Denying Foreign Bank Entry:

Implications for Bank Interest Margins

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Abstract: This paper examines the impact of restricting foreign bank entry on bank net interest margins while controlling for (a) impediments to domestic bank entry, (b) the degree of foreign bank ownership of the domestic banking industry, (c) an array of bank-specific characteristics, (c) banking sector concentration, and (d) various country traits. Using data on almost 1200 banks across 47 countries, the results suggest that restricting foreign bank entry boosts bank net interest margins. Also, restricting foreign bank entry is special in that restricting domestic bank entry does not help explain bank margins and the degree of foreign bank ownership also enters insignificantly. In extensions of the core result, I argue that the strong impact of regulatory impediments to foreign bank entry on bank margins may reflect deeper, historical approaches to openness and competition.

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I. Introduction

This paper examines the impact of policies toward foreign bank entry on commercial bank net interest margins. Do countries that impede the entry of foreign banks induce a bigger gap between the interest expense paid to depositors and the interest income received from borrowers after controlling for bank-specific characteristics, macroeconomic conditions, and structure of the economy's banking industry? Thus, the paper provides information on the efficiency effects of regulatory restrictions on foreign bank entry.

The paper goes farther, however, and assesses whether there is something special about foreign banks. Regulatory restrictions on foreign bank entry may be highly correlated with regulatory restrictions on domestic bank entry. If this is the case, then information on foreign banks may simply proxy for entry restrictions in general, rather than providing information on foreign banks in particular. To examine the independent impact of restrictions on foreign bank entry, I simultaneously control for restrictions on domestic bank entry. Thus, the paper provides information on the efficiency effects of regulatory restrictions on foreign bank entry independent from impediments to domestic bank entry.

Furthermore, the paper distinguishes between impediments to foreign bank entry and the fraction of the domestic banking industry owned by foreign banks. Some researchers focus on the degree of foreign bank ownership (Clarke, Cull, and Martinez-Peria, 2001). Others, however, argue that openness to foreign banks is crucial because it makes the domestic market contestable (Demirguc-Kunt, Levine, and Min, 1998; Claessens, Demirguc-Kunt, and Huizinga, 2001). From this perspective, the crucial issue

is access, not the actual fraction of the domestic banking industry owned by foreign banks (Clarke, Cull, D'amato, and Molinari, 2000; Clarke, Cull, Martinez-Peria, and Sanchez, 2003). To examine the independent impact of restrictions on foreign bank entry from actual foreign bank participation, I simultaneously control for the fraction of domestic banking assets associated with foreign owned banks. Thus, the paper provides information on the efficiency effects of regulatory restrictions on foreign bank entry independent of (i) impediments to domestic bank entry and (ii) the actual degree of foreign bank ownership.

This is the first paper to study the relationship between net interest margins and the fraction of foreign entry applications denied by the commercial bank supervisory agency when controlling for regulatory restrictions on domestic bank entry and foreign ownership. I use bank-level data on 1165 banks across 47 countries. While other studies examine the actual degree of foreign bank participation (Clarke, Cull, and Martinez-Peria, 2001), I simultaneously study the rate at which countries reject applications by foreign banks. While some studies use information on the number of foreign banks operating in the economy to proxy for the contestability of the market (Claessens, Demirguc-Kunt, and Huizinga, 2001), I use direct information on the fraction of foreign entry applications denied to gauge the regulatory barriers to foreign bank entry. Furthermore, while other studies do not control for regulatory restrictions on domestic bank entry, this paper controls for the fraction of domestic entry applications that are rejected by the supervisory agency. For more on the impact of various supervisory and regulatory policies on bank efficiency, see Demirguc-Kunt, Laeven, and Levine (2002). Thus, I simultaneously examine the impact of (a) impediments to domestic bank entry,

(b) impediments to foreign bank entry, and (c) the degree of foreign bank ownership of the domestic banking industry on net interest margins.

Since banks differ, it is important to control for bank-specific characteristics. In particular, I control for bank size, the degree to which banks hold liquid assets, the ratio of equity to total assets, the extent to which banks earn fee income, bank overhead expenditures, and the variability of bank profits. In this way, the analysis controls for bank-specific traits that may influence net interest margins. Results on the relationship between these bank-specific characteristics and net interest margins are independently valuable. For this paper, however, the purpose of controlling for bank-specific variables is to identify the impact of policies toward foreign banks on commercial bank net interest margins.

Similarly, since some theories and existing studies emphasize the role of country-specific traits in determining bank net interest margins, I control for country factors when evaluating the impact of policies toward foreign banks on bank margins. For instance, some work suggests that inflation will expand the wedge between interest income and interest expense. If macroeconomic instability is also associated with restrictions on foreign competition, then impediments to foreign banks may reflect general macroeconomic malaise rather than the independent influence of restrictions on foreign banks on bank margins. Thus, I control for inflation in assessing the links between regulatory impediments to foreign bank entry and bank margins. Similarly, an enormous literature highlights the role of the structure of the banking industry in determining net interest margins. These studies frequently assess whether banking sector concentration influences banking sector efficiency. Consequently, I include measures of bank

concentration to assess the independent impact of foreign bank entry restrictions on net interest margins. Demirguc-Kunt, Laeven, and Levine (2002) also analyze the impact of banking sector structure and the macroeconomic environment on bank margins and other measures of efficiency.

The data indicate that impediments to foreign bank entry boost bank net interest margins. These findings hold after controlling for bank-specific traits, inflation, and bank concentration. Moreover, the paper finds that foreign banks are special. When controlling for impediments to domestic bank entry, restrictions on foreign bank entry continue to explain bank net interest margins. Indeed, while foreign bank entry restrictions enter significantly, domestic bank entry restrictions do not explain bank interest margins. Furthermore, it is impediments to foreign bank entry, not foreign bank ownership per se. The actual fraction of the domestic banking industry controlled by foreign owned banks does not help account for bank interest margins. But, the fraction of foreign entry applications denied continues to explain bank interest margins even when controlling for the degree of foreign bank ownership. Contestability by foreign banks is an important determinant of bank interest margins. In sum, the paper finds that regulatory restrictions on foreign bank entry exert an independent impact on bank interest margins after controlling for (i) impediments to domestic bank entry, (ii) the actual degree of foreign bank participation, (iii) bank-specific factors, (iv) macroeconomic stability, and (v) banking sector concentration.

While the positive relationship between the fraction of foreign bank entry applications denied and bank net interest margins is robust to alterations in the conditioning information set, there are conceptual shortcomings with this paper's

measure of restrictions on foreign bank entry that may weaken confidence in the analysis. First, the fraction of foreign entry restrictions rejected by the regulatory agency may not accurately measure excessive regulatory impediments to foreign bank entry. If foreign banks expect that a country is likely to reject foreign bank entry applications, they (i) may be reluctant to apply or (ii) may use bribes and other measures prior to submitting an application. Under these conditions, a low rejection rate will not reflect the bribes and other obstacles faced by foreign banks. Alternatively, there may be sound prudential reasons for rejecting foreign banks. If foreign banks are not well managed and properly supervised in their home countries, a country may have legitimate reasons for rejecting their entry. Thus, high rejection rates may not suggest excessive entry barriers. In both of these cases, however, the results would be biased against finding a tight relationship between the fraction of foreign entry applications denied and bank margins. Nevertheless, at a broader level, skepticism about this paper's proxy for impediments to foreign bank entry will lower confidence in its conclusions.

A second potential weakness with using the fraction of entry applications denied is that it raises questions involving causal mechanisms. If barriers to foreign entry hinder bank efficiency, this raises a critical question: why do regulatory agencies in some countries impose high barriers to foreign entry? Furthermore, why are restrictions on foreign banks special? There is a strong link between restrictions on foreign bank entry and net interest margins, but not between restrictions on domestic bank entry and net interest margins. Thus, we need a theory as to why foreign banks are special and why countries choose to restrict foreign bank entry and boost net interest margins.

To confront potential deficiencies with the measure of foreign bank restrictions and to suggest a story as to why some countries restrict foreign bank entry and hence boost net interest margins, I examine endowments. Acemoglu, Johnson, and Robinson (henceforth AJR, 2001) and Engerman and Sokoloff (henceforth ES, 1997) argue that geographical endowments influence institutions, including national views toward openness and competition. In countries colonized by Europeans, AJR argue that poor endowments tended to create incentives to establish extractive colonies. In extractive colonies, Europeans constructed institutions designed to allow a few elite to extract as much wealth as possible. ES show that countries with particular types of geographical endowments that constructed extractive regimes tended to severely limit the entry of Europeans as a mechanism for reducing openness and competition. While there was a general propensity to restrict competition, there was, arguably, a particularly intense penchant for restricting foreign entry since domestic entrepreneurs could be coerced through an assortment of legal, regulatory, and political mechanisms that might work less effectively with foreign entrants. In countries with favorable endowments, Europeans established settler colonies. In settler colonies, the Europeans constructed long-lasting, comparatively egalitarian institutions that were more favorably disposed to openness and competition.

According to AJR and ES, endowments influenced the institutions constructed by Europeans and these long-lasting institutions continue to influence national policies toward openness and competition today. In particular, AJR stress that once colonization ended, settler regimes tended to maintain institutions that foster openness. In contrast, once colonization ended in extractive regimes, the indigenous elite took control over

colonial institutions and frequently exploited their positions of privilege. Thus, this theory suggests a link from endowments to enduring institutions that continue to shape national approaches to foreign competition, including the entry of foreign banks.

To assess whether (1) endowments influence restrictions on foreign bank entry and (2) whether the component of restrictions on foreign bank entry explained by endowments influences net interest margins, I use the absolute value of latitude as an instrumental variable. Latitude is clearly a problematic measure of endowments, but it is exogenous. Thus, even with its problems, if latitude explains restrictions on foreign bank entry and through this channel net interest margins, this would strongly suggest that (a) measurement error is not driving the core finding that restrictions on foreign bank entry boost net interest margins and (b) restrictions on foreign bank entry may reflect deep institutional characteristics.

The results with latitude show that (1) the absolute value of latitude is strongly, negatively associated with regulatory restrictions on foreign bank entry and (2) using latitude as an instrumental variable for the fraction of foreign entry applications denied confirms this the paper's core conclusion: regulatory restrictions on foreign bank entry boost bank interest margins. When controlling for bank-specific variables, macroeconomic instability, banking sector concentration, and even when using latitude as an instrument for restrictions on foreign bank entry, I find that the exogenous component of restrictions on foreign banks continues to exert a positive impact on bank margins. Thus, measurement error does not seem to drive the finding that restrictions on foreign bank entry boost net interest margins. Also, while the results with latitude must be viewed cautiously, the results are consistent with the view that endowments shape long-

lasting institutions that continue to influence attitudes toward foreign bank competition. In sum, I do not want to exaggerate the results with latitude. Rather, these findings increase confidence in the conclusion that regulatory restrictions on foreign bank entry boost bank interest margins, while cautioning that this relationship may reflect deeper institutional characteristics (as argued further by Demirguc-Kunt, Laeven, and Levine, 2002).

The remainder of the paper is organized as follows. Section II discusses the methodology, data, and summary statistics. Section III presents the results and Section IV concludes.

II. Methods, Data, and Summary Statistics

B. Methodology

This paper examines the impact of restrictions on foreign bank entry on net interest margins while controlling for bank-specific effects and country-specific traits. Specifically, I estimate the following regression.

$$\text{Net Interest Margin}_{i,k} = \alpha + \beta_1 F_i + \beta_2 B_{i,k} + \beta_3 C_i + \varepsilon_{i,k} \qquad (1)$$

In the specification, i indexes country i, and k indexes bank k, so that

F_i is a measure of restrictions on foreign bank entry in country i;
$B_{i,k}$ is a vector of bank-specific characteristics for bank k in country i;
C_i is a vector of country specific traits,
$\varepsilon_{i,k}$ is the residual.

The equation is primarily estimated using a generalized least squares estimator with random effects, though I also present the fixed effects estimates on the bank-specific variables. Furthermore, at the end of the paper, I extend the analysis and use a two-stage generalized least squares random effects estimator for this panel-data model.

B. Data

This paper uses two primary data sources. First, data for the bank-specific variables are obtained from the BankScope database, which is provided by Fitch-IBCA. The data are for commercial banks and account for 90 percent of all banking assets. I use data covering the 1995-99 period. Second, data for regulatory restrictions on bank entry are obtained from the Barth, Caprio, and Levine (henceforth BCL, 2001, 2002) database. BCL conduct a survey of national regulatory agencies. The responses to this survey of bank supervisory and regulatory practices are primarily for 1999, though BCL note that these policies have changed very little over time.

After combining the datasets, there are data on 1165 banks across 47 countries. The country coverage is quite broad, ranging from the richest countries in the world to the poorest and covering all regions of the globe. The sample is as follows: AUSTRALIA, AUSTRIA, BAHRAIN, BANGLADESH, BELGIUM, BOTSWANA, BURUNDI, CANADA, CHILE, CYPRUS, CZECH REPUBLIC, DENMARK, FINLAND, FRANCE, GERMANY, GHANA, GREECE, HUNGARY, ICELAND, INDIA, IRELAND, ITALY, JAMAICA, JAPAN, LATVIA, LEBANON, LITHUANIA, LUXEMBOURG, MALTA, MOLDOVA, NAMIBIA, NETHERLANDS, NEW ZEALAND, NIGERIA, PANAMA, PERU, PHILIPPINES, POLAND, ROMANIA, RWANDA, SOUTH AFRICA, SPAIN, SWEDEN, SWITZERLAND, TAIWAN, TRINIDAD AND TOBAGO, and the USA. I conduct the analyses on various subsets of countries to assess the robustness of the findings.

C. Variable Definitions

1. Net Interest Margin

Net interest margin equals interest income minus interest expense divided by interest-bearing assets and is averaged over the 1995-1999 period. There are problems with interpreting the net interest margin variable. For instance, there may be cases where lower margins reflect high loan default rates, not greater efficiency. Also, banks engaging in different activities may have different net interest margins for reasons that have nothing to do with bank efficiency. While net interest margins imperfectly measure bank efficiency, they do measure the gap between what the bank receives and pays on interest bearing securities and accounts. To enhance the interpretability of net interest margins, it is important to control for bank-specific differences. From Table 1, one sees

great cross-country variability in average net interest margins. Ghana, Burundi, and Moldova have net interest margins of greater than ten percent. In contrast, Finland, the Netherlands, Switzerland, and Luxembourg have net interest margins of less than two percent.

2. Bank-Specific Control Variables

Bank-size equals the logarithm of total bank assets in millions of US dollars in 1995. I use the 1995 figure to reduce potential simultaneity with net interest margins but the results do not change when using bank-specific control variables averaged over the 1995-99 period. As shown in Table 1, there is extraordinary cross-country variation in the average size of banks. Large banks may reduce net interest margins if there are increasing returns to scale. Alternatively, large banks may increase net interest margins if they exert market power.

Bank equity equals the book value of equity divided by total assets in 1995. Some theories suggest that highly capitalized banks face a lower probability of bankruptcy and hence lower funding costs. This will produce larger net interest margins if the interest charged on loans does not drop markedly with more highly capitalized banks. As with all the bank-specific control variables, we present the results, but our focus is on using these as control variables since this paper's focus is on assessing the impact of regulatory restrictions on foreign banks.

Bank overhead equals overhead costs divided by total assets in 1995. I use this variable to control for cross-bank differences in organization and operation. Large overhead costs may reflect bank inefficiencies or market power in a similar fashion to net interest margins. Thus, I expect to see a very high, positive correlation between bank

overhead and net interest margins. Indeed, including overhead costs may be so highly correlated with net interest margin that including bank overhead as a regressor substantively lower the likelihood of finding that other variables explain net interest margin. I obtain the same results when including or excluding bank overhead.

Fee income equals non-interest-operating income divided by total assets in 1995. Since banks engage in different non-lending activities, these other activities may influence the pricing of loan products. Thus, I include fee income to control of cross-bank differences in the products offered by banks.

Bank liquidity equals the liquid assets of the bank divided by total assets. Some argue that banks with a high level of liquid assts will receive lower interest income than banks with less liquid assets. This asset allocation, however, does not necessarily reflect great efficiency. Thus, I control for bank liquidity in 1995.

Bank risk equals the standard deviation of the rate of return on bank assets over the period 1995-99. Some hold that banks operating in more risky environment will tend toward an equilibrium characterized by a high net interest margin to compensate for this risk. Thus, to assess the independent effect of restrictions on foreign bank entry, it is important to control for individual bank risk.

3. Fraction Foreign Denied & Other Country-Specific Variables

Fraction Foreign Denied equals the fraction of entry application by foreign banks that are denied by the regulatory authority. Some countries during this period were completely closed to the entry of foreign banks, such as Burundi, Chile, and Jamaica. Others, such as Austria, South Africa, Canada, and Panama had denial rates of between five and twenty percent. Still others had denial rates of zero, i.e., no foreign bank

applications were denied. As shown in Table 1, the mean value of fraction foreign denied is 0.13 with a standard deviation of 0.28.

There are problems with the fraction foreign denied variable as discussed in the introduction. If a country does not allow foreign entry, then foreign banks will not apply and there will be no applications. If a country heavily restricts foreign entry, there may be few applications. In this case, those that do apply may use bribes and other measures prior to issuing an application. Thus, denial rates may be low even in countries that heavily restrict foreign entry. These measurement problems should bias the results against finding a robust link between the fraction foreign denied and net interest margin. Nevertheless, we use instrumental variables to mitigate the problem associated with pure measurement error, though instrumenting will not correct for systematic biases in measuring impediments to foreign entry.

Fraction Domestic Denied equals the fraction of entry applications by domestic entrepreneurs that are denied by the regulatory authority. As with the fraction foreign denied, there is extensive cross-country variation. I examine fraction domestic denied primarily as a control variable. Is fraction foreign denied associated with net interest margin beyond the fraction domestic denied? Thus, is there something special about restricting foreign bank entry?

Foreign Ownership equals the fraction of banking system assets held by banks that are 50 percent or more foreign owned. These data are from the BCL survey. In some countries, virtually all of the banking system is foreign owned, such as in New Zealand, Botswana, and Luxembourg. In other countries, none of the banking system is foreign owned, such as in Nigeria, India, Iceland, and Burundi. I use foreign ownership

to assess whether foreign ownership is crucial in explaining bank margins, or whether it is the contestability of the banking market – as proxied by fraction foreign denied – that is crucial for accounting difference in net interest margin.

Inflation equals the log difference of the consumer price index over the 1995-99 period and is taken from the World Bank's World Development Indicators. I use this to control for macroeconomic stability. Also, some theories suggest that inflation hinders contracting efficiency and increases the wedge between borrowing and lending rates.

Concentration equals the fraction of assets held by the three largest commercial banks in each country. Banking system structure may influence net interest margins. Indeed, regulatory restrictions on bank entry may influence net interest margins by increasing concentration and hence the market power of banks. I am interested in examining the impact of entry restrictions on net interest margins. I am less interested here in exploring whether restrictions on foreign bank entry influence concentration and through concentration net interest margins. Thus, I first conduct the analyses without concentration to assess the direct impact of fraction foreign denied on net interest margins. Then, I control for concentration.

Latitude equals the absolute value of the latitude of the country. I use this as an instrumental variable for fraction foreign denied. It helps assess the view that countries with poor endowments, countries in more tropical environments, have a great tendency to create institutions that protect the few from the many. These types of institutions would also restrict foreign entry and hence be associated with high net interest margins.

D. Correlations

The correlations in Table 2 foreshadow key elements of this paper's analyses. Fraction foreign denied is positively and significantly correlated with net interest margins. Fraction domestic denied is also positively and significantly correlated with net interest margins. While fraction foreign denied and fraction domestic denied are positively correlated with each other, the correlation coefficient is only 0.50, which indicates that regulatory restrictions on foreign and domestic banks do not move one-for-one with each other. The correlations also show that foreign bank ownership is not significantly correlated with net interest margins or the denial of bank entry. Finally, note that latitude is negatively and significantly correlated with net interest margins and fraction foreign denied, but not significantly correlated with domestic entry denied.

III. Regression Results

A. Preliminary regressions

As a preliminary step, Table 3 presented panel results using both random and fixed effects for only the bank specific variables. As shown, the coefficient estimates from the random and fixed effect estimators are very close. In later regressions when including country-specific variables, the regressions are run using random effects.

The coefficient estimates on the bank-specific variables suggest the following. Unsurprisingly, banks with large overhead costs also have large net interest margins. To the extent that large overhead expenditures and wide margins at least partially reflect bank inefficiency, then these bank characteristics will be positively related. The results indicate that big banks tend to have smaller margins. While I do not fit a cost curve, this finding is not inconsistent with arguments of economies of scale in banking. While

equity as a fraction of bank assets is not significantly related to net interest margins, banks that hold more liquid assets tend to have lower margins. This may reflect the lower remuneration on liquid assets. Finally, Table 3 demonstrates the negative relationship between fee income and interest margins. Banks that receive more income through non-interest earning activities have a smaller net interest income as a share of interest bearing assets. While by no means conclusive and also not the focus of the analysis here, this finding is consistent with arguments of cross-subsidization of activities within the bank.

B. Interest margins and foreign banks

Table 4 presents regressions including all the bank-specific variables and combinations of (i) fraction foreign denied, (ii) foreign ownership, and (iii) fraction domestic denied. The coefficients on the bank-specific variables are not included in the tables, though they do not vary much from the estimates in Table 3. As noted, the regressions are run using generalized least squares with random effects.

The results indicate that greater restrictions on foreign bank entry – as proxied by fraction foreign denied – is positively associated with net interest margins. That is, restricting foreign bank entry boost the gap between interest received and income paid as a fraction of interest earning assets. Furthermore, the results suggest that restricting foreign banks from entering is special.

The size of the coefficient is economically large. Consider the coefficient on the final regression in Table 4 on fraction foreign denied, which equals 3. This suggests that if Chile had the mean value of fraction foreign denied of 0.13 instead of its value of 1 over the estimation period its net interest margin on banks would be 2.6 percentage points

lower (3*0.87). This would imply a reduction in Chile's net interest margin from 5.0 to 2.4 and bring Chile's average net interest margin below the sample mean of 3.5.

The Table 4 regressions also indicate that foreign bank ownership of domestic banking assets and the fraction domestic denied are not significantly correlated with net interest margins. Foreign ownership per se is not crucial, but regulatory restrictions on foreign bank entry do impact net interest margins. These results highlight the importance of the contestability of the market. The results are consistent with argument that reducing the potential entry of foreign banks allows net interest margins to grow. Furthermore, restricting the entry of domestic bank is not as critical. While restricting foreign bank entry boost net interest margins, domestic bank does not enter the regression significantly.

Finally, when including (i) fraction foreign denied, (ii) foreign ownership, and (iii) fraction domestic denied simultaneously in the net interest margin regression, I find that only the fraction of foreign denied enter significantly. Even after controlling for regulatory restrictions on domestic bank entry and after controlling for the degree of foreign ownership of the domestic banking industry, the results continue to indicate that impediments to foreign bank entry boost net interest margins.

C. Sensitivity analyses

Readers may have concerns over the sample of countries, which includes Transition economies, Sub-Saharan African countries, and the United States, which has thousands of banks. Thus, it is important to assess whether the Table 4 results hold on sub-sets of countries. Table 5 presents the results four sub-sets of countries: (i) eliminating Sub-Saharan African countries, (ii) eliminating formerly socialist countries,

(iii), eliminating the United States, and (iv) eliminating Sub-Saharan African countries, formerly socialist countries, and the United States.

Even in the sub-sample that yields the smallest coefficient on fraction foreign denied, the coefficient suggests an economically meaningful magnitude. Specifically, the coefficient in regression 5, suggests that if Chile had the mean value of fraction foreign denied of 0.13 instead of its value of 1, its net interest margin on banks would be 1.4 percentage points lower (1.6*0.87). This would imply a reduction in Chile's net interest margin from 5.0 to 3.6 and bring Chile's average net interest margin close to the sample mean of 3.5. Thus, the robustness check using sub-sample of countries confirm the economically large impact o restricting foreign bank entry on net interest margins.

The Table 5 results indicate that the fraction foreign denied enters positively and significantly at the 0.01 in various sub-samples of countries. Thus, the finding that regulatory restrictions on foreign bank entry boost net interest margins is robust to alternations in the sample of countries.

It is also important to control for other country and bank characteristics. For instance, macroeconomic instability may produce large interest margins and macroeconomic instability may also create a political environment that takes a wary stance toward foreign competition. In this case, the positive relationship between regulatory restrictions on foreign bank entry and bank margins would reflect macroeconomic stability, not an independent relationship between entry restrictions on foreign banks and net interest margins. Thus, I control for inflation. Similarly, bank risk and the concentration of the banking industry may influence bank net interest margins. If

these factors are not controlled for, then we have correspondingly less confidence in the results on entry restrictions on foreign banks and bank margins.

The Table 6 results indicate that the positive relationship between fraction foreign denied and bank net interest margins is robust to including inflation, the variability of the rate of return on bank assets (bank risk), and the concentration of the banking industry for each country. Inflation enters all of the regressions positively and significantly at the 0.01 level. Bank risk and concentration enter some of the regressions significantly at the 0.10 level. For the purposes of this paper, note that regulatory restrictions on foreign bank entry enters all of the regression significantly at the 0.01 level.

D. Endowment, foreign banks, and margins

This subsection uses a two-stage generalized least squares estimator to assess whether the exogenous component of the fraction of foreign entry applications that are denied is associated with bank net interest margins. As discussed in the Introduction, I use the absolute value of the latitude of the country as an instrument for regulatory restrictions on foreign bank entry.

AJR and ES argue that geographical endowments influenced the formation of long lasting institutions that continue to shape national policies toward international openness and competition. This argument is based on the following building blocks. First, European colonists adopted different colonization strategies. At one end of the spectrum, the Europeans settled and created institutions to support private property, check the power of the State, and foster open, competitive economies. These "settler colonies" include the United States, Australia, and New Zealand. At the other end of the spectrum, Europeans did not aim to settle and instead sought to extract as much from the

colony as possible. In these "extractive states," Europeans did not create institutions to support private property rights and foster internationally open economies; rather, they established institutions that empowered and protected the elite. (e.g., Congo, Ivory Coast, and much of Latin America). The second component of AJR's theory holds that the type of colonization strategy was heavily influenced by the feasibility of settlement. In inhospitable environments, Europeans tended to create extractive states (AJR, 2001). In areas where endowments favored settlement, Europeans tended to form settler colonies. Third, the institutions created by European colonizers endured after independence. Settler colonies tended to produce post-colonial governments that were more devoted to defending private property rights and promoting competition than extractive colonies. In contrast, since extractive colonies had already constructed institutions for effectively extracting resources, the post-colonial elite frequently assumed power and readily exploited the pre-existing extractive institutions. While imperfect, I use the absolute value of latitude to proxy for geographical endowments. For more on using latitude to proxy for geographical endowments, see Beck, Demirguc-Kunt, and Levine (2003) and Easterly and Levine (2003).

Table 7 presents simple, pure cross-country regressions that suggest the appropriateness of using latitude as an instrumental variable for regulatory restrictions on foreign bank entry. In these regressions, net interest margin refers to the simple, un-weighted average of net interest margins across the country's banks. The first regression indicates that latitude significantly explains net interest margins. The second regression confirms that fraction foreign denied also explains net interest margins.

Table 7's third regression indicates that latitude significantly explains cross-country variation in regulatory restrictions on foreign bank entry at the 0.01 significance level. Importantly, the fourth regression presents regressions results of net interest margin against both latitude and fraction foreign denied. While fraction foreign denied enters significantly, latitude does not. This is consistent with the view that latitude explains net interest margin through its effect on fraction foreign denied. Indeed, the last regression in Table 7 uses latitude as an instrumental variable for fraction foreign denied. It indicates that in this pure cross-country context, the exogenous component of fraction foreign denied is positively associated with the average value of net interest margin.

Returning to bank-level data, Table 8 presents two-stage least squares regressions of individual net interest margins on bank-specific characteristics, various country-specific control variables, and fraction foreign denied, where latitude is used as an instrument for fraction foreign denied. As shown, the exogenous component of fraction foreign denied enters all of the regressions positively and significantly. Inflation also enters positively and significantly. Concentration and bank risk, however, do not enter these two-stage generalized least squares significantly.

In sum, the finding that regulatory restrictions on foreign bank entry boost bank net interest margins are robust to instrumenting for fraction foreign denied with latitude. In addition, latitude is significantly and negatively associated with fraction foreign denied in the first-stage regressions. This finding is consistent with AJR and ES theories of how geographical endowments influence the formation of national approaches to openness and competition.

IV. Conclusion

This paper examined the impact of regulatory impediments to foreign bank entry on bank net interest margins. To proxy for restrictions on foreign bank entry, I used the fraction of foreign bank entry applications denied by the regulatory authority of the country. The investigation uses data on 1165 banks across 47 countries and controls for numerous bank-specific and country-specific factors.

The paper also isolated the effect of restrictions on foreign bank entry from (1) restrictions on domestic bank entry and (2) foreign bank ownership of the domestic banking industry. Thus, the paper examined the extent to which restricting foreign bank entry is special. To accomplish this, I simultaneously controlled for regulatory restrictions on domestic entry and the fraction of domestic banking systems assets held by foreign owned banks.

The paper concludes that impediments to foreign bank entry exert a positive impact on bank net interest margins. Furthermore, I find that foreign banks are special. When controlling for impediments to domestic bank entry and the extent of foreign bank ownership, restrictions on foreign bank entry continue to explain bank net interest margins. Indeed, while foreign bank entry restrictions enter significantly, neither domestic bank entry restrictions nor foreign bank ownership help explain bank interest margins. Contestability by foreign banks importantly determines bank interest margins.

Based on theory and evidence by AJR and ES, this paper also used latitude as an instrumental variable for regulatory restrictions on foreign bank entry. The results show that (1) the absolute value of latitude is strongly, negatively associated with regulatory restrictions on foreign bank entry and (2) using latitude as an instrumental variable for the fraction of foreign entry applications denied confirms this the paper's core conclusion:

regulatory restrictions on foreign bank entry boost bank interest margins. While the results with latitude should be viewed cautiously, the results are consistent with the view that natural resource endowments shaped the formation of long-lasting institutions that continue to influence attitudes toward openness and competition today. These instrumental variable results increase confidence in the conclusion that restricting foreign bank entry increases bank interest margins, while cautioning that this relationship may reflect deeper institutional traits.

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Table 1: Summary Statistics

The number of countries is 47. The number of bank observations is 1165. The Appendix has detailed variable definitions. Interest margin is averaged over the 1995-99 period. The other bank-specific variables are from 1995. Regulatory variables on fraction of foreign and domestic entry applications denied and foreign bank ownership are from the Barth, Caprio, and Levine (2002a,b) dataset.

Variable	Obs	Mean	Std.Dev.	Min	Max
Interest Margin	1165	3.462	1.940	0.719	12.601
Bank Size	1165	7.144	1.980	1.939	13.488
Bank Liquidity	1165	21.376	16.410	0.233	82.190
Bank Equity	1165	8.553	6.335	-0.768	78.763
Fee Income	1165	0.890	1.442	-6.386	13.803
Bank Overhead	1165	3.000	1.773	0.150	15.721
Fraction Foreign Denied	47	0.131	0.276	0.000	1.000
Fraction Domestic Denied	47	0.205	0.306	0.000	1.000
Foreign Ownership	38	0.257	0.277	0.000	0.990
Latitude	47	0.403	0.196	0.022	0.722

Table 2: Simple Cross-Country Comparisons

	Interest Margin	Fraction Foreign Denied	Fraction Domestic Denied	Foreign Ownership
Fraction Foreign Denied	0.468***	1		
	(0.0009)			
	47	47		
Fraction Domestic Denied	0.385***	0.5***	1	
	(0.0075)	(0.0003)		
	47	47	47	
Foreign Ownership	0.1167	0.0707	0.0795	1
	(0.4852)	(0.6731)	(0.6351)	
	38	38	38	38
Latitude	-0.378***	-0.442***	-0.2351	-0.0813
	(0.0088)	(0.0019)	(0.1117)	(0.6276)
	47	47	47	38

Notes: *, **, *** indicate significance at the 10, 5, and 1 percent respectively.(P-values in parentheses.) * indicates significant at the five percent level.

Table 3: Regressions controlling only for bank-specific factors

Dependent variable is Interest margins, which is averaged over the 1995-99 period. The other bank-specific variables (Bank overhead, Bank size, Bank liquidity, Bank equity, Fee income) are measured in 1995. The Appendix gives detailed definitions. The estimation is done using GSL with random or fixed effects as indicated. A constant term was included, but is not reported. *, **, *** indicate significance at the 10, 5, and 1 percent respectively. P-values are in parentheses.

	(1)	(2)
Bank Overhead	0.537***	0.515***
	(0.000)	(0.000)
lasset95	-0.107***	-0.096***
	(0.000)	(0.000)
liquid95	-0.015***	-0.016***
	(0.000)	(0.000)
equity95	0.005	0.007
	(0.319)	(0.224)
fee95	-0.341***	-0.344***
	(0.000)	(0.000)
R2-within	0.364	0.3647
R2-between	0.5574	0.5224
No. Obs.	1165	1165
No. countries	47	47
Estimation	Random Effect	Fixed Effects

Table 4: Interest Margins and Restrictions on Foreign Bank Entry

Dependent variable is Interest margins, which is averaged over the 1995-99 period. The regression includes five bank-specific variables (Bank overhead, Bank size, Bank liquidity, Bank equity, Fee income) that are measured in 1995 and a constant term, but therese not reported below. The Appendix gives detailed definitions. The regressions include measures of the fraction of foreign bank entry applications denied, domestic bank entry applications denied, and foreign bank ownership. The estimation is done using GSL with random effects. *, **, *** indicate significance at the 10, 5, and 1 percent respectively. P-values are in parentheses.

	(1)	(2)	(3)	(4)
Fraction Foreign Denied	3.450***			3.060***
	(0.000)			(0.000)
Foreign Ownership		0.680		0.362
		(0.420)		(0.639)
Fraction Domestic Denied			1.184	0.723
			(0.114)	(0.373)
R2-within	0.364	0.299	0.364	0.299
R2-between	0.574	0.521	0.591	0.529
No. Obs.	1165	900	1165	900
No. countries	47	38	47	38

Table 5: Interest Margins and Restrictions on Foreign Bank Entry: Sub-Samples

Dependent variable is Interest margins, which is averaged over the 1995-99 period. The regression includes five bank-specific variables (Bank overhead, Bank size, Bank liquidity, Bank equity, Fee income) that are measured in 1995 and a constant term, but therese not reported below. The Appendix gives detailed definitions. The regressions include measures of the fraction of foreign bank entry applications denied, domestic bank entry applications denied, and foreign bank ownership. The estimation is done using GSL with random effects. *, **, *** indicate significance at the 10, 5, and 1 percent respectively. P-values are in parentheses.

	(1)	(2)	(3)	(4)	(5)
Sub-sample of countries:	Omit Sub-Saharan Africa (SSA)	Omit Formerly Socialist (FS)	Omit USA	Omit SSA, FS, & USA	Omit SSA, FS, & USA
Fraction Foreign Denied	1.972***	3.594***	3.401***	1.896***	1.585**
	(0.004)	(0.000)	(0.000)	(0.000)	(0.042)
Foreign Ownership					0.107
					(0.832)
Fraction Domestic Denied					0.587
					(0.379)
R2-within	0.371	0.405	0.368	0.434	0.344
R2-between	0.681	0.612	0.610	0.815	0.798
No. Obs.	1144	1107	930	851	600
No. countries	41	40	46	33	26

Table 6: Interest Margins and Restrictions on Foreign Bank Entry: Other Controls

Dependent variable is Interest margins, which is averaged over the 1995-99 period. The regression includes five bank-specific variables (Bank overhead, Bank size, Bank liquidity, Bank equity, Fee income) that are measured in 1995 and a constant term, but therese not reported below. The Appendix gives detailed definitions. The regressions include measures of the fraction of foreign bank entry applications denied, domestic bank entry applications denied, and foreign bank ownership. The estimation is done using GSL with random effects. *, **, *** indicate significance at the 10, 5, and 1 percent respectively. P-values are in parentheses.

	(1)	(2)	(3)	(4)
Fraction Foreign Denied	2.09***	2.035***	1.902***	2.317***
	(0.001)	(0.001)	(0.001)	(0.003)
Foreign Ownership				0.239
				(0.729)
Fraction Domestic Denied				-0.409
				(0.584)
Inflation	0.118***	0.121***	0.115***	0.119***
	(0.000)	(0.000)	(0.000)	(0.000)
Bank Risk		-0.057	-0.056	-0.121*
		(0.221)	(0.226)	(0.082)
Concentration			1.371*	1.564*
			(0.052)	(0.073)
R2-within	0.365	0.365	0.365	0.300
R2-between	0.738	0.741	0.756	0.727
No. Obs.	1137	1137	1137	872
No. countries	46	46	46	37

Table 7: Simple Cross-Country Regressions

These regressions are cross-country regressions. Interest margin is averaged over the bank in each country over the 1995-1999 period. Latitude is the absolute value of the latitude of the country. Fraction Foreign Denied is the fraction of foreign bank entry applications denied. See appendix for details.

	Dependent Variable				
	Interest Margin	Interest Margin	Fraction Foreign Denied	Interest Margin	Interest Margin
Latitude	-5.18**		-0.623***	-2.919	
	(0.016)		(0.009)	(0.152)	
Fraction Foreign Denied		4.55***		3.638**	8.324**
		(0.003)		(0.015)	(0.013)
Countries	47	47	47	47	47
R-square	0.143	0.219	0.196	0.255	
Estimation	OLS	OLS	OLS	OLS	2SLS

Notes: *, **, *** indicate significance at the 10, 5, and 1 percent respectively.(P-values in parentheses.) OLS: ordinary least squares with robust standard errors. 2SLS: Two-stage least squares where latitude is used as an instrument for Fraction Foreign Denied.

Table 8: Interest Margins and Restrictions on Foreign Bank Entry: Instrumental Variables

Dependent variable is Interest margins, which is averaged over the 1995-99 period. The regression the absolute value of a country's latitude as an instrument for Fraction Foreign Denied. The regression includes five bank-specific variables (Bank overhead, Bank size, Bank liquidity, Bank equity, Fee income) that are measured in 1995 and a constant term, but therese not reported below. The Appendix gives detailed definitions. The regressions include measures of the fraction of foreign bank entry applications denied, domestic bank entry applications denied, and foreign bank ownership. The estimation is done using a two-stage GSL with random effects. *, **, *** indicate significance at the 10, 5, and 1 percent respectively. P-values are in parentheses.

	(1)	(2)	(3)	(4)
Fraction Foreign Denied	8.287***	7.047***	6.958***	6.969***
	(0.000)	(0.003)	(0.001)	(0.001)
Inflation		0.081***	0.083***	0.079***
		(0.006)	(0.001)	(0.001)
Bank Risk			-0.052	-0.052
			(0.268)	(0.269)
Concentration				0.815
				(0.436)
R2-within	0.364	0.365	0.366	0.366
R2-between	0.418	0.593	0.598	0.607
No. Obs.	1165	1137	1137	1137
No. countries	47	46	46	46