acquisition of existing

domestic banks, thus preserving the oligopolistic structure of the industry (Moguillansky, Stuart, and Vergara, 2004).

The relation between market power and foreign ownership can also be affected by a number of characteristics of the banking industry. The study by Mian (2006) is the first to note that greater geographical and cultural distance from the foreign bank's home country increases the bias of foreign bank lending toward larger and hard-information firms. This effect should be more potent when the domestic banking system is characterized by relative lack of transparency compared to country of origin of the foreign bank. The lack of transparency in the banking sector is usually attributed to the lack of self-discipline, especially in terms of information disclosure of financial statements to the public (Cihak, Demirgüç-Kunt, Martinez Peria, and Mohseni-Cheraghlou, 2012; Barth, Caprio, and Levine, 2008).

Besides the two papers that are directly relevant to our work (Claessens and Laeven, 2004; Jeon, Olivero, and Wu, 2011), our study is also related to two large, but rather separate, literatures one on foreign bank participation and one on banking competition and market power. Claessens (2006) reviews and refines the full set of arguments linking the two literatures and identifies the limitations of the existing empirical evidence. Among other studies, Clarke, Cull, Martinez Peria, and Sanchez (2003) and Beck, Ioannidou, and Schafer (2012) find that foreign bank entry improves credit conditions for enterprises of all sizes, and Berger, Hasan, and Klapper (2004) suggest that a larger foreign bank presence leads to a greater availability of credit to SMEs (see also Giannetti and Ongena, 2009, 2012).

Detragiache, Gupta, and Tressel (2008) and Beck and Martinez Peria (2010) offer a less positive view of foreign bank participation by highlighting that foreign banks tend to select borrowers with greater creditworthiness ("cherry pick"), while domestic banks are left with lower quality borrowers. This, in turn can hurt the profitability of the domestic banks and their willingness to lend. Empirical research on the relative performance of domestic and

foreign banks has produced contradictory results, with some studies finding that foreign banks do better and other studies reporting stronger performance of domestic banks; see Degryse and Ongena (2008) and Chen and Liao (2011) for reviews of this evidence.

3. Variables and data

The empirical model used to study the relation between foreign bank ownership and bank market power is of the following form:

$$L_{itc} = \delta_0 + \delta_1 L_{i,t-1,c} + \varphi FO_{i,t-1,c} + \theta FP_{t-1,c} + \delta_2 B_{itc} + \delta_3 X_{t-1,c} + \varepsilon_{itc}\,. \qquad (1)$$

In equation (1) the market power L of bank i at year t and country c is regressed on its annual lag, a dummy variable *foreign-owned* (*FO*) that is observed at the bank-year level and takes the value one when a bank is foreign-owned and zero otherwise, an indicator *foreign presence* (*FP*) that is observed at the country-year level and measures the extent of foreign bank presence, a vector of bank characteristics B observed at the bank-year level, and a vector of variables X observed at the country-year level. ε_{itc} is the stochastic disturbance.

Foreign-owned and *foreign presence* enter equation (1) with a one-year lag, and the same holds for all the variables observed at the country-year level. This timing is derived from the fact that country-level changes, like structural, regulatory, and macroeconomic developments, take time to reach the market and have a bearing on the market power of individual banks. In addition, modelling our two foreign ownership variables in this way allows mitigating the engogeneity problem stemming from reverse causality. In contrast, all the bank-level control variables B enter equation (1) contemporaneously. These variables have a direct and contemporaneous bearing on the cost structure and the pricing decisions of banks, as they describe individual bank strategies that can change in the short-term.

The rest of this section discusses our measures for bank market power, the foreign ownership variables and the control variables used in our study. The correlation coefficients between the explanatory variables that were used as determinants of bank market power do

not give rise to any multicollinearity concerns (further left unreported). In Table 1 we provide detailed definitions for the variables used to estimate equation (1) and in Table 2 we report summary statistics for these variables.

[Insert Tables 1 and 2 about here]

3.1. Measures of market power

The measurement of market power has received much attention in the economics literature since the importance of imperfectly competitive markets was first recognized in the 1930s. The Lerner index (1934) remains to this day a popular measure of market power (and of competition) thanks to its simplicity and transparency. It is defined as:

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

where P and MC are the price of bank output and the marginal cost of the production of this output. The Lerner index ranges between zero and one, with zero corresponding to perfect competition and larger values reflecting more market power (and less competition). The index can also be negative if $P < MC$, which is of course not sustainable in the long run.

The Lerner index measures departures from the competitive benchmark of marginal cost pricing. This makes it a simple and intuitively appealing index of market power. The index has also often been used as a measure of competition. Although the link between market power and competition might seem obvious, it has been shown that the Lerner index does not always point in the expected direction when competitive conditions change (Stiglitz, 1989; Boone, 2008). For this reason we interpret the Lerner index as primarily a measure of market power, with a further connection to competition a natural but not entirely uncontroversial possibility.

Alternative measures of market power and competition include the H-statistic (Panzar and Rosse 1987) and the profit elasticity (Griffith, Boone, and Harrison 2005). The H-statistic has been widely used in banking studies, but has a shortcoming when it is used as a continuous measure of market power. As Bikker, Shaffer, and Spierdijk (2012) point out, the H-statistic maps the various degrees of market power only weakly and thus cannot be viewed as a continuous variable. The profit elasticity (or Boone indicator) is a relatively new concept that has been used in several recent studies but has also received some criticism. For example, Schiersch and Schmidt-Ehmcke (2010) show that it makes critical assumptions relative to firm size and to market definition.

Given that the alternative indices of market power and competition are still open to some critique, we favor the Lerner index and its variants as our proxy for market power. However, we also employ as robustness checks the H-statistic and the Boone indicator. The main reason for our choice is that the Lerner index allows for variation at the bank level. This advantage increases the richness of our empirical analysis as it allows us to study both the direct and the spillover effects. Also, as Beck, De Jonghe, and Schepens (2013) readily argue, the Lerner index is a good proxy for current and future profits stemming from pricing power, while it is not constrained by the extent of the market. In contrast, other bank-level measures, such as the market share or Tobin's q, can lead to measurement error because they also capture the rents extracted from being too-big-to-fail. Moreover, the Lerner index captures both the impact of pricing power on the asset side of the banks' balance sheet and the elements associated with the cost efficiency on their liability side. This is of particular importance in our analysis because of the implications of the foreign bank ownership for both the costs and the revenues of banks, as highlighted in Section 2.

Computation of the Lerner index requires knowledge of the marginal cost. When such information is unavailable (as in most empirical data sets), the marginal cost can be estimated using econometric methods. A popular approach has been to estimate a translog cost function

and take its derivative to obtain the marginal cost. Some recent work has shown that it is possible to improve on this methodology with semiparametric or nonparametric methods that allow for more flexibility in the functional form (Delis, Iosifidi, and Tsionas, 2013). We follow this new literature and estimate the cost function using a partial linear smooth coefficient (PLSC) model. We provide all the details for the estimation of marginal cost and the data cleaning process in Appendix A and here we just outline the advantages of this approach.

Most importantly, the semiparametric nature of the method implies that no assumption regarding the functional form of the cost equation is made globally. An assumption is just made "in local neighborhoods of observations." This is important as it is usually quite difficult for the researcher to be certain about the validity of the chosen functional form. In their survey paper, Reiss and Wolak (2007) are very skeptical about using a specific functional form to estimate a cost equation without a prior analysis of the data, since an "incorrect" cost equation can bias the estimation and inference of marginal cost to an unknown magnitude and direction. The flexibility of the semiparametric technique also allows using large international samples of banks from different countries, without being concerned that certain banking markets in different countries or banks within the same country face or adopt different production technologies. Hence, this approach takes into account the heterogeneity in the production technology across banks, countries, and time. Delis (2012), Delis, Iosifidi and Tsionas (2012), and Wheelock and Wilson (2012) show that estimation of marginal cost using semiparametric and nonparametric methods produces significantly better results (in terms of lower bias) than parametric techniques and commonly used functional forms like the translog.

The data used for the estimation of the Lerner index are from Bankscope and require an advanced cleaning process to avoid including duplicates in our sample. This literally involves examining each bank one by one and in many instances collecting information from

the banks' websites, for example to examine the history of bank operation and ownership, the existence of subsidiaries with the same names with the parent bank, and the occurrence of M&As during our sample period. We provide all the details of this intensive data collection and processing in Appendix A.

We also use two variants of the traditional Lerner index. The first is the efficiency-adjusted Lerner index, which takes the form:

$$adj.-Lerner_{itc} = \frac{\Pi_{itc} + TC_{itc} - MC_{itc} \cdot Q_{itc}}{\Pi_{itc} + TC_{itc}}, \quad (3)$$

where Π is the banks' profit and Q is the banks' output, measured by the banks' total earning assets. This index allows for the possibility that firms do not choose the prices and input levels in a profit-maximizing way. For the estimation of this index we use the exact same procedure as Koetter, Kolari, and Spierdijk (2012).

The second variant of the Lerner index adopts a dual-output cost function. Specifically, many banks have a significant volume of off-balance sheet items that can be considered as a distinct output besides the total earning assets that are used as our main output. The off-balance sheet items are produced using essentially the same inputs with the single-output model of the bank and, thus, the single-output model may be missing some important information. For the estimated dual-output cost function and its derivative, see Appendix A.

In Appendix B, we report the weighted mean values of the estimated Lerner index by country and year, with market shares as the weights. The equivalent estimates for the adjusted-Lerner index and the dual-output Lerner index are available on request. These values are effectively a new worldwide index of banking-sector competition, with larger coverage compared to existing literature. The weighted mean values are 0.27, 0.17, and 0.22 for the Lerner index, the adjusted-Lerner index, and the Lerner index with two outputs, respectively. The Lerner index ranges between -0.12 in Ecuador in 1998 and 0.82 (close to

monopoly) in Cuba in 1997. The adjusted-Lerner index ranges between -0.18 in Paraguay in 2002 and 0.82 in Cuba in 1997. We omit the discussion for the Lerner index for the two-output case, as the results on this index are very similar to the other two Lerner indices.

In Figure 1 we show the time trend in average bank competition for each of the three indices. In broad terms, all indices identify similar trends in competition for the 148 economies over time. More precisely, average bank market power peaks in 2003-2004, declines in the period 2007-2008, and increases again in 2009 and 2010. This pattern may reflect the sharp increase in financial globalization before the financial crisis of 2007 and related reforms that are likely to have led to higher market power through cross-border M&A's and increased efficiency, without an accompanying reduction in the lending rate. Evidently, the start of the global financial crisis coincides with a decrease in the market power. This may be related to capital losses and non-performing loans suffered by many banks, which reduced efficiency, or to the rising informational asymmetry costs faced by banks during crises (e.g., adverse selection and moral hazard) that sharply increase the real cost of lending.

[Insert Figure 1 about here]

3.2. Foreign bank ownership

Information for foreign bank ownership is from the database of Claessens and van Horen (2014). As we follow their approach in our own data processing to estimate bank market power, we have an almost identical sample of banks that we identify as foreign or domestic owned. Foreign-owned banks are identified as those with 50% or more of their assets owned by foreigners and we use this information to construct the *foreign-owned* dummy variable. This variable identifies the direct effect of foreign ownership on the market power of individual banks.

For the country-level *foreign presence*, Claessens and van Horen (2014) construct two indices. The first index is defined as the percentage of foreign banks among total banks in a country (*foreign presence*) and covers the period 1995 to 2009. The second is defined as the percentage of foreign bank assets among total bank assets (*foreign presence in terms of assets)*. Even though the second index can be argued to describe foreign bank presence somewhat better, it is only available for the 2004-2009 period because of missing information on bank assets for a large number of banks before 2004. The correlation coefficient between the two indices for the period 2004-2009 is as high as 81.1%. Thus, the large time span of the data set makes the use of the first index optimal for our study, whereas the index based on the market share of foreign banks is used in a sensitivity analysis.

By using *foreign presence* in the same equation with *foreign-owned* we are able to identify the separate impact of the two on banks' market power. Figure 2 presents a scatter plot of the Lerner index against *foreign presence* and the associated regression line. The regression line has a positive slope that is statistically significant at the 1% level. It remains to be examined whether this relation continues to hold when controlling for *foreign-owned* and whether it can be interpreted as causal.

[Insert Figure 2 about here]

Based on the theoretical discussion of Section 2, we also hypothesize that the impact of foreign bank ownership on the market power of banks depends on differences in banking-system transparency between the host and the origin country (Mian, 2006). To identify this potential heterogeneity we construct an additional variable. Specifically, financial-statement transparency in our context measures the degree to which banks face regulatory restrictions on their accounting disclosure. This index is constructed based on the following five questions: (1) whether the income statement includes accrued or unpaid interest or principal

on non-performing loans; (2) whether banks are required to produce consolidated financial statements, including non-bank financial affiliates or subsidiaries; (3) whether the off-balance sheet items are disclosed to the public; (4) whether banks' directors are legally liable for misleading or erroneous information; and (5) whether the penalties have been enforced. The indicator potentially ranges from zero to five, where higher values indicate greater disclosure (i.e., more transparent financial statements).[1]

For the construction of the distance variable we use a weighted distance measure between the host country and multiple foreign countries associated with the top five foreign banks in the host country.[2] To be specific, we first calculate the distance between the host country and each of the foreign countries, and then compute the average weighted by the percentage of assets held by each foreign country. Let d_{cfk} denote the distance between country *c* and country *f* in terms of characteristic *k* and w_{cfk} denote the share of country *c*'s banking assets that are held by country *f*. The explanatory variable is constructed as:

$$D_{ck} = \sum_f w_{cfk} d_{cfk}, \tag{4}$$

where the summation is taken over the top five foreign banks.

3.3. Control variables

Consistent with previous studies, we include several control variables that are drawn from the literature on the determinants of bank competition to rule out other possible explanations for our results (e.g., Claessens and Laeven, 2004; Beck, Demirgüç-Kunt, and Levine, 2006; Delis, 2012). The bank-specific variables (indicated as B_{itc} in Equation (1)) include: the ratio

[1] We also experiment with other differences between the host and the foreign banking industries. Specifically, we measure differences in terms of: (i) restrictions on banks to own non-financial firms, (ii) entry barriers on banks, (iii) regulations in terms of the summation of the three previous regulatory characteristics, (iv) geographical distance between the capitals of the two countries, (v) institutions (information sharing, credit rights and property rights), (vi) culture, and (vii) banking-industry concentration. We include formal definitions for these variables in Table 1. However, the coefficients on the interaction terms of our foreign ownership variables with these distance variables are statistically insignificant.

[2] Most of the host countries in our sample have fewer than five foreign banks operating in their respective markets. We keep a five bank upper limit in our estimations given that on average these top five foreign banks constitute over 99% of the foreign bank share in host countries.

of customer deposits to total assets (termed *deposits*) to control for the level of bank deposits supporting total assets; the ratio of equity capital to total assets (*capitalization*) to control for bank capitalization; the ratio of loans to total assets (*loans*) to control for bank specialization (also used as a crude measure of liquidity); and the natural logarithm of real total assets (*bank size*) to measure bank size. Delis (2012) shows that well-capitalized and larger banks are able to set higher margins or to have access to cheaper sources of funds due to scale economies and informational asymmetries. In contrast, a higher deposits ratio implies higher cost of intermediated funds and, thus, lower market power. In turn, *loans* is a measure of bank specialization, with a higher ratio relating to banks that focus on the traditional activity of credit provision.

We additionally assess the robustness of our results to the use of other measures of bank liquidity (liquid assets divided by total assets) and credit risk (non-performing loans divided by total loans or loan loss provisions divided by total loans), but we did not find significant changes in our results. It should be noted that the sample is smaller when including the last two variables, due to missing data, and that the definition of liquid assets in Bankscope is sometimes different between countries.

For the country-level characteristics we use a wide set of structural, regulatory, institutional, and macroeconomic variables. First, we use the entry restrictions index, which measures the degree to which all banks in a country face entry barriers. We construct this index using information from the studies of Cihak, Demirgüç-Kunt, Martinez Peria, and Mohseni-Cheraghlou (2012), Barth, Caprio, and Levine (2008), and previous versions of the latter study (details are provided in Table 1). This index takes a value from zero to 12, with larger values denoting more stringent entry restrictions.

We also use the relative share of privately owned banks *vs*. that of the publicly owned banks (constructed in terms of deposits). This allows avoiding to falsely attribute the impact of foreign bank ownership (which usually corresponds to private ownership), to the

associated impact of private ownership on banks' market power. We note that poorer countries are associated with higher levels of public ownership of banks, which is consistent with the findings of La Porta, Lopez de Silanes, and Shleifer (2002). Further, we use the Herfindahl-Hirschman index, which is defined as the ratio of the sum of squared market shares of each bank in the industry. Market concentration measures, such as the Herfindahl-Hirschman index, have been considered in the past as measures of competition (Cetorelli and Strahan, 2006). There is now consensus that these indices are not accurate proxies of competition but they are nonetheless useful control variables as they reflect important industry characteristics (Beck, Demirgüç-Kunt, and Levine, 2006; Claessens and Laeven, 2004).

Another important set of characteristics that can potentially influence the relation between market power and foreign bank ownership relates to the regulatory framework in which banks operate (Beck, Demirgüç-Kunt, and Levine, 2006; Claessens and Laeven, 2004). We use three indices obtained from Cihak, Demirgüç-Kunt, Martinez Peria, and Mohseni-Cheraghlou (2012), Barth, Caprio, and Levine (2008), and previous versions of the latter study. These indices represent activity restrictions, capital requirements, and supervisory power. Explicit definitions of these indices are provided in Table 1. For a literature review of the relation between bank competition and regulation, see for example Degryse and Ongena (2008).

Moreover, we control for the impact of the macroeconomic environment common to all banks that can potentially affect competitive conditions. We use the share of the manufacturing sector relative to GDP (*manufacturing*) and the net inflow of foreign direct investment (*FDI*). Cetorelli and Strahan (2006) suggest that the manufacturing sector is highly bank-dependent and the conditions in this industry can affect the market power of banks through both demand and supply forces. Clarke, Cull, Martinez Peria, and Sanchez (2003) provide evidence suggesting that foreign banks follow their clients abroad. Thus, the

effect of foreign bank ownership on the banks' market power might be overestimated when the net inflow of *FDI* and *manufacturing* are excluded from the analysis.

In addition, we use information from the Heritage foundation on the size of the public sector, as measured by the ratio of government spending to GDP (*government spending*). Following the reasoning of La Porta, Lopez de Silanes, and Shleifer (2002), countries with a larger public sector are relatively inefficient, governments are interventionist, and protection of property rights is poor. Thus, we could observe a positive link between this measure of government size and banks' market power.

Along the same lines, we use the financial freedom index and the trade freedom index from the Heritage foundation. The financial freedom index measures independence from government control and interference in the financial sector. Higher values for this index reflect greater financial liberalization.[3] The trade freedom index is a composite measure of the absence of tariff and non-tariff barriers that affect imports and exports of goods and services, with higher values indicating more freedom to trade internationally.

We also control for the prevailing political ideology and freedom using the ideology of chief executives variable (left, center, or right) from Beck, Clarke, Groff, Keefer, and Walsh (2001) (updated until 2012) and the polity variable from the Polity IV project, respectively. These two variables are potentially important in explaining the competitive conditions in the banking sector, because banks operating in more democratic and more rightwing countries will have fewer restrictions that might not be captured by our regulatory variables. Finally, we control for the level of economic development by including the natural logarithm of GDP per capita, taken from the World Bank Indicators.[4]

[3] An alternative index has been constructed by Abiad, Detragiache, and Tressel (2010) but its coverage ends in 2005.

[4] We exhaustively control with more than two hundred other variables taken from various databases. But we do not find any significant changes in the main results we report here. We therefore think our estimates are conservatively robust.

4. Foreign bank ownership and market power: Identification and results

4.1. Empirical identification

Two important identification problems are the dynamic nature of bank market power and the potential endogeneity of the foreign ownership variables. Concerning the former, Berger, Bonime, Covitz, and Hancock (2000) and Goddard, Molyneux, and Wilson (2004) suggest that even developed banking markets might be characterized by information opacity, networking, and relationship-lending, all of which impede competition. These elements cause persistence in the cost structure, profitability, and market power of banks.

To account for these dynamics we include the first and/ or the second lag of the dependent variable among the regressors and use the GMM estimators for dynamic panels of Arellano and Bond (1991) and Blundell and Bond (1998). In our analysis we use the two-step "difference" GMM estimator with robust standard errors corrected using the method of Windmeijer (2005).[5] The consistency of the GMM estimator depends both on the assumptions that the error term does not exhibit serial correlation and on the validity of the instruments. To this end, we use two tests proposed by Arellano and Bond (1991) to evaluate these assumptions. The first is the Hansen test of over-identifying restrictions, which tests the overall strength of the instruments. The second test examines the assumption of no serial correlation in the error terms.

Note that the error term obtained from the estimation of equation (1) is likely to be serially correlated due to the fact that the dependent variable is observed at the bank-country-year level and some of the explanatory variables are observed at the country-year level. This problem is comprehensively analyzed by Moulton (1990). Thus, estimation is carried out using standard errors clustered by country. We also experiment with country-specific year

[5] We prefer the "difference" over the "system" GMM estimator because the results on the specification tests are better under the former method. Specifically, we find that the lagged differences used as instruments under the system GMM procedure are rather poor instrumental variables.

effects, but this increases the number of instruments in the GMM procedure asymptotically and causes the Hansen test to be equal to unity.

In estimating equation (1), endogeneity of the two foreign ownership variables can arise both from reverse causality and omitted variable bias. Reverse causality could emerge from the preference of foreign-owned banks to enter with monopolistic products with high markups, so as to generate higher profits. To alleviate these concerns of reverse causality, all the right-hand side variables except bank characteristics are lagged once. This is intuitive both statistically and theoretically. From a statistical viewpoint, the literature (e.g., Beck, Jonghe, and Schepens, 2013) suggests that explanatory variables in lags can potentially diminish endogeneity issues that emerge due to reverse causality. On the theoretical side, the banks are aware of their main balance-sheet characteristics when deciding on their cost structure and pricing policy (i.e., the components of the Lerner index).

In turn, we reduce the omitted variable problem by using an IV-style instrumental variable. Specifically, we use the entry restrictions for foreign banks (*ERFB*) lagged once as an IV-style instrument. We construct this index with information from the studies of Cihak, Demirgüç-Kunt, Martinez Peria, and Mohseni-Cheraghlou (2012), Barth, Caprio, and Levine (2008) and previous versions of the latter study (details are provided in Table 1). This index ranges between zero and four inclusive, with higher values reflecting higher entry restrictions for foreign banks. We identify the two endogenous variables by using both $ERFB_{t-1}$ and $ERFB_{t-2}$ as IV-style instruments.

Naturally, the entry restrictions for foreign banks affect foreign bank ownership and presence in each country: we hypothesize that foreign bank presence must be lower in countries with significant protection of the domestic banking sector. Further, it seems unlikely that these restrictions affect banks' market power directly. The only way that *ERFB* could be correlated with the Lerner indices is through common regulatory, institutional, and macroeconomic developments that tend to move together. However, as discussed in Section

3.3, in our empirical analysis we control for a number of such variables, and most importantly for the general entry restrictions common to all banks, foreign-owned or not. Thus, we distinguish between entry restrictions for foreign banks and general entry restrictions. We also control for year fixed effects, and other regulatory, macroeconomic, institutional, and political variables. Finally, we experiment with country*year fixed effects, the results being essentially the same.[6]

Some of the control variables can also be considered as endogenous in equation (1) owing to omitted variable bias. Not treating them this way can bias the coefficient on the foreign ownership variable. GMM allows treating these variables as endogenous using lags of the instrumented variables as instruments (Bond, 2002; Beck, Demirgüç-Kunt, and Levine, 2006; Roodman, 2009). We adopt this strategy despite its imperfections because finding instruments for all potential endogenous control variables is extremely difficult. We choose the lag-length of these instruments on the basis of the Hansen test of overidentifying restrictions.

In light of the above, the full set of the instrumental variables in the baseline specification includes the contemporaneous and the first lag of the entry restrictions for foreign banks as IV-style instruments, and, as GMM-style instruments, the third lag of the dependent variable, the first lags of the bank-specific control variables and the second to fourth lags of *entry restrictions*. In the specifications with additional controls we also add the second lags of these control variables as GMM-style instruments. Use of these instruments yields Hansen tests that do not reject the null of overidentifying restrictions. We are examining the sensitivity of our results with even fewer instruments to avoid the too-many instruments problem highlighted by Roodman (2009). Our results are essentially unchanged.

[6] We run additional tests for the validity of the *ERFB* variable as an instrument as follows. First, we regress, using the fixed effects model, the two foreign ownership variables on the *ERFB* variable plus controls and we find that *ERFB* is negative and strongly statistically significant. Also, we regress, again with the fixed effects model, the market power variables on the *ERFB* plus the same controls and we find that *ERFB* is statistically insignificant.

We also confirm, using the second-order autocorrelation test (reported as AR2), that our estimated equations do not suffer from serial correlation.

4.2. Baseline results

In Table 3 we report the results from the estimation of equation (1). The Hansen test shows that the estimated equations are not overidentified and the AR2 test that there is no second-order autocorrelation. As expected, the values of the coefficient on the lagged dependent variable indicate that market power is quite persistent.

[Insert Table 3 about here]

The specifications in Table 3 include the baseline models (columns I-III) and the models with structural, regulatory, macroeconomic, and institutional controls (columns IV-IX). In the interest of parsimony, we do not include all these controls in the same equation. The coefficient of *foreign-owned* in column I shows that, controlling for bank characteristics, the average foreign bank in our sample does not have a significantly higher Lerner index compared to the average domestically owned bank.

In Column II we repeat the same exercise, this time using only the *foreign presence* variable. The results show that the stronger presence of foreign banks increases the market power of the average bank. This effect is also economically significant. According to the baseline specification, a 10% increase in *foreign presence* will increase, on average, the Lerner index of banks by 0.09. Considering that the standard deviation of *foreign presence* is 16.97 and the trend on this variable is increasing, it seems that the share of foreign banks is a very important explanatory factor of the bank-level markups.

In Columns III-IX we carry out the same analysis this time including both *foreign-owned* and *foreign presence*. The results show that the former variable remains statistically

insignificant, while the coefficients on *foreign presence* are essentially the same with those of column II. The implications of these results are then straightforward. The ownership status, foreign or domestic, of individual banks seems to play no role in explaining banks' market power. Thus, we can rule out a significant direct effect of *foreign-owned* on bank market power, but we do find a positive and significant spillover effect of *foreign presence* on bank markups. Worth noting is that the positive association between *foreign presence* and market power remains prevalent after controlling for structural, regulatory, macroeconomic, and institutional factors in Table 3.

The effect of the control variables is in line with expectations and with previous studies. For example, Barth, Caprio, and Levine (2004) find that higher entry restrictions in banking markets are associated with a greater ability for the banks to charge a price above its marginal cost. In our sample we identify the same effect through the entry restrictions variable. We also find that well-capitalized banks are those possessing higher market power, which can be attributed to their ability to raise capital more easily and perhaps more inexpensively. In contrast, banks with higher *deposits* have lower market power in most of our specifications. This is consistent with the fact that the higher cost of deposits relative to other sources of bank funds, implies lower market power, probably because the marginal cost is higher.

The impact of the structural variables in column IV is statistically insignificant. This result confirms that the structural variables, useful as they may be in revealing important structural characteristics of the industry, are not good proxies for bank competition (Claessens and Laeven, 2004). We find that more stringent capital requirements increase banks' market power. This result has important policy implications in light of the discussions under the Basel accord surrounding the reforms in banking regulation.

All the macroeconomic variables in column VI are statistically significant. In particular, the larger the manufacturing sector the lower is the Lerner index of banks, which

is intuitive because manufacturing firms can use more collateral compared to service and retail enterprises and, thus, obtain lower lending rates. In turn, a higher volume of foreign direct investment yields lower Lerner indices because these firms can obtain financing from their parent company or banks operating in their host countries and, thus, do not need to borrow from local banks. In turn, the positive effect of higher government spending on banks' market power is consistent with La Porta, Lopez de Silanes, and Shleifer (2002), who suggest that large governments are interventionist and inefficient in protecting consumers and promote competitive market practices.

In contrast, trade freedom enhances bank market power (column VII). This may be due to the increased demand for funding that was observed following the abrupt abolition of tariff and non-tariff barriers in the last two decades. With respect to the political variables (column VIII), we find that banks operating in more democratic and more right-wing countries have higher market power. One possible explanation for the effect of the latter variable is that competition policy is enforced less rigorously by right-wing governments; this is widely believed to be the case in the United States. Concerning the effect of democracy, we observe a considerable increase in the share of foreign bank presence over our sample period in many countries that are new democracies with no tradition in strong institutions and market-oriented policies. Yet, to reach a definite conclusion that the positive relationship between democratization and right-wing governments is not a spurious correlation, a much deeper analysis is required involving addressing the causality issue that is probably beyond the scope of the present study. This is more so if we consider that higher economic development (as measured by the *GDP per capita*) is associated with lower Lerner indices.

In Table 4 we first assess the inclusion of *foreign presence in terms of assets* to examine the spillover effect (column I). The coefficient on this variable is positive and statistically significant at the 1% level. The economic significance is lower compared to *foreign presence*. This is expected because the assets-based variable incorporates the element

that foreign banks can also be partially owned by domestic owners, whereas *foreign presence* characterizes foreign banks entirely as foreign-owned or not. Still a 10% increase in foreign bank ownership in terms of assets will increase the Lerner index by 0.03. For the bank in our sample with an average Lerner index this implies an 13.6% increase in the Lerner index. Further, in column II we use as dependent variable the average Lerner by country and year (a country-level Lerner index), with the results being essentially the same with those of our baseline model (column III of Table 3). These results also hold with small variation even after using the adjusted-Lerner and the dual-output Lerner indices (columns III and IV of Table 4).

[Insert Table 4 about here]

The findings of Tables 3 and 4 are in contrast with the two existing studies on this issue (Claessens and Laeven; 2004; Jeon, Olivero, and Wu, 2011) that document a negative effect of foreign bank presence on market power measured at the country level. Intuitively, the increased foreign bank presence can increase the market power of banks for at least three reasons. First, foreign banks penetrate those banking sectors with profit opportunities. Usually the old regime of these sectors consists of banks with low-quality technology that miss-price risk. In these situations, foreign banks are better able to price risk through their technological advantage, and this leads to higher intermediation margins *via* higher intermediation prices. This effect is then carried over to the domestic banks, which will follow the new pricing schemes because they will, in time, gain access to the new technology.

Second, foreign banks tend to lend to more creditworthy clients. From the demand side, these borrowers might be willing to pay higher margins, if they perceive foreign banks as less risky. Finally, and perhaps most importantly, foreign banks have the ability to offer new banking products compared to domestic banks. Thus, they become the monopolists in

these products, at least for some time. Below we will also show that the positive impact of foreign bank presence on banks' market power is primarily driven by banks entering through M&As and will offer further intuition behind our main results.

In Table 5 we further explore the nexus between foreign bank ownership and market power using alternative measures of market power (other than Lerner-type indices). In column I we use the H-statistic, which we estimate using the same PSLC method with our Lerner indices from the regression of bank interest revenues on the same three input prices (see also Table 1). By adding the observation-specific coefficients on the three input prices by bank and year, our method yields bank-year estimates for the H-statistic.[7] The results provide a different picture than that of Tables 3 and 4. Specifically, the results show that *foreign-owned* (and not *foreign presence*) is the significant variable, the model predicting that foreign banks have a higher H-statistic (lower market power). Thus, the H-statistic is the only measure of market power among the ones commonly used in the literature, which predicts a positive and significant direct effect of foreign bank ownership on competition. However, as we highlight in Section 3.1, the H-statistic does not map the various levels of market power robustly and, thus, these results should be treated with caution. In contrast, the findings in columns II and III, where we use the World Bank's Lerner and Boone indicators (observed at the country-year level), are consistent with our findings in Tables 3 and 4.

[Insert Table 5 about here]

A potential problem with our estimates of the Lerner index is that changes in risk perceptions of banks could be unevenly reflected in prices and costs. The risk is of course also priced in deposit rates, which are part of our costs and are usually very easily adjustable

[7] The World Bank also has estimates for the H-statistic, however these are given for the cross-section of countries, limiting our study to a cross-sectional analysis with a small number of observations. The H-statistic has been estimated at the bank-level by Brissimis and Delis (2011).

within a given year, but there could still be some uneven distribution of risk to depositors and borrowers. To this end, we control in columns IV and V for two different measures of credit risk, namely the ratios of loan-loss provisions to total loans and non-performing loans to total loans, respectively.[8] The first ratio is positive and significant, while the second is insignificant. However, in both cases the effect of *foreign presence* on *Lerner* remains essentially the same with that reported in Table 3.

The final exercise of Table 5 is about distinguishing between the numerator of the Lerner index (the margin between price and marginal cost) and the denominator (price). The results show that the effect of *foreign presence* on the Lerner index is due to the increase in the gap between the price and marginal cost (column VII). Thus, the main mechanism driving the increase in the market power of banks relates to the efficiency advantage of the foreign banks, which forces domestic banks to also become more efficient. However, this increase in efficiency is not accompanied by a reduction in the lending rates for the average bank.

In additional robustness checks that we do not report owing to space considerations, we examine whether the relation between foreign bank ownership and bank market power is non-linear by adding the squared term of the two foreign bank ownership variables. We find a statistically insignificant coefficient on the squared term, while we still find that the level term of *foreign presence* is statistically and economically significant. We also experiment with many other bank-year and country-year control variables, the results being quantitatively similar. Finally, we add the second and the third lags of *foreign-owned* and *foreign presence* to allow more time for the effect of the foreign ownership variables to reach the market. Again, the coefficients on these lags are statistically insignificant.

[8] An alternative approach would be to control for risk in our estimations of marginal cost. However, we prefer to follow here the most recent literature in the definition of the cost function (e.g. Koetter, Kolari, and Spierdijk, 2012).

4.3. Heterogeneity in the results due to bank and country characteristics

Up to now *foreign presence* seems to be the foreign ownership variable explaining bank market power. In this sub-section we use the theoretical conjectures of Section 2 to examine whether our main result on the spillover effect varies with specific bank- and industry-specific characteristics. We carry out this analysis by adding in equation (1) interaction terms between *foreign presence* and these characteristics. The choice of the variables to be interacted with *foreign presence* is guided by the theoretical discussion of Section 2. We also examine the interaction terms between *foreign-owned* and the same characteristics, but the respective coefficients are statistically insignificant and, hence, we do not report them.[9]

Specifically, with respect to bank characteristics, we focus on the capitalization and deposits variables. In addition to the theoretical discussion in Section 2, we observe that in countries with higher than average foreign bank presence the mean capital ratios are significantly higher than in the countries with lower than average foreign bank presence (0.111 and 0.086, respectively). Similarly, the ratio of total customer deposits to total assets (*deposits*) is quite higher in countries with very low levels of foreign bank presence compared to countries with very high foreign bank presence. This is a crude indication that high foreign bank presence induces banks in the industry to hold significantly higher levels of capital, while they have significantly lower levels of loanable funds in the form of deposits. Then, this type of heterogeneity could have important implications for the relation between foreign bank presence and market power.

To provide inference at the mean of the main effects, we mean-center the variables used to construct interaction terms. We report the estimation results from this exercise in the first two columns of Table 6. We find that the positive effect of *foreign presence* on bank market power is smaller for well-capitalized banks and larger for banks with high deposit

[9] One such interaction term of particular interest would be the one between *Foreign-owned* and *foreign presence*. This would allow to see whether the spillover effect is similar across the domestic and foreign banks. We find that this interaction term is statistically insignificant, showing that domestic and foreign banks are perfect substitutes in this process.

ratios, with the statistical significance of the interaction term including capitalization being higher. These findings suggest that if the banks in the host country are well-capitalized and have alternative sources of loanable funds, foreign banks will not have an advantage in lending and Lerner indices will be lower. Then, these characteristics of the host banking system are an important prerequisite for a neutral effect of foreign bank presence on market power. However, it should be noted that the levels of *capitalization* in which the impact of foreign bank presence turns negative is very high.[10]

[Insert Table 6 about here]

In column III of Table 6 we present the results from a specification that includes an interaction term between the foreign bank ownership variable and the variable named *country M&As*. This variable equals the number of foreign owned banks that enter in the host country through an M&A over those that enter through the establishment of a new institution (greenfield entry), scaled from zero to one for expositional brevity. In our sample, two out of three foreign banks enter our sample through an M&A. The main effect of the demeaned foreign ownership variable comes out positive and statistically significant as before. The interaction effect is also positive and statistically significant at the 5% level, indicating that entry through M&As is one of the main causal factors of the positive relation between *foreign presence* and *Lerner*. Thus, greenfield entry of foreign banks, along with an equally capitalized domestic banking sector, seems to be the *sine qua non* to avoid the buildup of market power.

In line with our arguments in Section 4.2 on the positive relation between foreign bank presence and market power, we can provide some further explanations of this important finding. First, a foreign bank usually brings in its own, many times superior, technology in

[10] Specifically, it would take a capitalization ratio equal to 0.42 for this to happen.

pricing risk and this can lead to a change in the pricing decisions compared to the acquired domestic-owned bank. To avoid losses associated with very risky borrowers of the old regime that get hegemonic loan deals, the foreign bank could charge higher rates instead of potentially dropping these strategic relationships. Indeed, foreign banks frequently enter a country *via* M&A's, instead of greenfield entry, to benefit from the comparative advantage in relationship lending of the existing domestic bank.

Second, there is a very possible efficiency effect (Bonin, Hasan, and Wachtel, 2005; Degryse, Havrylchyk, Jurzyk, and Kozak, 2012), which is also prevalent in the last two regressions of Table 5. Foreign banks mainly acquire domestic banks with high cost inefficiency and the new bank, after the M&A, tends to reduce marginal costs, which increases the Lerner index. On the same line, a recent strand of literature (Martinez Peria and Mody, 2004) suggests that cross-border M&As in banking are value destructing because of high inefficiency of the old domestic bank. The new bank entering through an M&A will lower costs, giving rise to higher Lerner indices. All in all, we have to keep in mind that there is a reason for the acquisition. Even in developed countries, the acquired bank usually is a low-performance institution or a government-owned one with no clear profit-maximizing objective.

In column IV of Table 6 we examine whether our main result on the spillover effect varies with differences in financial-statement transparency. We observe that the estimated coefficient of foreign bank presence remains positive and significant and takes a value of 0.010, which is the same with the baseline specification (column III of Table 3). The interaction term is negative and statistically significant at the 10% level. However, the economic significance is quite high: for a large gap in the financial-statement transparency between the host and the origin country, the positive effect of foreign bank presence on Lerner becomes only 0.010-0.005=0.005 and is statistically insignificant. Intuitively, this implies that foreign banks from more advanced origin countries in terms of transparency and

market discipline bring in their progressive reporting techniques and reduce informational asymmetries in the banking sectors of the host countries. This, in turn, seems to benefit borrowers, given the lower levels of market power.[11]

As a final exercise, we consider the potential heterogeneity in the coefficient on *foreign presence* based on the time (years) since the foreign bank presence reached a specific threshold. The rationale for including this variable is that the longer it takes foreign banks to dominate in a new market, the more acquainted they become with domestic practices and clientele, thereby facing lower informational and agency costs. To this end, we introduce interaction terms between the years since *foreign presence* reached a value of 40% and 50% and we present the estimation results in Table 7. We find a positive and marginally statistically significant (at the 10% level) interaction term in the first regression (*foreign presence* reached a value of 40%) and a higher statistical significance in the second regression. Therefore, our findings do seem to suggest that the longer a country has high levels of foreign bank presence, the higher the positive impact of foreign bank presence on banks' market power.

[Insert Table 7 about here]

5. Conclusions

This paper analyzes the impact of foreign bank ownership on the market power of individual banks. We collect bank-year data for all countries in the world to estimate the market power of banks through the use of the Lerner index. We use a cost function with a semiparametric

[11] Existing studies find that the geographical distance between the host and the origin countries, as well as cultural, economic, and institutional differences could also matter for the foreign banks' location decisions (Claessens and van Horen, 2014) and for their lending behavior in the host countries (Mian, 2006; Beck, Ioannidou, and Schafer, 2012). Thus, we also examine whether the impact of the foreign bank entry on the host country's banks' market power depends on such characteristics. Definitions for these distance variables are provided in Table 1. Yet, the interaction terms of all of these variables with *foreign presence* are statistically insignificant. We also experiment with interaction terms including banking-industry concentration, GDP per capita, and growth. Again these interaction terms are statistically insignificant.

technique that allows for a very flexible specification and does not impose a specific functional form on the data. Our method yields observation-specific estimates of the Lerner index for a maximum of 12,206 banks operating in 148 countries during the period 1997 to 2010.

Subsequently, we match our data set with that of Claessens and van Horen (2014) who have information on foreign bank ownership in 137 countries over the period 1995 to 2009 (thus, our final sample is restricted to 131 countries over the period 1997-2009). Using the merged data sets we examine the impact of the ownership status (foreign or domestic) of individual banks on their market power (direct effect), as well as the impact of the share of the number of foreign-owned banks to the total number banks in the industry (spillover effect).

We find that the only significant impact comes from the spillover effect and that this effect is positive in the sense of a higher bank market power due to an increased foreign bank presence. This effect seems to be transmitted through the considerably higher incidence of foreign bank entry through M&As, instead of greenfield entry, as well as through the capitalization of banks in the host country. We also find that the positive impact of the country-level trends in foreign bank presence on banks' market power is significantly weaker when differences in the financial-statement transparency between the host and the origin country are rather important.

These results have important policy implications for regulators and policy makers alike. If increased competition is the requirement, then it seems imperative that the host banking industry is well-capitalized and that foreign bank entry is made through greenfield entry. Further, a concomitant abolition of entry barriers and an establishment of strong transparency in the functioning of banks is warranted. If, in contrast, competition is already rather strong and there are concerns about the stability of the banking system, the foreign bank entry through M&As and the protectionist policies are preferable to increase the market

power of banks and their rents. Thus, a natural extension to our work would be to examine the real effects behind the positive nexus of foreign bank presence with banks' market power. In particular, bank market power is usually linked to increased lending rates and, thus, to reduced welfare. Yet, a higher market power of banks increases bank profitability and can lead to increased financial stability. Given our findings, the special role of foreign bank presence in the bank market power-stability relation needs further examination. We leave this and other issues for future research.

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Table 1. Variable definitions and sources

Name	Description	Data source
Panel A: Variables used in the analysis of market power		
Earning assets	Natural logarithm of deflated total earning assets (measure of a bank's output).	Bankscope
Price of output	Total income divided by total earning assets.	Bankscope
Expenses	Natural logarithm of deflated total interest expenses and total noninterest expenses (measure of a bank's total cost).	Bankscope
Price of deposits	Natural logarithm of total interest expenses divided by total customer deposits.	Bankscope
Price of labor	Natural logarithm of personnel expenses divided by total assets.	Bankscope
Price of physical capital	Natural logarithm of overheads minus personnel expenses divided by fixed assets.	Bankscope
Panel B: Variables used in the analysis of market power		
A. Dependent variable		
Lerner index	The ability of an individual bank to charge a price above marginal cost.	Own calculations
Average Lerner index	The Lerner index averaged by country and year	Own calculations
Adj.-Lerner index	Variant of the Lerner index which allows for the possibility that firms do not choose the prices and input levels in a profit-maximizing way.	Own calculations
Dual-output Lerner	Variant of the Lerner index that adopts a dual-output cost function.	Own calculations
H-statistic	This is the Panzar and Rosse (1987) H-statistic measured by the elasticity of bank interest revenues to input prices. The H-statistic is estimated at the bank-year level using the same technique with the Lerner indices. Higher values reflect less market power.	Own calculations
Lerner World Bank	The Lerner index by country and year, where marginal cost is estimated with the usual parametric techniques and a translog cost function.	World Bank
Boone World Bank	The elasticity of profits to marginal costs by country and year, where marginal cost is estimated with the usual parametric techniques and a translog cost function.	World Bank
B. Bank characteristics		
Deposits	Total customer deposits divided by total assets.	Bankscope
Capitalization	Equity capital divided by total assets.	Bankscope
Loans	Total loans divided by total assets.	Bankscope
Bank size	Natural logarithm of total assets.	Bankscope
C. Main explanatory variables		
Foreign-owned	Dummy variable equal to one if bank is foreign owned (50% or more of their assets)	Claessens and Van Horen (2014)
Foreign presence	The ratio of the number of foreign banks over the number of all banks.	Claessens and Van Horen (2014)
Foreign presence in terms of assets	The ratio of the assets of foreign banks over the total assets of all banks.	Claessens and Van Horen (2014)
Country M&As	The ratio of the number of foreign-owned banks that enter via M&As over the number of all banks (scaled from zero to one).	Claessens and Van Horen (2014)
Entry restrictions	The index measures the degree to which banks face entry restrictions in the banking market and is constructed by adding 1 if the answer is yes and 0 otherwise, for each one of the following twelve questions: (1) Is more than one license required (e.g. one for each banking activity)? (2) Which of the following are legally required to be submitted before issuance of the banking license: (a) draft bylaws (b) intended organizational chart (c) financial projections for first three years (d) financial information on main potential shareholders (e) background/experience of future board directors (f) background/experience of future senior managers (g) source of funds to be used as capital. (3) What were the primary reasons for denial of the applications: (a) capital amount or quality (b) banking skills (c) reputation (d) other? This index takes a value from 0 to 12, with larger values denoting more stringent entry restrictions.	Cihak, Demirgüç-Kunt, Martinez Peria, and Mohseni-Cheraghlou (2012), Barth, Caprio, and Levine (2008,2004,2001)
Loan-loss provisions	Loan-loss provisions divided by total loans	Bankscope
Non-performing loans	Non-performing loans	Bankscope
Private ownership	The percentage of bank deposits held in privately owned banks were used to construct rating intervals. Countries with larger shares of privately held deposits received higher ratings.	Economic freedom of the world: 2012 Annual report
Herfindahl-Hirschman index	Hirschman-Herfindahl index of each bank's total earning assets (takes value from 0 to 1).	Own calculations
Activity restrictions	The score for this variable is determined on the basis of the level of regulatory restrictions on bank participation in: (1) securities activities, (2) insurance activities, (3) real estate activities, and (4) bank ownership of non-financial firms. These activities can be unrestricted, permitted, restricted or prohibited and on this basis the variable is assigned the values of 1, 2, 3 or 4, respectively. The index takes a value from 0 to 16, with larger values denoting more stringent activity restrictions.	Cihak, Demirgüç-Kunt, Martinez Peria, and Mohseni-Cheraghlou,(2012), Barth, Caprio, and Levine (2008,2004,2001)
Capital requirements	This variable is determined: (a) by adding 2, 1, or 0 if the answer is Basel II, Basel I, or other; in the question: Which is the regulatory capital adequacy regime?, (b) by adding 1 if the answer is yes and 0 otherwise in the questions: Does the ratio vary with market risk? Are the sources of funds to be used as capital verified by the	Cihak, Demirgüç-Kunt, Martinez Peria, and Mohseni-Cheraghlou,(2012), Barth, Caprio, and Levine

	regulatory/supervisory authorities?, (c) by adding 1 if the answer is no and 0 otherwise in the questions: Can the initial or subsequent injections of capital be done with assets other than cash or government securities? Can initial disbursement of capital be done with borrowed funds? This index takes a value from 0 to 6, with larger values denoting more stringent capital requirements.	(2008,2004,2001)
Supervisory power	Index of the powers of the supervisor of the banking sector, reflecting whether the supervisory agency has the authority to take specific actions to prevent and correct problems in the banking sector. Takes values from 0 to 14, with higher values reflecting more supervisory powers (see Barth, Caprio, and Levine, 2008).	Cihak, Demirgüç-Kunt, Martinez Peria, and Mohseni-Cheraghlou,(2012), Barth, Caprio, and Levine (2008,2004,2001)
Manufacturing	The sum of gross output minus the value of intermediate inputs used in the production of manufacturing goods.	World Development Indicators
Foreign direct investment	The net inflow of foreign direct investment.	World Development Indicators
Government spending	The level of government expenditures as a percentage of GDP.	Heritage Foundation
Financial freedom	Index of banking security and independence from government control. Larger values indicate more freedom.	Heritage Foundation
Trade freedom	A composite measure of the absence of tariff and non-tariff barriers that affect imports and exports of goods and services. Larger values indicate more freedom.	Heritage Foundation
Ideology	The classification rule for the chief executive of each country is as follows: Right (1); Center (2); Left (3); No information (NA); No executive (NA).	Beck, Clarke, Groff, Keefer, and Walsh (2001)
Polity	The polity scale ranges from +10 (strongly democratic) to -10 (strongly autocratic).	Polity IV
GDP per capita	Natural logarithm of GDP per capita.	World Development Indicators
Difference in transparency	The weighted difference in the banks' financial-statement transparency between the host and the origin country.	Cihak, Demirgüç-Kunt, Martinez Peria, and Mohseni-Cheraghlou,(2012), Barth, Caprio, and Levine (2008,2004,2001), Bankscope and own calculations
Years of foreign ownership>40%	The number of consecutive years since when the foreign ownership variable reached a value of 40% or higher in a specific country (zero otherwise).	Own calculations
Years of foreign ownership>50%	The number of consecutive years since when the foreign ownership variable reached a value of 50% or higher in a specific country (zero otherwise).	Own calculations
D. Instrumental variable		
Entry restriction for foreign banks	This variable is determined by adding 1 if the answer is yes and 0 otherwise, for each one of the following four questions: Are foreign entities prohibited from entering through: (1) Acquisition, (2) Subsidiary, (3) Branch and (4) Joint venture. The index takes a value from 0 to 4, with larger values denoting more stringent entry restrictions for foreign banks.	Cihak, Demirgüç-Kunt, Martinez Peria, and Mohseni-Cheraghlou,(2012), Barth, Caprio, and Levine (2008,2004,2001)

Table 2. Summary statistics
The table reports summary statistics for the variables used in the empirical analysis. The variables are defined in Appendix A.

Variable	Level	Obs.	Mean	Std. Dev.	Min.	Max.
Panel A: Variables used in the derivation of market power from 1997-2010						
Earning assets	Bank	89,778	11.71	2.02	6.83	21.38
Price of output	Bank	89,778	0.09	0.07	0.02	0.71
Expenses	Bank	89,778	8.85	1.93	4.55	18.41
Price of deposits	Bank	89,778	0.06	0.09	0	1.03
Price of labor	Bank	89,778	0.02	0.01	0	0.09
Price of physical capital	Bank	89,778	1.70	3.71	0.13	56.96
Marginal cost	Bank	89,019	0.07	0.06	0.006	1.656
Panel B: Variables used in the analysis of market power from 1997-2009						
Lerner index	Bank	80,725	0.22	0.12	-0.2	0.95
Adjusted-Lerner index	Bank	78,724	0.17	0.12	-0.2	0.95
Dual-output Lerner index	Bank	74,366	0.21	0.20	-11.54	0.95
H-statistic	Bank	82,151	0.23	0.23	-0.56	0.46
Lerner World Bank	Country	81,943	0.21	0.08	-1.61	0.82
Boone World Bank	Country	74,111	-0.05	0.10	-2.08	5.69
Deposits	Bank	82,151	0.69	0.2	0	1.93
Capitalization	Bank	82,146	0.1	0.08	-2.58	1
Loans	Bank	82,083	0.61	0.19	0	9.36
Bank size	Bank	82,151	12.85	1.66	7.7	21.51
Loan-loss provisions	Bank	45,948	0.00	0.01	0.00	0.26
Non-performing loans	Bank	79,690	0.02	0.70	-5.70	180.54
Foreign-owned	Bank	82,151	0.07	0.27	0	1
Country M&As	Country	82,151	0.72	0.32	0	1
Foreign presence	Country	82,151	20.6	16.97	0	100
Foreign presence in terms of assets	Country	42,490	18.39	18.54	0	100
Entry restrictions	Country	81,423	7.56	1.96	0	12
Private ownership	Country	72,775	7.65	2.46	0	10
Herfindahl-Hirschman index	Country	82,151	0.09	0.14	0	1
Activity restrictions	Country	81,454	9.01	2.51	1	16
Capital requirements	Country	81,593	3.53	0.86	0	6
Supervisory power	Country	81,543	11.05	2.27	1	14
Manufacturing	Country	80,575	17.93	4.55	1.82	35.63
Foreign direct investment	Country	81,980	5.62	34.22	-15.03	564.92
Government spending	Country	81,894	50.89	21.04	0	99.3
Financial freedom	Country	81,894	64.13	18.58	10	90
Trade freedom	Country	81,894	77.72	9.97	0	95
Ideology	Country	78,136	1.64	1.08	0	3
Polity	Country	80,559	8.88	3.19	-10	10
GDP per capita	Country	82,109	10.09	0.82	6.1	11.21
Difference in transparency	Country	79,571	-0.44	0.64	-4.1	1.94
Years of foreign ownership>40%	Country	82,151	0.59	2.13	0	13
Years of foreign ownership>50%	Country	82,151	0.39	1.7	0	13
Entry restrictions for foreign banks	Country	81,987	0.09	0.34	0	4

Table 3. The impact of bank foreign bank ownership and foreign bank presence on market power

The table reports coefficients and t-statistics (in parentheses). The dependent variable in columns I-IX is the Lerner index. The variables are defined in Table 1. All regressions are estimated with the two-step "difference" GMM estimator for dynamic panels and robust standard errors are clustered by country. Also, all regressions include year-fixed effects. Wald is the p-value of the Wald test, which shows the joint statistical significance of the coefficient estimates. Hansen is the p-value of the Hansen test of overidentifying restrictions, which requires a value higher than 0.05 to accept the null (valid instruments) at the 5% level. AR1 and AR2 are the p-values of the tests for the first- and- second-order autocorrelation, respectively. All equations include GMM-style instruments (lags) and the entry restriction for foreign banks ($ERFB_{t-1}$) as an IV-style instrument. The *, **, *** marks denote statistical significance at the 10, 5, and 1% level, respectively.

	I	II	III	IV	V	VI	VII	VIII	IX
	Bank ownership	Country ownership	Spillover effect	Structural variables	Regulation variables	Macroeconomic variables	Freedom variables	Political variables	GDP per capita
Lagged dependent	0.626***	0.413***	0.412***	0.335***	0.451***	0.465***	0.412***	0.372***	0.468***
	(3.903)	(3.328)	(3.375)	(2.699)	(3.981)	(3.709)	(2.601)	(2.889)	(3.482)
Deposits	-0.208	-0.369*	-0.332*	-0.346	-0.315*	-0.146	-0.230*	-0.301**	-0.241
	(-1.272)	(-1.932)	(-1.871)	(-1.388)	(-1.923)	(-0.881)	(-1.807)	(-2.040)	(-1.335)
Capitalization	0.597**	0.838***	0.841***	0.766***	0.639***	0.693***	0.746***	0.723***	0.906***
	(2.548)	(4.247)	(4.303)	(3.228)	(3.146)	(3.567)	(3.749)	(2.950)	(4.021)
Loans	0.039	-0.092	-0.071	-0.055	-0.073	-0.045	-0.026	-0.017	0.050
	(0.540)	(-0.687)	(-0.542)	(-0.400)	(-0.696)	(-0.532)	(-0.252)	(-0.215)	(0.267)
Bank size	0.031**	0.008	0.009	0.000	0.006	-0.011	0.002	0.000	0.044
	(2.143)	(0.364)	(0.423)	(0.014)	(0.291)	(-0.595)	(0.081)	(0.027)	(1.336)
Foreign-owned	-0.307		-0.192	-0.192	-0.218	-0.342*	-0.290	-0.066	-0.186
	(-1.029)		(-0.804)	(-0.569)	(-1.033)	(-1.648)	(-1.447)	(-0.361)	(-0.755)
Foreign presence		0.009***	0.010***	0.010***	0.010***	0.006**	0.006***	0.006***	0.009***
		(3.158)	(3.004)	(3.439)	(3.026)	(2.230)	(2.931)	(3.774)	(2.870)
Entry restrictions	0.011***	0.014***	0.015***	0.015***	0.018***	0.013***	0.013***	0.015***	0.015***
	(6.304)	(5.065)	(4.947)	(4.171)	(5.589)	(4.846)	(5.035)	(6.395)	(5.953)
Private ownership				-0.001					
				(-0.208)					
HHI				-0.075					
				(-1.127)					
Activity restrictions					0.003				
					(0.814)				
Capital requirements					0.020***				
					(2.708)				
Supervisory power					0.004				
					(1.008)				
Manufacturing						-0.010***			
						(-4.134)			

FDI						-0.000***			
						(-4.216)			
Government spending						0.001**			
						(2.353)			
Financial freedom							0.000		
							(0.485)		
Trade freedom							0.004***		
							(3.757)		
Ideology								-0.005**	
								(-2.206)	
Polity								0.021**	
								(2.110)	
GDP per capita									-0.334**
									(-2.297)
Observations	49,948	49,948	49,948	46,782	49,887	49,052	49,871	46,756	49,944
Wald	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Hansen	0.336	0.288	0.288	0.770	0.852	0.640	0.402	0.795	0.241
AR1	0.001	0.001	0.001	0.003	0.000	0.001	0.007	0.001	0.001
AR2	0.478	0.796	0.747	0.550	0.983	0.832	0.557	0.657	0.985

Table 4. Sensitivity to different Lerner indices and measures of foreign bank presence

The table reports coefficients and t-statistics (in parentheses). The dependent variable in column I is the Lerner index, in II the average Lerner index by country and year, in III the adjusted-Lerner index, and in IV the Lerner index obtained from the dual-output cost function. The variables are defined in Table 1. All regressions are estimated with the two-step "difference" GMM for dynamic panels and robust standard errors clustered by country. Also, all regressions include year-fixed effects. Wald is the p-value of the Wald test, which shows the joint statistical significance of the coefficient estimates. Hansen is the p-value of the Hansen test of overidentifying restrictions, which requires a value higher than 0.05 to accept the null (valid instruments) at the 5% level. AR1 and AR2 are the p-values of the tests for the first- and- second-order autocorrelation, respectively. All equations include GMM-style instruments (lags) and the entry restriction for foreign banks ($ERFB_{t-1}$) as an IV-style instrument. The *, **, *** marks denote statistical significance at the 10, 5, and 1% level, respectively.

	I	II	III	IV
Dependent variable:	Lerner	Average Lerner	Adj.-Lerner	Dual-output Lerner
Lagged dependent	0.361*	0.434***	0.572***	0.265***
	(1.835)	(3.646)	(5.906)	(3.871)
Deposits	-0.356	-0.329***	-0.355**	-0.103
	(-1.348)	(-2.653)	(-2.566)	(-0.361)
Capitalization	0.910*	-0.096	0.922***	0.819**
	(1.843)	(-0.796)	(3.975)	(2.442)
Loans	0.076	-0.184**	-0.078	0.074
	(0.584)	(-2.539)	(-0.430)	(0.501)
Bank size	0.026	-0.021	0.009	0.037
	(0.999)	(-0.892)	(0.456)	(1.540)
Foreign-owned	-0.004	0.089	-0.022	-0.032
	(-0.017)	(0.446)	(-0.113)	(-0.211)
Foreign presence in terms of assets	0.003***			
	(3.824)			
Foreign presence		0.009***	0.006**	0.004*
		(3.230)	(2.108)	(1.785)
Entry restrictions	0.040	0.009***	0.013***	0.008***
	(1.440)	(2.587)	(3.942)	(2.767)
Bank observations	25,902	51,387	47,191	56,046
Wald	0.000	0.000	0.000	0.000
Hansen	0.190	0.895	0.291	0.379
AR1	0.048	0.001	0.000	0.000
AR2	0.617	0.078	0.509	0.365

Table 5. Other measures of market power, controlling for bank risk, and decomposition of the Lerner index
The table reports coefficients and t-statistics (in parentheses). The dependent variable in columns I is the H-statistic, in II the Lerner index of the World Bank by country and year, in III the Boone indicator from the World Bank, in IV and V our usual Lerner index, in VI the different between price (P) and marginal cost (MC) and in VII MC. The variables are defined in Table 1. All regressions are estimated with the two-step "difference" GMM for dynamic panels and robust standard errors clustered by country. Also, all regressions include year-fixed effects. Wald is the p-value of the Wald test, which shows the joint statistical significance of the coefficient estimates. Hansen is the p-value of the Hansen test of overidentifying restrictions, which requires a value higher than 0.05 to accept the null (valid instruments) at the 5% level. AR1 and AR2 are the p-values of the tests for the first- and- second-order autocorrelation, respectively. All equations include GMM-style instruments (lags) and the entry restriction for foreign banks ($ERFB_{t-1}$) as an IV-style instrument. The *, **, *** marks denote statistical significance at the 10, 5, and 1% level, respectively.

	I	II	III	IV	V	VI	VII
Dependent variable:	H-statistic	Lerner World Bank	Boone World Bank	Lerner	Lerner	P	P-MC
Lagged dependent	0.373***	-0.339	0.314***	0.094	0.372***	0.418***	0.439***
	(6.585)	(-1.414)	(4.634)	(1.229)	(2.926)	(4.028)	(6.994)
Deposits	0.234*	-0.291**	-0.030	-0.235*	-0.204	0.190	-0.045
	(1.867)	(-2.471)	(-0.297)	(-1.784)	(-1.594)	(1.366)	(-1.601)
Capitalization	0.242*	0.194	-0.002	0.595***	0.518***	0.238	0.230***
	(1.892)	(0.561)	(-0.025)	(2.628)	(2.952)	(1.504)	(7.183)
Loans	-0.176*	0.136	-0.186	0.056	0.068	0.037	-0.026
	(-1.787)	(0.362)	(-1.536)	(0.324)	(0.747)	(0.475)	(-1.158)
Bank size	-0.044	-0.024	-0.038**	0.019	0.004	0.007	0.003
	(-1.354)	(-0.493)	(-2.159)	(1.106)	(0.171)	(0.188)	(0.922)
Foreign-owned	0.660**	-0.246	0.228	-0.186	-0.503	0.081	0.003
	(2.230)	(-0.487)	(1.166)	(-0.678)	(-1.261)	(0.366)	(0.105)
Foreign presence	0.001	0.015***	0.004**	0.006***	0.009***	-0.002	0.001**
	(0.168)	(3.654)	(2.148)	(3.309)	(2.685)	(-0.426)	(2.085)
Entry restrictions	-0.003	0.027***	-0.001	0.014***	0.014***	-0.004	0.000
	(-0.777)	(2.926)	(-0.191)	(4.291)	(3.096)	(-1.337)	(0.634)
Loan-loss provisions				0.005***			
				(3.259)			
Non-performing loans					-0.286		
					(-0.224)		
Observations	51,388	61,898	55,788	48,404	28,818	51,388	51,388
Wald	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Hansen	0.735	0.624	0.562	0.760	0.991	0.268	0.607
AR1	0.000	0.253	0.000	0.003	0.003	0.000	0.000
AR2	0.278	0.860	0.509	0.101	0.428	0.418	0.458

Table 6. Foreign bank presence and market power: Heterogeneous effects

The table reports coefficients and t-statistics (in parentheses). The dependent variable is the Lerner index. The variables are defined in Table 1. All regressions are estimated with the two-step "difference" GMM for dynamic panels and robust standard errors clustered by country. Also, all regressions include year-fixed effects. Wald is the p-value of the Wald test, which shows the joint statistical significance of the coefficient estimates. Hansen is the p-value of the Hansen test of overidentifying restrictions, which requires a value higher than 0.05 to accept the null (valid instruments) at the 5% level. AR1 and AR2 are the p-values of the tests for the first- and- second-order autocorrelation, respectively. All equations include GMM-style instruments (lags) and the entry restriction for foreign banks ($ERFB_{t-1}$) as an IV-style instrument. The *, **, *** marks denote statistical significance at the 10, 5, and 1% level, respectively.

	I	II	III	IV
Heterogeneous effects due to:	Capitalization	Deposits	Entry through M&As	Difference in transparency
Lagged dependent	0.502***	0.509***	0.437***	0.430***
	(3.400)	(3.804)	(4.255)	(3.467)
Deposits	-0.433*	-0.459**	-0.382**	-0.323
	(-1.932)	(-2.399)	(-2.036)	(-1.627)
Capitalization	0.713***	0.758***	0.884***	0.885***
	(2.753)	(3.262)	(2.996)	(3.866)
Loans	0.012	0.003	-0.002	0.063
	(0.099)	(0.023)	(-0.016)	(0.545)
Bank size	0.041	0.072*	0.057*	0.058**
	(1.511)	(1.930)	(1.938)	(2.009)
Foreign-owned	-0.616	-0.592	-0.765	-0.506
	(-1.498)	(-1.235)	(-1.612)	(-1.249)
Foreign presence	0.011**	0.007**	0.008**	0.010**
	(2.439)	(2.079)	(2.116)	(2.400)
Entry restrictions	0.017***	0.016***	0.016***	0.019***
	(3.591)	(2.941)	(3.573)	(3.918)
Foreign presence * Capitalization	-0.026**			
	(-2.118)			
Foreign presence * Deposits		0.012*		
		(1.659)		
Country M&As			0.026	
			(0.431)	
Foreign presence * Country M&As			0.008**	
			(2.090)	
Foreign presence * Difference in transparency				-0.005*
				(-1.676)
Bank observations	49,948	49,948	49,948	48,679
Wald	0.000	0.000	0.000	0.000
Hansen	0.287	0.517	0.219	0.557
AR1	0.002	0.000	0.000	0.001
AR2	0.944	0.883	0.285	0.713

Table 7. Foreign bank presence and market power: Heterogeneous effects due to the number of years since foreign bank presence reaches a specific threshold

This table reports coefficients and t-statistics (in parentheses). The dependent variable is the Lerner index. The variables are defined in Table 1. All regressions are estimated with the two-step "difference" GMM for dynamic panels and robust standard errors clustered by country. Also, all regressions include year-fixed effects. Wald is the p-value of the Wald test, which shows the joint statistical significance of the coefficient estimates. Hansen is the p-value of the Hansen test of overidentifying restrictions, which requires a value higher than 0.05 to accept the null (valid instruments) at the 5% level. AR1 and AR2 are the p-values of the tests for the first- and- second-order autocorrelation, respectively. All equations include GMM-style instruments (lags) and the entry restriction for foreign banks ($ERFB_{t-1}$) as an IV-style instrument. The *, **, *** marks denote statistical significance at the 10, 5, and 1% level, respectively.

	I	II
Heterogeneous effects due to:	Years of foreign ownership>40%	Years of foreign ownership>50%
Lagged dependent	0.440***	0.434***
	(3.922)	(3.695)
Deposits	-0.322**	-0.346**
	(-2.027)	(-2.150)
Capitalization	0.667**	0.873***
	(2.547)	(4.364)
Loans	-0.003	-0.003
	(-0.025)	(-0.026)
Bank size	0.029	0.032*
	(1.387)	(1.789)
Foreign-owned	-0.198	-0.069
	(-0.851)	(-0.764)
Foreign presence	0.005***	0.008***
	(2.661)	(3.330)
Entry restrictions	0.014***	0.015***
	(6.550)	(5.703)
Years of foreign ownership	-0.034*	-0.063**
	(-1.742)	(-2.150)
Foreign presence * Years of foreign ownership	0.001*	0.001**
	(1.799)	(2.193)
Observations	49,905	49,905
Wald	0.000	0.000
Hansen	0.849	0.889
AR1	0.000	0.000
AR2	0.835	0.813

Appendix A. Estimation of the Lerner indices

Consider a cost equation of the general form:

$$TC_{itc} = f(Q_{itc}, W_{L,itc}, W_{K,itc}, W_{D,itc}), \tag{A.1}$$

where $W_{L,itc}$, $W_{K,itc}$ and $W_{D,itc}$ are factor prices of labor, capital and deposits and Q_{itc} is the output of each bank i at time t in country c. Because we will be using a semiparametric approach to estimate the cost function, the choice of the functional form is not of primary significance; hence we aim for simplicity and use a standard log-linear production function. Also, we impose the usual linear homogeneity restriction in input prices, that is we normalize total cost and the input prices by the price of deposits before taking logs. We end up with the following cost function:

$$\ln TC_{itc} = b_1 + b_2 \ln W_{L,itc} + b_3 \ln W_{K,itc} + a_1 \ln Q_{itc} . \tag{A.2}$$

The PLSC model uses the local polynomial fitting regression and the Gaussian kernel function. A thorough theoretical discussion of the PLSC model can be found in Fan and Zhang (1999) and Mamuneas, Savvides, and Stengos (2006). Here we only provide a brief outline of the econometrics of our method.

Specifically, and by dropping the t and c subscripts for simplicity, we can write the total cost equation in econometric form as follows:

$$Y_i = \mathrm{E}(Y_i \mid W_i) + e_i = X_i \beta_1 + V_i \beta_2 (Z_i) + e_i . \tag{A.3}$$

In this equation, β_2 is a function of one or more variables with dimension k added to the vector Z, which is an important element of the analysis and will be discussed below. The linear part in (A.3) is in line with the idea of the semiparametric model as opposed to a nonparametric model (e.g., Zhang, Lee, and Song, 2002). The coefficients of the linear part are estimated in the first step as averages of the polynomial fitting by using an initial bandwidth chosen by cross-validation (Hoover, Rice, and Wu, 1998). We then average these estimates β_{1i} and β_{2i} to receive β_1 and β_2 in (A.3). In the second step we use the average estimates and (A.3) to redefine the dependent variable as follows:

$$Y_i^* \equiv Y_i - X_i\hat{\beta}_i = V_i\beta_2(z) + e_i^* \,, \tag{A.4}$$

where the asterisks denote the redefined dependent variable and error term. $\beta_2(z)$ is a vector of smooth but unknown functions of z_i, estimated using a local least squares approach of the form

$$\hat{\beta}_2(z) = \left[(n\lambda^k)^{-1}\sum_{j=1}^{n} V_j^2 K\left(\frac{z_j - z}{\lambda}\right)\right]^{-1}\left[(n\lambda^k)^{-1}\sum_{j=1}^{n} V_j Y_j^* K\left(\frac{z_j - z}{\lambda}\right)\right] = [B_n(z)]^{-1}C_n(z), \tag{A.5}$$

where $B_n(z) = (n\lambda^k)^{-1}\sum_{j=1}^{n} V_j^2 K\left(\frac{z_j - z}{\lambda}\right)$, $C_n(z) = n\lambda^k)^{-1}\sum_{j=1}^{n} V_j Y_j^* K\left(\frac{z_j - z}{\lambda}\right)$.

Equation (A.5) represents a local constant estimator, where $K(z, \lambda)$ is a kernel function, λ is the smoothing parameter (chosen by generalized cross validation) for sample size n, and k is the dimension of z_i.

If we assume that z is a scalar and K is a uniform kernel, then (A.5) can be written as follows:

$$\hat{\beta}_2(z) = \left[\sum_{|z_j - z| \le \lambda} V_j^2\right]^{-1}\left[\sum_{|z_j - z| \le \lambda} V_j Y_j^*\right]. \tag{A.6}$$

In (A.6), $\hat{\beta}_2(z)$ is a least squares estimator obtained by regressing Y_j^* on V_j, using the observations of (V_j, Y_j^*) for which the corresponding z_j is close to z, that is, $|z_j - z| \le \lambda$. Therefore, to estimate $\hat{\beta}_2(z)$, we only use observations within this "sliding window." Note that no assumptions are made about this estimator globally, but locally—within the sliding window—we assume that $\hat{\beta}_2(z)$ can be well-approximated. Also, because $\beta_2(z)$ is a smooth function of z, $|\beta_2(z_j) - \beta_2(z)|$ is small when $|z_j - z|$ is small. The condition that $n\lambda$ is large ensures that we have sufficient observations within the interval $|z_j - z| \le \lambda$ when $\beta_2(z_j)$ is close to $\beta_2(z)$. Therefore, under the conditions $\lambda \to 0$ and $n\lambda^k \to \infty$ (for $k \ge 1$), the local least squares regression of Y_j^* on V_j provides a consistent estimate of $\beta_2(z)$ (for a proof, see

Li, Huang, Li, and Fu, 2002). Therefore, the estimation method is usually referred to as a local regression.

We can now re-write (A.2) in econometric form as:

$$\ln TC_{itc} = b_1 + a_1(z_{itc}) \ln Q_{itc} + b_{2,itc} \ln W_{L,itc} + b_{3,itc} \ln W_{K,itc} + e_{itc}, \quad \text{(A.7)}$$

where e is a stochastic disturbance and z is the smoothing variable. The choice of the variable(s) to comprise z is a critical issue in the estimation process. The best candidates are variables that are highly correlated with a_1 and exhibit substantial variation across banks, countries and time. In a cost function, the natural candidates to use are the input prices. The advantage of this choice is that input prices most certainly affect a_1 to a large extent. This has been shown many times in estimates of parametric translog cost functions that include multiplicative terms of output with input prices. Delis, Iosifidi, and Tsionas (2012) also propose using as z the linear combination of input prices, when using the PLSC model. Following this paradigm, we define the smoothing variable as $z_{itc} = \ln W_{L,itc} + \ln W_{K,itc}$. We find that our results are not sensitive to the use of other z functions, such as the product of the input prices or linear combinations with different weights. From (A.7) we can obtain the marginal cost at the bank-year level as $\partial TC_{itc} / \partial Q_{itc} = a_1(z_{itc})(TC_{itc} / Q_{itc})$. We then use the estimates of marginal cost and equation (2) to calculate the Lerner index.

To estimate equation (A.7) and compute the Lerner index we rely on Bankscope as our primary source of bank-level data. We focus on commercial banks, savings banks and cooperative banks. We exclude real-estate and mortgage banks, investment banks, other non-banking credit institutions (mainly operating in Germany), specialized governmental credit institutions, bank-holding and other holding companies.[12] Besides bank-holding companies, the excluded institutions are less dependent on the traditional intermediation function and have a different financing structure compared to our focus group. In turn, the inclusion of bank-holding companies can lead to double counting, as these are corporations controlling

[12] The main activities of the excluded financial institutions relate to the following: provide mortgages; assist corporations and governments in a range of services (e.g., M&A's, raising capital, etc.); provide credit to public sectors; provide funding for public or municipal projects.

one or more banks. We checked one by one all banks to confirm that we have the subsidiaries of these companies in the sample to avoid false exclusion.

We apply three further selection rules to avoid including duplicates in our sample. This is an essential part of the sample-selection process and is absent in most empirical studies using the Bankscope database (for a similar strategy with ours, see Claessens and van Horen, 2014). First, even though we do not include bank-holding companies, we still need to exclude double entries between parent banks and subsidiaries. Bankscope's consolidation code system allows downloading either consolidated or unconsolidated statements, but in some cases information on either unconsolidated or consolidated statements of certain banks is not available.[13] We use either the consolidated or the unconsolidated statement depending on which one is available. This is a non-trivial choice and requires the re-examination of all banks on an individual basis to avoid double counting. Notably, there are cases of banks with subsidiaries in domestic or in foreign countries and one should be very careful in avoiding double-counting of subsidiaries that are established, for example, in a foreign country.[14]

Second, we account for mergers and acquisitions (M&A's). We went through all the M&A's one by one and made sure that both banks appear separately in the sample before the M&A and only the merged entity or the acquiring bank is included in the sample after the event. For example, if bank A and bank B merged in 2005, we create a new entity AB after 2005 and exclude the separate financial accounts of A and B that might still be reported for some time after the merger. We identify M&A's and their timing using Bankscope and the websites of the merging parties.

[13] A consolidated statement is the statement of a bank integrating the statements of its subsidiaries or branches. An unconsolidated statement does not integrate subsidiaries.

[14] Let us provide some examples to clarify this point. Assume that bank A1 is the parent bank with a consolidated (C) statement and banks A11, A12 and A13 are subsidiaries with unconsolidated (U) statement. If we include all banks in our sample we will have 3 duplicates. Hence, we need to subtract either the percentage of the subsidiaries or to exclude the subsidiaries from the sample. The former solution is not feasible because we do not have enough information for the percentage and the time duration of the ownership of the subsidiaries. Thus, we resort to the later solution. Two other examples for the case of banks with foreign subsidiaries that we account for using the same strategy are (i) B1 is a parent bank with a C statement, B11 is a subsidiary bank operating in the domestic market with a C or a U statement and B111 is a sub-subsidiary bank operating in the domestic market and (ii) B1 is a parent bank with C statement, B12 is a subsidiary bank operating abroad with a C or a U statement and B121 is a sub-subsidiary bank operating in the domestic market with a U statement.

Third, in the US there are quite a few separate banks that have the same name but are active in a different state. To solve this issue, we relate the value of total assets of, say, bank *i* in the last year this bank appears in our sample with Bankscope's identification number for bank *i*. This also allows avoiding problems with our procedure concerning M&A's described above.

As a final step, we clean our sample from negative values of total assets and total expenses. Additionally, we drop 1% of our sample from each end of the distribution of each of the three input prices. This excludes unreasonably high or low input prices (Delis, 2012; Claessens and Laeven, 2004). Notably, the initial dataset before all the steps of the cleaning process includes 300,180 observations for 21,445 banks operating in 149 countries between 1997 and 2010. Our final dataset for the estimation of market power consists of 89,778 observations for 12,206 banks operating in 148 countries between 1997 and 2010. Most of the observations dropped are related to some form of double-counting stemming from Bankscope's consolidation system and M&As. This highlights the importance of the data-cleaning process in generating sensible indices of bank competition.

In Panel A of Table 1 we define the variables used to estimate the cost function and then calculate the Lerner index, and in Panel A of Table 2 we provide summary statistics for these variables. To measure bank inputs and outputs we use the intermediation approach, which assumes that deposits are inputs used in the production process to produce bank outputs. A number of studies have shown this approach to be the preferred one (e.g., Berger and Humphrey, 1997; Hughes and Mester, 1993). In particular, we measure bank total costs (TC) by real total expenses, and bank output (Q) by real total earning assets. This measure for bank output relates to the traditional banking activities and, therefore, our main indices reflect competition in these activities. We construct real variables using the GDP deflator

(obtained from the World Bank).[15] Real total earning assets include loans, securities, and other earning assets (such as investments and insurance assets).

In turn, the three input prices are: W_L for the price of labor, which is measured by the ratio of personnel expenses to total assets;[16] W_K for the price of physical capital, measured by the ratio of capital expenditures to fixed assets; and W_D for the price of deposits, which is measured as total interest expenses over total customer deposits. For the Lerner index we also need a proxy for the output price (P), which is calculated as the ratio of total income over total earning assets (e.g., Beck, Jonghe, and Schepens, 2013).

Finally, to estimate the dual-output Lerner index we use the following cost function:

$$\ln TC_{itc} = b_1 + a_1(z_{itc}) \ln Q_{1,itc} + a_2 \ln Q_{2,itc} + b_{2,itc} \ln W_{L,itc} + b_{3,itc} \ln W_{K,itc} + e_{itc}, \qquad \text{(A.8)}$$

where Q_1 equals Q in the previous cost equations and Q_2 is the total value of off-balance sheet items. Given that we focus on the market power stemming from traditional banking activities, marginal cost is still derived from $\partial TC / \partial Q_{1,itc} = a_1(z_{itc})\left(TC_{itc} / Q_{1,itc}\right)$.

[15] As is standard in the macroeconomics literature, for Taiwan we use the GDP deflator of China and for Netherlands Antilles we use the GDP deflator of Aruba.

[16] We divide by total assets instead of the number of employees because Bankscope has limited information on the number of employees. The related literature follows a similar approach (e.g., Delis, 2012; Claessens and Laeven, 2004).

Appendix B. Average estimates of market power (weighted by market shares) using the Lerner index

This table reports average estimates of market power (weighted by market shares) by country and year. Averages are obtained from the bank-level estimates of market power using the Lerner index, as this is defined in equation (1). Higher values reflect higher market power (lower competition).

	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	Mean
Afghanistan									0.381	0.237	0.084	0.362	0.299	0.147	0.244
Albania			0.120	0.321	0.210	0.201	0.184	0.215	0.293	0.274	0.317	0.303	0.318	0.359	0.266
Algeria	0.153	0.165	0.065	0.153	0.229	0.387	0.244	0.459	0.590	0.648	0.533	0.624	0.528	0.513	0.442
Andorra	0.255	0.296	0.354	0.359	0.305	0.373	0.459	0.505	0.505	0.507	0.439	0.281			0.377
Angola	0.275	0.313	0.281	0.397	0.498	0.427			0.412	0.267	0.459	0.492	0.427	0.467	0.412
Antigua and Barbuda				0.051	0.090	0.123	0.133				0.266	0.334	0.344		0.184
Argentina	0.217	0.170	0.189	0.218	0.136	0.121	0.019	0.167	0.257	0.285	0.245	0.209	0.325	0.318	0.194
Armenia	0.182	0.235	0.215	0.188	0.280	0.348	0.375	0.389	0.374	0.364	0.354	0.329	0.226	0.284	0.304
Australia	0.253	0.248	0.211	0.285	-0.085	0.225			0.250	0.233	0.218	0.165	0.250	0.251	0.219
Austria	0.147	0.122	0.132	0.146	0.145	0.154	0.189	0.185	0.182	0.174	0.166	0.151	0.206	0.260	0.173
Azerbaijan	0.533	0.370	0.377	0.535	0.436	0.382	0.375	0.435	0.441	0.388	0.388	0.411	0.380	0.275	0.393
Bahamas, The	0.159	0.173	0.210	0.272	0.294	0.214	0.321	0.356	0.393	0.388	0.421	0.333	0.391	0.390	0.321
Bahrain	0.205	0.177	0.175	0.161	0.177	0.239	0.223	0.284	0.265	0.201	0.189	0.232			0.209
Bangladesh	0.030	-0.033	0.070	0.114	0.134	0.142	0.138	0.164	0.214	0.189	0.211	0.256	0.275	0.339	0.183
Belarus	0.092	0.209	0.112	0.178	0.120	0.183	0.168	0.150	0.182	0.211	0.186	0.174	0.241	0.246	0.190
Belgium	0.103	0.138	0.145	0.162	0.166	0.150	0.161	0.158	0.122	0.143	0.071	-0.016	0.079	0.155	0.126
Bermuda	0.097	0.114	0.118	0.156	0.120	0.194	0.210	0.131	0.269	0.266	0.274	0.128	0.211	0.229	0.190
Bolivia	0.138	0.186	0.206	0.179	0.194	0.239	0.203	0.145	0.177	0.221	0.238	0.300	0.261	0.274	0.208
Bosnia and Herzegovina								0.215	0.237	0.233	0.256	0.183	0.230	0.251	0.229
Botswana	0.246	0.307	0.248	0.324	0.326	0.338	0.353	0.337	0.357	0.328	0.269	0.294	0.309	0.336	0.316
Brazil	0.137	0.160	0.155	0.132	0.144	0.161	0.228	0.219	0.244	0.274	0.278	0.195	0.294	0.259	0.209
Bulgaria					0.309	0.283	0.339	0.360	0.372	0.378	0.385	0.338	0.323	0.343	0.351
Burkina Faso	0.277	0.386	0.337	0.270	0.236	0.350	0.348	0.317	0.342	0.306	0.308	0.246	0.266	0.346	0.307
Cambodia				0.478	0.469	0.337	0.386	0.436	0.436	0.450	0.484	0.517	0.379	0.363	0.430
Cameroon			0.580	0.499	0.451	0.420	0.385	0.479	0.432	0.426	0.435	0.390	0.314	0.345	0.421
Canada	0.135	0.108	0.179	0.168	0.166	0.194	0.202	0.229	0.187	0.215	0.190	0.152	0.258	0.304	0.196
Cayman Islands	0.176														0.176
Chile	0.161	0.160	0.204	0.206	0.238	0.283	0.194	0.150	0.160	0.228	0.308	0.217	0.411	0.383	0.278
China	0.405	0.383	0.254	0.275	0.259	0.346	0.379	0.399	0.385	0.390	0.429	0.407	0.417	0.449	0.410
Colombia	0.146	0.081	0.030	0.085	0.146	0.152	0.244	0.283	0.322	0.279	0.312	0.318	0.341	0.379	0.212
Costa Rica	0.073	0.084	0.076	0.182	0.185	0.183	0.235	0.220	0.214	0.226	0.213	0.175	0.145	0.222	0.182
Cote d'Ivoire	0.379	0.386	0.322	0.300	0.263	0.241	0.230	0.273	0.266	0.276	0.303	0.286	0.277	0.263	0.290
Croatia	0.209	0.167	0.169	0.226	0.202	0.215	0.251	0.271	0.282	0.257	0.268	0.253	0.274	0.301	0.240
Cuba	0.824	0.761	0.731	0.689	0.569	0.703	0.785	0.787	0.701	0.611	0.470	0.557	0.536	0.651	0.658
Cyprus	0.155	0.151	0.284	0.107	0.111	0.143	0.176	0.208	0.188	0.253	0.284	0.202	0.233	0.249	0.194
Czech Republic	0.180	0.158	0.167	0.166	0.162	0.239	0.267	0.298	0.343	0.328	0.328	0.277	0.440	0.444	0.273
Denmark	0.165	0.175	0.141	0.147	0.251	0.265	0.390	0.180	0.184	0.161	0.135	0.104	0.218	0.213	0.189
Dominican Republic	0.189	0.180	0.166	0.190	0.190	0.198	0.175	0.115	0.184	0.202	0.220	0.226	0.220	0.266	0.195
Ecuador	0.050	-0.124	0.297	0.127	0.113	0.185	0.197	0.227	0.268	0.276	0.268	0.241	0.234	0.265	0.210
Egypt, Arab Rep.											0.065	0.065	0.314	0.238	0.236
El Salvador	0.119	0.169	0.166	0.178	0.244	0.288	0.282	0.304	0.326	0.365	0.359	0.365	0.380	0.447	0.295
Estonia	0.262	0.029	0.014	0.052	0.204	0.271	0.328	0.347	0.341	0.364	0.323	0.313	0.286	0.373	0.272
Ethiopia	0.270	0.257	0.344	0.285	0.406	0.331	0.574	0.573	0.574	0.612	0.538	0.616	0.650	0.595	0.515
Finland	0.055	0.000	0.338	0.354			0.266	0.207	0.174	0.188	0.194	0.118	0.267	0.280	0.206
France	0.100	0.107	0.128	0.112	0.132	0.152	0.168	0.205	0.220	0.221	0.197	0.172	0.229	0.248	0.161
Gambia, The	0.495		0.569	0.551	0.552	0.529	0.530	0.437	0.401	0.417	0.272	0.330	0.253	0.317	0.410
Georgia		0.335	0.362	0.318	0.339	0.341	0.341	0.316	0.351	0.333	0.282	0.262	0.230	0.235	0.304

Germany	0.171	0.151	0.164	0.139	0.132	0.157	0.175	0.189	0.185	0.204	0.166	0.153	0.193	0.234	0.171
Ghana	0.160	0.442	0.419	0.137		0.412	0.414	0.435	0.483	0.442	0.293	0.274	0.241	0.324	0.307
Greece	0.169	0.201	0.404	0.215	0.000	0.044	0.112	0.136	0.183	0.216	0.173	0.104	0.184	0.151	0.168
Guatemala				0.088	0.124	0.126	0.186	0.228	0.246	0.251	0.242	0.253	0.248	0.257	0.222
Haiti	0.123	0.119	0.116	0.172	0.156	0.108	0.224	0.099	0.145	0.171	0.178	0.197	0.183	0.183	0.158
Honduras	0.338	0.262	0.186	0.129	0.165	0.197	0.256	0.180	0.205	0.240	0.250	0.272	0.233	0.208	0.224
Hong Kong SAR, China	0.238	0.187	0.243	0.273	0.165	0.351	0.389	0.429	0.300	0.276	0.260	0.176	0.299	0.343	0.282
Hungary	0.153	0.144	0.087	0.122	0.163	0.181	0.226	0.219	0.245	0.243	0.250	0.192	0.223	0.313	0.197
Iceland	0.167	0.175	0.200	0.068	0.145	0.210	0.231	0.269	0.336	0.363	0.331	0.426	0.337	0.489	0.294
India	0.121	0.146	0.120	0.158	0.158	0.209	0.244	0.303	0.282	0.266	0.241	0.186	0.194	0.211	0.205
Indonesia	0.134	0.043	0.030	0.107	0.129	0.160	0.228	0.325	0.248	0.256	0.295	0.311	0.315	0.356	0.206
Iraq											0.463	0.316			0.389
Ireland	0.177	0.175	0.253	0.215	0.148	0.135	0.228	0.217	0.144	0.132	0.146	0.146	0.196	0.205	0.185
Israel	0.153	0.064	0.092	0.124	0.084	0.102	0.116	0.177	0.150	0.198	0.206	0.141	0.197	0.108	0.122
Italy	0.157	0.200	0.143	0.203	0.183	0.218	0.218	0.179	0.241	0.258	0.240	0.198	0.238	0.236	0.226
Jamaica	0.128	0.158	0.201		0.289	0.216	0.271	0.233	0.267	0.278	0.271	0.301	0.293	0.334	0.266
Japan	0.246	0.246	0.259	0.259	0.250	0.230	0.266	0.261	0.282	0.285	0.286	0.242	0.191	0.233	0.252
Jordan	0.152	0.182	0.173	0.147	0.239	0.237	0.325	0.362	0.490	0.400	0.363	0.349	0.370	0.419	0.307
Kazakhstan	0.245	0.310	0.306	0.246	0.347	0.366	0.359	0.393	0.356	0.329	0.340	0.243	0.230	0.077	0.296
Kenya	0.153	0.262	0.270	0.311	0.321	0.318	0.380	0.371	0.361	0.391	0.369	0.344	0.326	0.384	0.338
Korea, Rep.	0.071	0.115	0.219	0.179	0.266	0.311	0.316	0.331	0.310	0.291	0.271	0.191	0.221	0.258	0.249
Kuwait	0.092	0.239	0.287	0.299	0.367	0.444	0.517	0.555	0.565	0.470	0.393				0.407
Kyrgyz Republic	0.176			0.323	0.116	0.371	0.375	0.460	0.365	0.397	0.454	0.319	0.359	0.327	0.348
Lao PDR		0.232				0.019	0.000	0.252	0.478	0.555	0.669	0.292	0.285	0.353	0.330
Latvia	0.280	0.214	0.257	0.280	0.271	0.303	0.337	0.356	0.362	0.327	0.305	0.241	0.247	0.227	0.292
Lebanon	0.168	0.149	0.141	0.144	0.127	0.141	0.163	0.142	0.151	0.149	0.144	0.179	0.190	0.226	0.161
Libya				0.535		0.576	0.535	0.050	0.401	0.523	0.597	0.691	0.248		0.463
Lithuania	0.269	0.154	0.242	0.151	0.183	0.217	0.184	0.252	0.289	0.306	0.311	0.245	0.178	0.205	0.231
Luxembourg	0.103	0.095	0.115	0.134	0.118	0.134	0.151	0.189	0.207	0.198	0.184	0.137	0.242	0.285	0.153
Macao SAR, China	0.127	0.132	0.166	0.184	0.190	0.290	0.354	0.396	0.366	0.296	0.280	0.325	0.395	0.423	0.300
Macedonia, FYR	0.498	0.353	0.346	0.297	0.303	0.265	0.317	0.317	0.359	0.359	0.365	0.314	0.261	0.242	0.322
Madagascar	0.555	0.565	0.507	0.377	0.321	0.356	0.451	0.458	0.471	0.492	0.441	0.337	0.271	0.260	0.419
Malawi	0.420	0.460	0.443	0.390	0.263	0.357	0.360	0.371	0.390	0.491	0.525	0.438	0.422	0.360	0.395
Malaysia	0.277	0.246	0.271	0.362	0.344	0.355	0.351	0.352	0.355	0.353	0.360	0.366	0.362	0.409	0.327
Mali	0.252	0.266	0.298	0.253	0.324	0.307	0.335	0.304	0.311	0.367	0.325	0.304	0.321	0.286	0.306
Malta	0.214	0.217	0.249	0.226	0.225	0.239	0.273	0.307	0.345	0.339	0.336	0.292	0.310	0.362	0.286
Mauritania	0.574	0.505				0.313	0.340	0.186	0.463	0.466	0.275	0.277	0.431	0.333	0.369
Mauritius	0.174	0.198	0.180	0.183	0.204	0.326	0.279	0.324	0.330	0.279	0.262	0.284	0.304	0.399	0.297
Mexico	0.011	0.002	0.063	0.017		0.280			-0.025	-0.023					0.031
Moldova	0.353	0.388	0.401	0.413	0.380	0.384	0.408	0.351	0.289	0.341	0.340	0.284	0.222	0.309	0.318
Mongolia			0.316	0.220	0.272	0.255	0.226	0.263	0.214	0.167	0.200	0.219	0.207	0.190	0.220
Montenegro						0.000	0.275	0.238	0.161	0.204	0.256	0.205	0.197	0.231	0.216
Morocco	0.217	0.237	0.217	0.294	0.310	0.329	0.329	0.375	0.305	0.337	0.336	0.359	0.354	0.364	0.311
Mozambique	0.263	0.236	0.319	0.259	0.279	0.272	0.194	0.238	0.259	0.340	0.368	0.375	0.385	0.356	0.317
Namibia				0.183		0.023	0.490	0.425	0.270	0.255	0.256	0.249	0.241	0.270	0.259
Nepal	0.355	0.247	0.319	0.362	0.357	0.348	0.231	0.258	0.273	0.311	0.292	0.333	0.326	0.283	0.302
Netherlands Antilles		0.114	0.142	0.210		0.130	0.129								0.140
Netherlands	0.126	0.127	0.143	0.204	0.213	0.109	0.094	0.160	0.154	0.135	0.177	0.183	0.149	0.256	0.157
New Zealand	0.121	0.085	0.230	0.207	0.226	0.272	0.249		0.200	0.211	0.196	0.173	0.204		0.193
Nicaragua						0.201	0.220	0.237	0.295	0.327	0.342	0.370	0.379	0.367	0.341
Niger	0.261	0.399	0.066	0.206	0.145	0.206	0.143	0.233	0.304	0.322	0.265	0.352	0.336	0.328	0.260
Nigeria	0.228	0.290	0.304	0.276	0.296	0.268	0.275	0.264	0.313	0.317	0.309	0.325	0.195	0.224	0.278

Norway	0.169	0.061	0.146	0.157	0.155	0.128	0.159	0.219	0.265	0.230	0.176	0.146	0.266	0.263	0.214
Oman	0.309	0.274	0.283	0.258	0.301	0.392	0.398	0.428	0.423	0.420	0.378	0.429	0.464		0.359
Pakistan	0.040	0.023	-0.014	0.045	0.119	0.185	0.259	0.270	0.395	0.368	0.321	0.277	0.288	0.276	0.245
Panama	0.196	0.134	0.317	0.259	0.255	0.300	0.363	0.322	0.306	0.275	0.320	0.311	0.305	0.313	0.299
Papua New Guinea		0.250	0.259	0.088			0.401	0.641	0.520	0.504	0.611	0.614	0.530	0.490	0.430
Paraguay	0.278	0.181	0.104	0.041	0.092	0.015	-0.114	0.052	0.140	0.131	0.133	0.208	0.168	0.216	0.137
Peru	0.219	0.203	0.184	0.160	0.174	0.259	0.295	0.315	0.357	0.364	0.351	0.387	0.438	0.390	0.280
Philippines	0.264	0.272	0.177	0.001	0.065	0.214	0.298	0.237	0.239	0.248	0.239	0.193	0.278	0.325	0.248
Poland	0.170	0.175	0.162	0.165	0.166	0.169	0.137	0.174	0.190	0.239	0.246	0.215	0.232	0.241	0.197
Portugal	0.119	0.131	0.104	0.168	0.305	0.202	0.230	0.294	0.198	0.162	0.138	0.082	0.087	0.065	0.140
Qatar				0.242	0.318	0.471	0.522	0.514	0.551	0.435	0.398	0.370	0.375		0.427
Romania	0.233	0.215	0.214	0.199	0.247	0.190	0.202	0.262	0.236	0.221	0.209	0.224	0.234	0.278	0.228
Russian Federation	0.207	0.061	0.410	0.377	0.454	0.344	0.310	0.339	0.307	0.297	0.282	0.272	0.239	0.202	0.279
Rwanda					0.187	0.205	0.257	0.109	0.004	0.320	0.352	0.343	0.249	0.343	0.252
San Marino	0.185	0.262	0.400	0.397	0.328	0.335	0.435	0.506	0.504	0.460	0.382	0.195			0.397
Saudi Arabia	0.263	0.261	0.254	0.247	0.311	0.405	0.490	0.501	0.490	0.488	0.340	0.225	0.362	0.288	0.342
Senegal	0.356	0.428	0.351	0.344	0.364	0.352	0.345	0.342	0.330	0.340	0.307	0.327	0.297	0.281	0.335
Serbia						0.374	0.472	0.362	0.336	0.217	0.249	0.228	0.234	0.176	0.264
Seychelles		0.198						0.508	0.559	0.567	0.595	0.594	0.377	0.528	0.501
Sierra Leone	0.190	0.400		0.646	0.535	0.481	0.474	0.519	0.472	0.386	0.287	0.188	0.247	0.328	0.409
Singapore	0.248	0.232	0.362	0.353	0.297	0.230		0.414	0.361	0.309	0.331	0.376	0.489	0.438	0.351
Slovak Republic	0.092	0.032	0.029	0.142	0.158	0.183	0.216	0.246	0.267	0.291	0.284	0.304	0.322	0.390	0.219
Slovenia	0.214	0.213	0.224	0.238	0.188	0.210	0.214	0.252	0.266	0.252	0.249	0.184	0.237	0.269	0.230
South Africa	0.105	0.163	0.167	0.179	0.204	0.300	0.211	0.177	0.155	0.233	0.222	0.199	0.217	0.229	0.200
Spain	0.130	0.161	0.228	0.181	0.179	0.196	0.238	0.275	0.242	0.246	0.229	0.207	0.292	0.305	0.242
Sri Lanka	0.149	0.177	0.114	0.102	0.094	0.150	0.224	0.210	0.210	0.196	0.171	0.146	0.171	0.232	0.174
Sudan	0.395	0.266	0.246	0.258	0.145	0.317	0.180	0.291	0.257	0.277	0.171	0.223	0.193	0.214	0.236
Sweden	0.186	0.168	0.156	0.182	0.183	0.169	0.206	0.277	0.234	0.224	0.178	0.160	0.223	0.244	0.206
Switzerland	0.168	0.132	0.126	0.156	0.124	0.165	0.179	0.180	0.122	0.125	0.039	0.036	0.129	0.179	0.130
Syrian Arab Republic									0.000	0.064	0.309	0.568	0.569	0.567	0.498
Taiwan				0.159	0.165	0.227	0.349	0.283	0.307	0.278	0.248	0.218	0.294	0.342	0.282
Tanzania							0.471	0.439	0.390	0.423	0.395	0.392	0.357	0.343	0.385
Thailand	0.171	0.011	0.045	0.106	0.148	0.233	0.290	0.375	0.375	0.288	0.289	0.334	0.369	0.389	0.257
Togo	0.111	0.191	0.216	0.446	0.225	0.129	0.276	0.315	0.259	0.307	0.259	0.282	0.244	0.344	0.242
Trinidad and Tobago	0.195	0.193	0.231	0.266	0.284	0.302	0.360	0.347	0.309	0.321	0.338	0.345	0.313	0.442	0.310
Tunisia	0.562	0.557	0.458	0.302	0.292	0.267	0.189	0.208	0.221	0.285	0.295	0.323	0.331	0.346	0.291
Turkey	0.022	0.034	0.143	0.046	-0.017	0.112	0.190	0.240	0.286	0.226	0.227	0.209	0.335	0.320	0.192
Uganda											0.401	0.360	0.368	0.341	0.364
Ukraine	0.229	0.269	0.316	0.211	0.229	0.182	0.245	0.233	0.221	0.243	0.220	0.314	0.250	0.214	0.241
United Arab Emirates	0.307	0.298	0.314	0.295	0.340	0.462	0.507	0.516	0.516	0.359	0.346	0.372	0.453	0.468	0.405
United Kingdom	0.182	0.184	0.177	0.243	0.110	0.169	0.282	0.292	0.254	0.241	0.236	0.103	0.294	0.308	0.228
United States	0.239	0.229	0.252	0.224	0.266	0.332	0.355	0.321	0.304	0.268	0.227	0.239	0.344	0.352	0.288
Uruguay	0.072	0.076	0.073	0.097	0.037	0.248	0.013	0.241	0.090	0.190	0.269	0.363	0.181	0.250	0.152
Uzbekistan	0.378	0.307	0.301	0.371	0.364	0.321	0.223	0.181	0.239	0.275	0.283	0.229	0.212	0.248	0.264
Venezuela, RB	0.291	0.283	0.217	0.182	0.226	0.301	0.327	0.343	0.276	0.293	0.281	0.263	0.265	0.306	0.270
Vietnam	0.379	0.346	0.314	0.345	0.264	0.292	0.273	0.349	0.336	0.282	0.277	0.208	0.198	0.205	0.256
Yemen, Rep.									0.055	0.226	0.231	0.200	0.272	0.242	0.228
Zambia	0.047	0.172	0.117	0.194	0.234	0.224	0.101	0.233	0.296	0.340	0.340	0.299	0.337	0.288	0.257
Zimbabwe													0.297	0.299	0.298
Mean	0.176	0.163	0.204	0.192	0.207	0.244	0.268	0.262	0.252	0.247	0.223	0.212	0.260	0.278	0.266

Figure 1
Evolution of the average Lerner indices by year

Figure 2
Foreign bank presence and banks' market power