DENYING FOREIGN BANK ENTRY: IMPLICATIONS FOR BANK INTEREST MARGINS

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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 the structure of the economy's banking industry? In exploring this issue, 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.

The paper also 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 Martínez Pería, 2001). Others, however, argue that openness to foreign banks is crucial because it makes the domestic market contestable (Demirgüç-Kunt, Levine, and Min, 1998; Claessens, Demirgüç-Kunt, and Huizinga, 2001). From this perspective, the key

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, Martínez Pería, and Sánchez, 2002). To isolate the impact of restricting foreign bank entry from actual foreign bank participation, I simultaneously control for the fraction of domestic banking assets associated with foreign-owned banks.

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 forty-seven countries. While other studies examine the actual degree of foreign bank participation (Clarke, Cull, and Martínez Pería, 2001), I simultaneously study the rate at which countries reject applications by foreign banks. Furthermore, whereas some studies use information on the number of foreign banks operating in the economy to proxy for the contestability of the market (Claessens, Demirgüç-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. Finally, other studies do not control for regulatory restrictions on domestic bank entry; this paper, in contrast, controls for the fraction of domestic entry applications that are rejected by the supervisory agency.[1] I thus simultaneously examine the impact of impediments to domestic bank entry, impediments to foreign bank entry, and the degree of foreign bank ownership of the domestic banking industry on net interest margins.

To assess the independent link between foreign banks and commercial bank net interest margins, I control for an array of bank-specific and country-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 terms of country-specific variables, I control for inflation and the level of bank concentration in each country. Results on the relationships between interest margins and bank-specific and country-specific factors are valuable. For this paper, however, the purpose of controlling

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1. For more on the impact of various supervisory and regulatory policies on bank efficiency, see Demirgüç-Kunt, Laeven, and Levine (2002).

for these factors is to identify the impact of policies toward foreign banks on net interest margins.

The data indicate that impediments to foreign bank entry boost bank net interest margins. 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, the key factor 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. The fraction of foreign entry applications denied, however, 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 impediments to domestic bank entry, the actual degree of foreign bank participation, bank-specific factors, macroeconomic stability, and banking sector concentration.

While the positive relationship between the fraction of foreign bank entry applications denied and net interest margins is robust to alterations in the conditioning information set, there may be concerns with the measure of foreign bank entry restrictions. First, the fraction of foreign entry applications 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 may be reluctant to apply or may use bribes and other measures prior to submitting an application. Under these conditions, a low rejection rate will not reflect bribes and other obstacles faced by foreign banks. Second, 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. These concerns, however, would bias the results *against* finding a relationship between the fraction of foreign entry applications denied and bank margins. Moreover, when I use an instrumental variables estimator and employ different sets of instruments, I continue to find that restricting foreign bank entry boosts net interest margins.

The remainder of the paper is organized as follows. Section 1 discusses the methodology and data; section 2 presents the results; and section 3 concludes.

1. METHODS, DATA, AND SUMMARY STATISTICS

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.

$$\text{Net Interest Margin}_{i,k} = \alpha + \beta_1 F_i + \beta_2 \mathbf{B}_{i,k} + \beta_3 \mathbf{C}_i + \varepsilon_{i,k}.$$

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; $\mathbf{B}_{i,k}$ is a vector of bank-specific characteristics for bank k in country i; $\mathbf{C}_i$ is a vector of country-specific traits; and $\varepsilon_{i,k}$ 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. 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.

1.1 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. Second, data for regulatory restrictions on bank entry are obtained from the Barth, Caprio, and Levine database (Barth, Caprio, and Levine, 2001a, 2001b, 2003). The database is constructed from a survey of national regulatory agencies. The responses to this survey regarding the denial of entry applications primarily cover the period 1997–98.

After combining the datasets, there are data on 1165 banks across forty-seven 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 United States. I conduct the analyses on various subsets of countries to assess the robustness of the findings.

1.2 Variable Definitions

This subsection defines the variables used in the regression analyses: namely, net interest margin, several bank-specific control variables, and country-specific variables.

Net Interest Margin

Net interest margin equals interest income minus interest expense divided by interest-bearing assets. The net interest margin measure represents the gap between what the bank pays the providers of funds and what the bank gets from firms and other users of bank credit. Since the net interest margin focuses on the conventional borrowing and lending operations of the bank, I normalize by interest-bearing assets rather than total assets. I compute and examine the net interest margin over two periods. First, I average over the 1995–99 period so that one year does not dominate. The disadvantage of this approach is that the main explanatory variable, denial of foreign bank entry applications, is computed primarily over the 1997–98 period. I do not believe that this is an important disadvantage, however, because Barth, Caprio, and Levine (2001a) and Carkovic and Levine (2002) show that bank supervision and regulation has changed remarkably little. Second, I examine the net interest margin computed in 1999. This alleviates any concerns about the timing of the dependent and independent variables. The disadvantage is that business-cycle phenomena and crises may unduly influence margins in 1999. In any event, the results are the same whether using net interest margins in 1999 or averaging over the 1995 to 1999 period. The results reported below use the net interest margin averaged over the years 1995–99. Table 1 reports 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.

Table 1. Summary Statistics[a]

Variable	No. observations	Mean	Standard deviation	Min	Max
Interest margin	1,165	3.46	1.94	0.72	12.60
Bank size	1,165	7.14	1.98	1.94	13.49
Bank liquidity	1,165	21.38	16.41	0.23	82.19
Bank equity	1,165	8.55	6.34	–0.77	78.76
Fee income	1,165	0.89	1.44	–6.39	13.80
Bank overhead	1,165	3.00	1.77	0.15	15.72
Fraction foreign denied	47	0.13	0.28	0.00	1.00
Fraction domestic denied	47	0.21	0.31	0.00	1.00
Foreign ownership	38	0.26	0.28	0.00	0.99
Latitude	47	0.40	0.20	0.02	0.72

a. The number of countries is forty-seven. The number of bank observations is 1,165. 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 (2003) dataset.

Since the net interest margin is subject to measurement problems, it is crucial to use a variety of control variables and sensitivity checks to mitigate problems with interpreting the findings. I want to hold a sufficient amount constant to ensure that greater net interest values reflect either operational inefficiency or market power. Confounding issues arise, however. For instance, banks engaging in fee-income-generating activities may have different net interest margins because of cross-subsidization of activities. In this case, cross-bank differences in net interest margins may reflect differences in bank activity, rather than differences in efficiency or competition. Also, bank inefficiencies and market conditions may yield high overhead costs rather than large interest margins. Furthermore, bank margins may reflect different asset allocations and risk tastes of firms, such that the net interest margin may reflect equity premiums. I therefore control for bank equity and bank risk; I also obtain consistent results when controlling for bank profitability and the share of nonperforming loans in the economy. These measurement and interpretational concerns emphasize the need to control for bank-specific characteristics.

Bank-specific control variables

I use bank-specific variables as control variables, since the focus of the paper is on assessing the impact of regulatory restrictions on foreign banks. The following variables are considered in the analysis.

Bank-size equals the logarithm of total bank assets in millions of U.S. 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.

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. Different organizations will choose different business systems, product mixes, and asset allocations, with consequently different overhead cost structures. Large overhead costs may reflect bank inefficiencies or market power in a similar fashion to net interest margins. I thus expect to see a very high, positive correlation between bank overhead and net interest margins. Indeed, overhead costs may be so highly correlated with net interest margin that including bank overhead as a regressor substantively lowers 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 noninterest operating income divided by total assets in 1995. Banks have different product mixes. Since banks engage in different nonlending activities, these other activities may influence the pricing of loan products owing to cross-subsidization of bank products. I therefore include fee income to control for 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 greater efficiency. I thus 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 a relatively 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.

Country-specific variables

Fraction foreign denied equals the fraction of commercial banking applications from foreign banks that are denied by the regulatory authority. These are based on the Barth, Caprio, and Levine (2001a, 2001b, 2003) survey of bank supervision and regulation. Some countries were completely closed to the entry of foreign banks during this period, 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, that is, 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. 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. Denial rates may thus be low even in countries that heavily restrict foreign entry. Similarly, measurement problems may arise in the case of countries that allow a foreign bank to enter by purchasing a domestic bank, because this mode of entry does not require the foreign bank to apply for a commercial banking license. This type of entry is not captured in the survey, which only measures applications. However, it is captured by the change in the fraction of foreign bank ownership. These measurement problems should bias the results against finding a robust link between the fraction of foreign entry applications denied and net interest margin. Nevertheless, I use instrumental variables to mitigate the problem associated with pure measurement error and confirm the results.

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? If so, it would indicate that there is 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 Barth, Caprio, and Levine survey. In some countries, virtually all of the banking system is foreign owned, as in New Zealand,

Botswana, and Luxembourg. In other countries, none of the banking system is foreign owned, 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 explaining differences 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*. 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. I therefore control for inflation in assessing the links between regulatory impediments to foreign bank entry and bank margins.

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; I then control for concentration.

1.3 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.

Table 2. Simple Cross-country Comparisons[a, b]

Variable	Interest margin	Fraction foreign denied	Fraction domestic denied	Foreign ownership
Fraction foreign denied	0.468 (0.0009) *47*	1 *47*		
Fraction domestic denied	0.385 (0.0075) *47*	0.5 (0.0003) *47*	1 *47*	
Foreign ownership	0.1167 (0.4852) *38*	0.0707 (0.6731) *38*	0.0795 (0.6351) *38*	1 *38*

a. *P* values in parentheses.
b. Number of observations in italics.

2. Regression Results

As a preliminary step, I ran a panel regression using both random and fixed effects, controlling only for the bank-specific variables. As shown in table 3, the coefficient estimates from the random and fixed effect estimators are very close. Later regressions include country-specific variables and 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, 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. Equity as a fraction of bank assets is not significantly related to net interest margins, although 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 than do banks with a lower portion of their income from such activities. 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.

Table 3. Regressions Controlling Only for Bank-specific Factors[a]

Independent variable	(1)	(2)
Bank overhead	0.537	0.515
	(0.000)	(0.000)
Bank size	–0.107	–0.096
	(0.000)	(0.000)
Bank liquidity	–0.015	–0.016
	(0.000)	(0.000)
Bank equity	0.005	0.007
	(0.319)	(0.224)
Fee income	–0.341	–0.344
	(0.000)	(0.000)
Summary statistic		
R^2 within	0.364	0.365
R^2 between	0.558	0.522
No. observations	1,165	1,165
No. countries	47	47
Estimation	Random effects	Fixed effects

a. 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, and fee income) are measured in 1995. The estimation is performed using generalized least squares (GLS) with random or fixed effects, as indicated. A constant term was included, but it is not reported in the table. *P* values are in parentheses.

Table 4. Interest Margins and Restrictions on Foreign-bank Entry[a]

Independent variable	(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)
Summary statistic				
R^2 within	0.364	0.299	0.364	0.299
R^2 between	0.574	0.521	0.591	0.529
No. observations	1,165	900	1,165	900
No. countries	47	38	47	38

a. Dependent variable is interest margins, which is averaged over the 1995–99 period. The regressions include five bank-specific variables (bank overhead, bank size, bank liquidity, bank equity, and fee income) measured in 1995 and a constant term, but these are not reported in the table. The regressions also include measures of the fraction of foreign bank entry applications denied, domestic bank entry applications denied, and foreign bank ownership. The estimation is performed using generalized least squares (GLS) with random effects. *P* values are in parentheses.

2.1 Interest Margins and Foreign Banks

Table 4 presents regressions including all the bank-specific variables and combinations of fraction foreign denied, foreign ownership, and 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 boosts 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, its net interest margin on banks would be 2.7 percentage points lower (3·0.87) over the estimation period. This would imply a reduction in Chile's net interest margin from 5.0 to 2.3, and it would bring Chile's average net interest margin below the sample mean of 3.5.

The regressions in table 4 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 affect net interest margins. These results highlight the importance of the contestability of the market. The results are consistent with the argument that reducing the potential entry of foreign banks allows net interest margins to grow. Furthermore, restricting the entry of domestic banks is not as critical. While restricting foreign bank entry boosts net interest margins, domestic bank entry does not enter the regression significantly.

Finally, when including fraction foreign denied, foreign ownership, and fraction domestic denied simultaneously in the net interest margin regression, I find that only the fraction of foreign denied enters significantly. Even after controlling for regulatory restrictions on domestic bank entry and 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.

2.2 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. It is thus important to assess whether the results in table 4 hold on subsets of countries. Table 5 presents the results for four subsets of countries: namely, the full sample less the sub-Saharan African countries, less the formerly socialist countries, less the United States, and less the sub-Saharan African countries, the formerly socialist countries, and the United States.

Even in the subsample 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

Table 5. Interest Margins and Restrictions on Foreign Bank Entry: Subsamples[a]

	Subsample of countries				
	Omit sub- Saharan Africa (SSA)	*Omit formerly socialist countries (FS)*	*Omit USA*	*Omit SSA, FS, & USA*	*Omit SSA, FS, & USA[b]*
Independent variable	*(1)*	*(2)*	*(3)*	*(4)*	*(5)*
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)
Summary statistic					
R^2 within	0.371	0.405	0.368	0.434	0.344
R^2 between	0.681	0.612	0.610	0.815	0.798
No. observations	1,144	1,107	930	851	600
No. countries	41	40	46	33	26

a. Dependent variable is interest margins, which is averaged over the 1995–99 period. The regressions include five bank-specific variables (bank overhead, bank size, bank liquidity, bank equity, and fee income) measured in 1995 and a constant term, but these are not reported in the table. 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 performed using generalized least squares (GLS) with random effects. *P* values are in parentheses.
b. In addition to the right-hand-side variables included in regression (4), regression (5) includes fraction domestic denied and foreign ownership.

in Chile's net interest margin from 5.0 to 3.6, and it would bring Chile's average net interest margin close to the sample mean of 3.5. Thus, the robustness check using subsamples of countries confirms the economically large impact o restricting foreign bank entry on net interest margins.

The results in table 5 indicate that the fraction foreign denied enters positively and significantly at the 0.01 level in various subsamples 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 it may also create a political environment that fosters 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. I thus control for inflation. Similarly, bank risk and the concentration of the banking industry may influence bank net interest margins. If the regressions do not control for these factors, then the results on entry restrictions on foreign banks and bank margins will generate correspondingly lower confidence.

Table 6 indicates 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. Most pertinent here, regulatory restrictions on foreign bank entry enters all of the regression significantly at the 0.01 level.

2.3 Robustness Check Using Instrumental Variables

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 above, there may be problems associated with measuring restrictions on foreign bank entry. I use two different types of instrumental variables in conducting robustness checks.

Table 6. Interest Margins and Restrictions on Foreign-bank Entry: Other Controls

Independent variable	(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)
Summary statistic				
R^2 within	0.365	0.365	0.365	0.300
R^2 between	0.738	0.741	0.756	0.727
No. observations	1,137	1,137	1,137	872
No. countries	46	46	46	37

a. Dependent variable is interest margins, which is averaged over the 1995–99 period. The regressions include five bank-specific variables (bank overhead, bank size, bank liquidity, bank equity, and fee income) measured in 1995 and a constant term, but these are not reported in the table. The regressions also include measures of the fraction of foreign bank entry applications denied, domestic bank entry applications denied, and foreign bank ownership. The estimation is performed using generalized least squares (GLS) with random effects. *P* values are in parentheses.

First, as argued by Demirgüç-Kunt, Laeven, and Levine (2002), regulatory impediments on banks reflect broad national institutional characteristics. Thus, I first use the Kaufmann, Kraay, and Zoido-Lobatón (2001) measure of institutional development as an instrument for entry restrictions. Specifically, Kaufmann, Kraay, and Zoido-Lobatón (2001) compile information on voice and accountability, that is, the extent to which citizens can choose their government and enjoy political rights, civil liberties, and an independent press; political stability, that is, a low likelihood that the government will be overthrown by unconstitutional or violent means; government effectiveness, that is, the quality of public service delivery, the competence of civil servants, and the absence of politicization of the civil service; light regulatory burden, that is, a relative absence of government controls on goods markets, government interference in the banking system, excessive bureaucratic controls on starting new businesses, and excessive regulation of private business and international

trade; rule of law, that is, protection of persons and property against violence or theft, independent and effective judges, and contract enforcement; and freedom from graft, that is, absence of corruption or the use of public power for private gain. These components have values between zero and two, with larger values implying better institutions. I average these components into an aggregate measure of institutional development for each country. The correlation between this aggregate institutional index and the fraction of entry applications denied is –0.63 and is significant at the 0.05 level.

When using this aggregate institutional index as an instrumental variable, I confirm all of the paper's findings with little change in the coefficient estimates. Thus, the results are robust to pure measurement error. Moreover, these instrumental variable findings provide an economically intuitive story. National institutions and attitudes toward competition are reflected in policies, such as impediments to foreign bank entry, and hence in bank net interest margins.

As a second robustness check, I use an alternative, arguably more exogenous, instrumental variable: namely, the absolute value of the latitude of the country. From an economic perspective, Acemoglu, Johnson, and Robinson (2001) and Engerman and Sokoloff (1997) argue that geographical endowments influenced the formation of longlasting 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. Examples include Congo, Ivory Coast, and much of Latin America. The second component of Acemoglu, Johnson, and Robinson's theory holds that the type of colonization strategy was heavily influenced by the feasibility of settlement. Europeans tended to create extractive states in inhospitable environments, whereas they tended to form settler colonies in areas where endowments favored settlement (Acemoglu, Johnson, and Robinson, 2001). Third, the institutions created by European colonizers endured after independence. Settler colonies tended to produce

postcolonial 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 postcolonial elite frequently assumed power and readily exploited the preexisting extractive institutions. I use the absolute value of latitude to proxy for geographical endowments, albeit imperfectly. This proxy for geographical endowments is particularly problematic for noncolonies, so I confirm all the findings for various subsamples. For more on using latitude to proxy for geographical endowments, see Beck, Demirgüç-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, unweighted 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.

The third regression in table 7 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 regression results of net interest margin against

Table 7. Simple Cross-country Regressions[a]

Independent variable	Dependent variable				
	Interest margin	*Interest margin*	*Fraction foreign denied*	*Interest margin*	*Interest margin*
Latitude	–5.180 (0.016)		–0.623 (0.009)	–2.919 (0.152)	
Fraction foreign denied		4.550 (0.003)		3.638 (0.015)	8.324 (0.013)
Summary statistic					
No. countries	47	47	47	47	47
R^2	0.143	0.219	0.196	0.255	
Estimation	OLS	OLS	OLS	OLS	2SLS

a. These are cross-country regressions. Interest margin is averaged over the bank in each country over the 1995–99 period. Latitude is the absolute value of the latitude of the country. Fraction foreign denied is the fraction of foreign bank entry applications denied. OLS: ordinary least squares with robust standard errors. 2SLS: Two-stage least squares, where latitude is used as an instrument for fraction foreign denied. *P* values in parentheses.

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.

I return now 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 is robust to instrumenting for fraction foreign denied.

Table 8. Interest Margins and Restrictions on Foreign-bank Entry: Instrumental Variables[a]

Independent variable	(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)
Summary statistic				
R^2 within	0.364	0.365	0.366	0.366
R^2 between	0.418	0.593	0.598	0.607
No. observations	1,165	1,137	1,137	1,137
No. countries	47	46	46	46

a. Dependent variable is interest margins, which is averaged over the 1995–99 period. The regressions use the absolute value of a country's latitude as an instrument for fraction foreign denied. The regressions include five bank-specific variables (bank overhead, bank size, bank liquidity, bank equity, and fee income) measured in 1995 and a constant term, but these are not reported in the table. The regressions also include measures of the fraction of foreign bank entry applications denied, domestic bank entry applications denied, and foreign bank ownership. The estimation is performed using a two-stage generalized least squares (GLS) with random effects. *P* values are in parentheses.

3. 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 forty-seven countries and controls for numerous bank-specific and country-specific factors.

The paper also isolated the effect of restricting foreign bank entry from restrictions on domestic bank entry and from foreign bank ownership of the domestic banking industry. The paper thus 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 system 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. This paper's findings are confirmed when using instrumental variables to proxy for differences in national institutions that yield different policies toward foreign banks. 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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