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Do Non-Tariff Measures Make Domestic Firms More Profitable? Evidence from the Commercial Banking Sector

Sarah Oliver

Abstract

Using firm level data for a sample of 78 country markets in 2012, this paper analyzes the relationship between the severity of non-tariff measures related to the entry and operation of foreign firms and firm profitability in the commercial banking sector, and differentiates the impact of these non-tariff measures on foreign-owned and domestic firms. Overall, there is a non-linear relationship between the level of restrictions and the profitability of firms. Banks in countries with low levels of restriction are significantly more profitable than banks in countries with no restrictions, while banks in countries with moderate levels of restriction are less profitable than banks in countries with no restrictions. Additionally, foreign owned firms are significantly more profitable than domestic firms when there are no restrictions on the entry and operation of foreign firms, but less profitable than domestically owned firms at both low and moderate levels of restriction.

United States International Trade Commission

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Introduction

In contrast to goods, which tend to face trade costs in the form of tariffs on particular products, trade costs for services tend to be associated with regulatory and policy measures, collectively known as non-tariff measures (NTMs). These NTMs can apply both to cross-border trade in services and establishment and operation of affiliates. Some NTMs, such as those related to consumer safety or market stability, are considered necessary to protect consumers and are applied without discriminating between foreign and domestic firms. Other NTMs, such as limits on foreign investment, explicitly target foreign-owned firms, and can increase the costs of establishing and operating an affiliate of a foreign firm.

This paper examines the relationship between the severity of NTMs that limit foreign firm entry and operations (i.e. restrictions on foreign affiliates), and the level of competition in the commercial banking sector, using profitability as an indicator of the level of competition. In markets with more severe restrictions, the level of competition in the commercial banking sector is likely to be lower than in markets with no restrictions, which is likely to increase profitability of individual firms. Additionally, since these measures explicitly target foreign firms, the increase in profitability associated with decreased competition likely benefits domestic firms over foreign firms.

Previous literature looking at the impact of NTMs on profitability in the service sector has focused on measuring firm level profitability for all firms in the market. This paper extends previous work on quantifying NTMs in banking by introducing an indicator for the ownership of individual firms (foreign or domestic), to determine whether the gains in profitability associated with lower levels of competition benefit domestic firms more than foreign firms. This paper also extends previous work on the performance of foreign banks relative to domestic banks, which has primarily focused on the impact of market-wide regulatory regimes on foreign and domestic firms, rather than regulations specifically aimed at limiting foreign affiliate entry and operations.

Overall, banks are significantly more profitable when faced with low levels of restriction on foreign affiliates than banks in countries with no restrictions. However, with moderate levels of restriction on foreign affiliates, banks are less profitable relative to banks in countries with no restrictions, though results are not significant. This suggests there is a non-linear relationship between the level of restrictions and bank profitability, and could indicate that there is less competition in markets with low levels of restriction on foreign affiliates. However, at moderate levels of restriction, the benefit of reduced competition may be offset by increased costs to firms due to inefficiency.

Separating firms by ownership shows that the severity of restrictions on foreign affiliates affects domestic and foreign-owned firms differently. In markets with no restrictions on foreign affiliates, foreign owned banks tend to be significantly more profitable than domestically owned banks. For domestic firms, introducing low levels of restriction leads to a significant increase in profitability relative to domestic firms in a market with no restrictions. Moderate restrictions lead to a smaller increase in domestic firm profitability relative to domestic firms in markets with no restrictions, though results are not significant. Similarly, foreign firms are also more profitable in markets with low and moderate levels of restriction compared to foreign firms in markets with no restrictions. However, the rate at which profitability increases at both low and moderate levels of restriction is smaller for foreign firms than for domestic firms, which eliminates the gap in firm profitability observed between foreign and domestic firms in markets with no restrictions. This result suggests that the decrease in competition associated with more severe restrictions is stronger than any cost effects.

The remainder of the paper is divided into five sections. The first section describes previous work analyzing the impact of NTMs on services firms and bank performance. The second section describes the estimation framework. Section three describes the firm level bank data and the World Bank Services Trade Restrictions Index, which is used to measure the severity of NTMs in the banking sector for each country. Section four presents estimation results, and the final section concludes.

Literature Review

Previous work quantifying NTMs in services has taken two broad approaches: estimating a tariff equivalent, and creating an index that scores the relative severity of restrictions in a sector based on an aggregation of specific NTMs. Both approaches are outlined briefly below.

The first approach measures the added trade costs associated with NTMs by calculating an ad valorem tariff equivalent (AVE). The AVE is calculated by measuring the gap between actual prices, quantities, or trade values and predicted trade values or prices in the absence of any non-tariff measures.[1] While many of these estimates look at NTMs throughout the economy, some focus on calculating AVEs for services sectors specifically. For example, Park (2002), Fontagné, Guillin and Mitaritonna (2011), and Fontagné, Mitaritonna and Signoret (2016) use

[1] For a comprehensive survey of the methodologies used to calculate AVEs for non-tariff measures, see Abbyad and Herman, "How Much do Non-Tariff Measures Cost? A Survey of Quantification Methods," 2017.

unexplained variation in gravity models of cross-border service trade to estimate AVEs at the sector level.[2]

The second approach measures the relative severity of NTMs by cataloging specific policies that pertain to each sector and country market. This could be accomplished either by measuring the total number of NTMs that a firm faces in each market, or by compiling an index that scores the severity of each NTM in terms of how much it limits trade.[3] In the index-based approach, individual barriers are scored and then aggregated into an overall sector-level score for each market. These scores are then used to estimate the impact of NTMs on firm performance. Findley and Warren (2000), Dee (2005), and Dihel and Shepherd (2007) all adopt this approach for a variety of service sectors.[4] Dihel and Shepherd (2007) also separate the measures by the type of service trade they limit, considering, for example, limits on cross-border provision of services and limits on establishment and operations of foreign affiliates separately for each sector.

This paper relies on the index-based approach to quantify NTMs and uses the Service Trade Restrictions Index (STRI) compiled by the World Bank to analyze the impact of NTMs related to foreign affiliate entry and operations on profitability in the banking sector. This choice of index follows Khachaturian (2015) and Khachaturian and Oliver (2016), which use the World Bank STRI to measure the impact of NTMs on profitability in telecommunications and life insurance, respectively.[5]

A variety of papers have used the index approach to focus on estimating the impact of NTMs on foreign entry and operation and bank performance specifically, but have looked at the banking sector as a whole rather than differentiating between foreign and domestic firms. Barth, Caprio and Levine (2004) use country-level averages of bank performance indicators and find a positive association between restrictions on bank entry and overhead costs, but no relationship between barriers to foreign entry and profitability.[6] Kalirajan et al (2000), Herfindahl and Brown (2007), and Diehl and Shephard (2007) all find a positive relationship

[2] Park, "Measuring Tariff Equivalents in Cross-Border Trade in Services," 2002; Fontagné, Guillin and Mitaritonna, "Estimates of Tariff Equivalents for the Services Sectors," 2011: Fontagné, Mitaritonna and Signoret, "Estimated Tariff Equivalents of Services NTMs," 2016.

[3] For example, a measure that prevents foreign firms from owning more than 30 percent of a domestic company would be considered a more severe restriction than a 50 percent ownership cap.

[4] Findlay and Warren, *Impediments to Trade in Services: Measurement and Policy Implications*, 2000; Dee "A Compendium of Barriers to Services Trade," 2005; Dihel and Shepherd, "Modal Estimates of Service Barriers," 2007.

[5] Khachaturian, "Services Trade Restrictions and Company Profits: Telecommunications," 2015; Khachaturian and Oliver "Firm Level Analysis of Services Trade Restrictions in the Life Insurance Industry," 2016.

[6] Barth, Caprio and Levine, "Bank Regulation and Supervision: What works Best?" 2004.

between the level of restrictions and bank profitability, while Rouzet and Spinelli (2016) find a negative relationship in some specifications.[7]

Analysis of the difference in performance between foreign and domestic banks in various markets is also well developed in the literature. Claessens and van Horen (2012) provide a survey of this literature, which primarily focuses on whether foreign-owned banks tend to perform better than domestic banks in a variety of market and regulatory conditions.[8] Some of these papers, described below, look at how foreign and domestic bank performance differs depending on banking regulations at the country level. However, they do not differentiate the impact of non-tariff measures targeted at foreign firms specifically.

Claessens, Demirgüç-Kunt and Huizinga (2001) find that a larger share of foreign owned banks in a country is associated with lower net interest margins for domestic banks, and interpret these results to indicate that there are less competitive conditions in countries where firms tend to have higher net interest margins.[9] Demirgüç-Kunt, Laeven, and Levine (2004) examine the impact of regulatory restrictions on all firms, including the rate at which licenses are granted and restrictions on banks engaging in non-bank activities. Their findings suggest that a higher level of restrictions also leads to higher net interest margins for all banks in a country. However, the authors do not distinguish between regulations that apply to all firms and regulations directed specifically at foreign firms.[10] Garcia Herrero and Martinez Peria (2007) separate lending by foreign firms into foreign claims, which indicate cross-border lending activity, and local claims, which indicate lending from an affiliate. Banks operating in foreign markets tend to have a lower share of local claims in countries where restrictions on bank openness and activities are high. Their indicator of bank openness includes restrictions on the ability of foreign banks to open branches and subsidiaries, along with market-wide restrictions.[11]

This work combines these two strands of literature to study the impact of NTMs that specifically target the entry and operation of foreign firms in the banking sector on profitability of foreign-owned and domestic firms. In contrast to previous work, this paper separates the impact of these NTMs by type of firm ownership in order to evaluate the difference between foreign and domestic bank performance.

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[7] Kalirajan et al "The Price Impact of Restrictions on Banking Services", 2000; Herfindahl and Brown, "WTO Negotiations in Financial Services: Standing Offers Disappoint," 2007; Dihel and Shepherd, "Modal Estimates of Service Barriers," 2007; Rouzet and Spinelli, "Services Trade Restrictiveness, Mark-Ups and Competition," 2016.
[8] Claessens and van Horen "Being a Foreigner among Domestic Banks: Asset or Liability?" 2012.
[9] Claessens, Demirgüç-Kunt and Huizinga, "How Does Foreign Entry Affect Domestic Banking Markets?" 2000.
[10] Demirgüç-Kunt, Laeven, and Levine, "Regulations, Market Structure, Institutions, and the Cost of Financial Intermediation," 2004.
[11] Garcia Herrero and Martinez Peria, "The Mix of International Banks' Foreign Claims: Determinants and Implications," 2007.

Methodology

In order to evaluate the impact of restrictions on foreign affiliates on the profitability of individual firms, any econometric model must be able to combine both firm and country-level variables into the estimation strategy. Many previous studies using indexes to measure the impact of NTMs on firm performance use a two-stage model in order to control for both firm and country-level determinants of profitability, and separate the firm and country level variables into two regressions to correct for potential within-group correlation of standard errors at the firm level, following Moulton (1990).[12]

In these models, including those adopted by Kalirajan et al (2000), Herfindahl and Brown (2007), and Diehl and Shephard (2007) the first estimation creates an "adjusted" profit margin at the country level by removing variation determined by firm-level variables, such as capital and liquidity ratios, and non-interest expenses.[13] This approach assumes that these firm level variables are predictors of profitability rather than jointly determined with profitability. The adjusted country-level margin is then used in the second stage, which includes a measure of trade restrictions along with economy wide variables such as GDP.

More recently, Wooldridge (2003) corrects the problem of potential within-group correlation of firm level standard errors raised in Moulton (1990) by clustering standard errors at the country level.[14] This allows for firm and country-level variables to be combined in a single regression. This structure, which has been used in more recent assessments of the impact of NTMs on service sector performance, including in Fontagné and Mitaritonna (2012), Khachaturian (2015), and Rouzet and Spinelli (2016), is adopted for this analysis.[15]

Equation 1 is a reduced form expression of the model, designed to assess the overall impact of the trade restrictions on the profitability of banks. The dependent variable is profitability, measured as the net interest margin of an individual firm in a given country in 2012. The net interest margin, a standard indicator of bank profitability that encompasses lending and deposit

[12] This misspecification may lead to downward bias in standard errors. Moulton, "An Illustration of a Pitfall in Estimating the Effects of Aggregate Variables on Micro Units," 1990.
[13] Herfindahl and Brown (2007) exclude net non-interest operating expenses, while Diehl and Shepard (2007) include recent growth of net interest income and market share in their first stage regression in addition to capital, liquidity and non-interest operating expenses. Kalirajan et al "The Price Impact of Restrictions on Banking Services," 2000; Herfindahl and Brown, "WTO Negotiations in Financial Services: Standing Offers Disappoint," 2007; Dihel and Shepherd, "Modal Estimates of Service Barriers," 2007.
[14] Wooldridge, "Cluster-Sample Methods in Applied Econometrics," 2003.
[15] Fontagné and Mitaritonna, "Assessing Barriers to Trade in the Distribution and Telecom Sectors in Emerging Countries," 2012; Khachaturian, "Services Trade Restrictions and Company Profits: Telecommunications," 2015; Rouzet and Spinelli "Services Trade Restrictiveness, Mark-Ups and Competition," 2016.

activity, is measured as the net revenue from interest-accruing assets divided by total earning assets.[16]

$$(1)\ NetInterestMargin_{ic} = \beta_1 + \beta_2 STRI25_c + \beta_3 STRI50_c + \beta_4 \ln Population_c + \beta_5 GDPPerCapita_c + \epsilon_{ic}$$

The World Bank STRI measures variation in regulations regarding the entry and operation of foreign firms in the banking sector. Broadly, this measure encapsulates measures relating to foreign ownership and licensing for foreign banks, and assigns an overall country score for the commercial banking sector.[17] Scores range from 0 (completely open to foreign banks) to 100 (completely closed). Due to data availability, this analysis only considers countries with STRI scores of 0, 25 or 50, and breaks the STRI into two country-level dummy variables, *STRI25* and *STRI50*. Since the World Bank STRI index is not continuous, this allows for comparison of different levels of restriction with the baseline case of no restrictions. The baseline case in the model is an STRI score of 0, indicating no restrictions on foreign affiliates in commercial banking. *STRI25* equals one when countries have an STRI score of 25, indicating a low level of restrictions on foreign affiliates in commercial banking. *STRI50* equals one when countries have an STRI score of 50, indicating a moderate level of restrictions on foreign affiliates in commercial banking.

In addition to the STRI, this estimation also includes two variables that control for variation in market size across countries. When choosing locations to establish affiliates, firms may be more likely to enter markets with a higher total demand for banking services, thereby making these markets more competitive than those with lower demand for banking services. *LnPopulation* measures the log population of each market in 2012, and is used to control for the potential size of the financial sector. *GDP per capita* in 2012 controls for increased consumer demand for banking services at higher income levels.

Equation 2 separates the sample into foreign-owned and domestic banks to evaluate whether variation in regulations on the entry and operations of foreign firms affects foreign-owned and domestic banks differently. In addition to the variables presented in equation 1, in equation 2, *Foreign Owned* equals one when the global parent of a bank is located in another country. This equation also adds two interaction terms, *STRI25*Foreign Owned* and *STRI50*Foreign Owned*,

[16] Net gains from interest-accruing assets are calculated as the difference between interest received from commercial bank assets, such as commercial loans, mortgages, and investment securities, and interest paid on bank liabilities, such as consumer deposits and interbank borrowing.

[17] In the World Bank STRI, these types of barriers are known as mode 3 barriers. For banking services, countries receive individual scores for restrictions on lending and on deposits. These scores are then combined for an overall banking score, which is used in this analysis.

which measure the additional impact of trade restriction on the net interest margins of foreign-owned firms, at low and moderate levels of restriction, respectively.

$$(2)\ NetInterestMargin_{ic} = \beta_1 + \beta_2 STRI25_c + \beta_3 STRI50_c + \beta_4 ForeignOwned_{ic} + \beta_5 (STRI25_c * ForeignOwned_{ic}) + \beta_6 (STRI50_c * ForeignOwned_{ic}) + \beta_7 \ln Population_c + \beta_8 GDPPerCapita_c + \epsilon_{ic}$$

Data

To measure bank profitability at the firm level, this paper uses banking company data for the year 2012 from Bureau van Dijk's Orbis database.[18] The sample includes all companies listed under NAICS primary code 52211-Commercial Banking, that have financial data available in 2012.[19] This Orbis dataset also includes information on parent companies of the banks in the sample, making it possible to distinguish between foreign-owned and domestic firms. After eliminating firms that have no data on ownership, the sample includes global parent companies, domestic subsidiaries, and foreign-owned subsidiaries.

Orbis defines a global parent company as the largest independent shareholder of a company, provided this shareholder owns at least 50 percent of the company (either directly or through another subsidiary).[20] Global parent firms appear both as individual firm observations in the sample, and as the owners of the foreign and domestic bank subsidiaries. Table 1 compares average profitability of these global parent companies with the subsidiaries in the sample. On average, the global parent companies are less profitable than the subsidiaries in the sample, and have a lower standard deviation.

The majority of the global parent companies in the sample report consolidated financial accounts, which combine financial data for all of their subsidiaries worldwide. [21] This means, that although these global parent companies could be considered domestic firms, it is not possible to determine whether their reported profitability only reflects the conditions in the home market. As a result, any estimates that include global parent companies will not accurately capture profitability of domestic firms, particularly if global parent profitability is

[18] Data was downloaded November 8, 2016.
[19] NAICS code 52211 includes "establishments primarily engaged in accepting demand and other deposits and making commercial, industrial, and consumer loans. Commercial banks and branches of foreign banks are included in this industry"
[20] Bureau van Dijk, "Ultimate Owner Identification," Orbis User Guide, https://help.bvdinfo.com/mergedProjects/68_EN/Home.htm.
[21] The search strategy for downloading data in Orbis prioritized reporting unconsolidated accounts, but consolidated accounts are automatically substituted when unconsolidated accounts are unavailable.

primarily based on conditions in a foreign market. To avoid inaccurate estimation of domestic firm profitability, these parent companies are removed from the sample.

Table 1: Summary statistics for global parents and subsidiaries

	Subsidiaries	Global parent companies
Average net interest margin (percent)	3.95	3.28
Standard deviation (percent)	9.94	1.86
Number of firms	6,515	485

Source: Author's calculations using data from Bureau van Dijk, Orbis Database (accessed November 4, 2016).

As explained in the methodology section, to measure the level of restrictions on foreign banks, this paper uses the World Bank Service Trade Restrictions Index (STRI) scores for restrictions to foreign affiliate entry and operations in banking services as of 2008.[22] One advantage of using the World Bank STRI to measure the severity of NTMs is that it explicitly focuses on measures designed to limit foreign firm participation, rather than including regulations such as reserve requirements, which are designed to mitigate risk in the banking system and apply to all firms in the market.[23] Restrictions on foreign affiliates in the commercial banking sector include policies such as limits on foreign ownership of banks, limits on cross-border mergers and acquisition, differences in licensing requirements, and limits on the establishment of bank branches.

Combining this data with the firm-level data from Orbis yields 6,515 firm observations in 78 markets. Although in theory STRI ranges from 0 to 100, due to missing data this sample only includes countries with no restrictions (score of 0), a low level of restrictions (score of 25), and a moderate level of restrictions (score of 50).[24] Appendix table A.1 lists the countries in the sample by level of STRI restrictions, and includes the number of bank observations per country and the average net interest margin. Country averages for the net interest margin range from 66 to 23 percent.

Table 2 shows the distribution of domestic and foreign-owned firms by level of restriction, as well as the average net interest margin for each category. Figure 1 shows this distribution graphically, and includes the combined average net interest margin for all firms (black line). On average, foreign-owned firms have higher net interest margins than domestic firms at all levels of restriction, though the gap between foreign and domestic average net interest margins shrinks from 3 percentage points at no restrictions category to only 0.08 percentage points for markets with moderate levels of restriction.

[23] See Borchert, et al. (2012) for a detailed explanation of scoring criteria. Borchert, et al., "Guide to the Services Trade Restrictions Database," 2012.

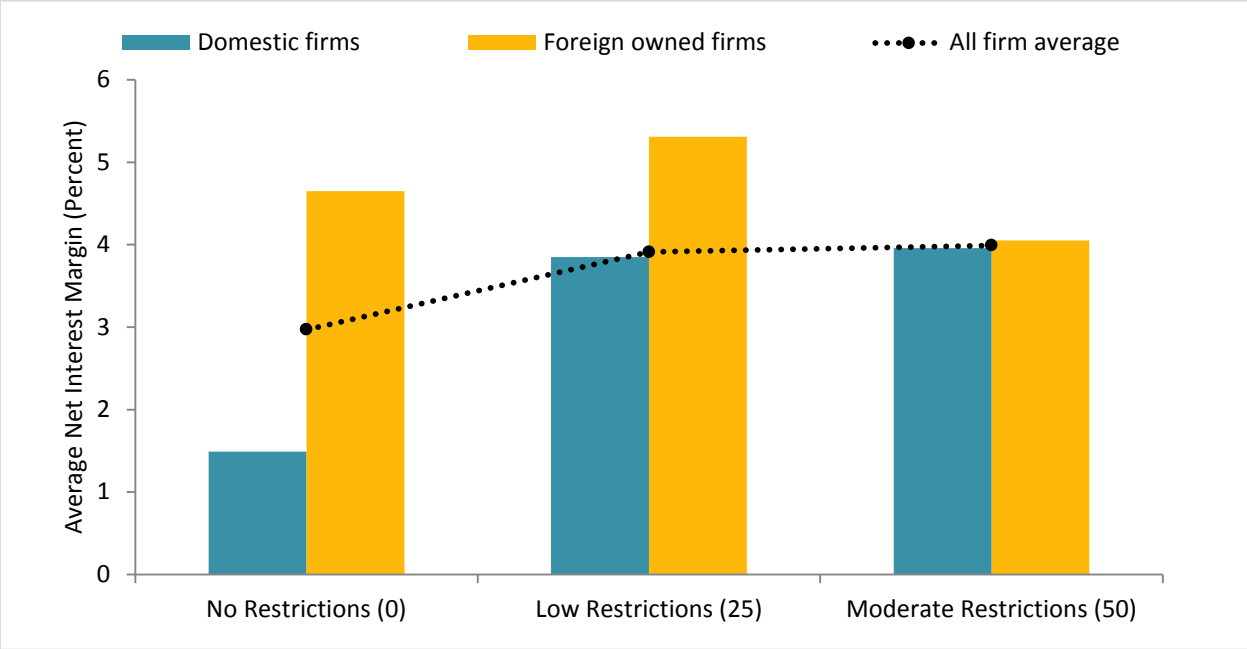
[24] The STRI includes countries with scores of 75 (Burundi and Qatar) and 100 (Iran and Ethiopia). However, there are no firm observations for these countries in the sample.

Table 2: Distribution of firms by ownership type and level of restrictions on firm entry and operations, 2012

	No Restrictions (0)		Low restrictions (25)		Moderate Restrictions (50)	
Ownership type	**Number of observations**	**Avg net interest margin**	**Number of observations**	**Avg net interest margin**	**Number of observations**	**Avg net interest margin**
Domestic	119	1.49	4,668	3.85	66	3.96
Foreign-owned	104	4.65	193	5.31	42	4.04
All firms	223	2.97	4,861	3.91	108	3.99

Source: Author's calculations using data from Bureau van Dijk, Orbis Database (accessed November 4, 2016) and the World Bank STRI.

Figure 1: Average net interest margin of firms by ownership type and level of restrictions



Source: Author's calculations using data from Bureau van Dijk, Orbis Database (accessed November 4, 2016) and the World Bank STRI.

Results

Table 3 presents regression results. Column (1) shows results for specification (1), which does not distinguish between foreign-owned and domestic firms. In this specification, comparing no restrictions on foreign affiliates to a low level of restrictions leads to a 3 percentage point increase in the net interest margin. The average firm in a market with no restrictions has a net interest margin of 3 percent. This result implies that in a market with low restrictions, this average firm would have a predicted net interest margin of 6 percent. Results are significant at the 1 percent level. In contrast, comparing no restrictions to a moderate level of restrictions is associated with a 0.3 percentage point decrease in the net interest margin, though results are not significant.

This finding suggests that relative to countries with no restrictions, low levels of restriction tend to reduce competition in the banking sector. However, in markets with moderate levels of restriction, banks could be less profitable than banks in countries with no restrictions on foreign affiliates. Although lower profitability tends to indicate more competition, this result may instead indicate higher inefficiency in markets with moderate levels of restriction. At STRI50, fewer foreign firms are able to enter the market. Domestic firms therefore do not have to be as efficient as firms competing in the global market in order to continue operations. As a result, inefficient domestic firms can survive in the market despite being less profitable than firms in countries with no restrictions.

Column (2) shows results for specification (2) which differentiates between foreign-owned and domestic firms. In this specification, the coefficients on STRI25 and STRI50 compare the profitability of domestic firms in countries with restrictions relative to domestic firms in countries with no restrictions. Similarly to the previous estimation, domestic banks in countries with a low level of restrictions tend to be significantly more profitable than domestic banks in countries with no restrictions, though the magnitude of this effect is larger in column (2) than in column (1). In contrast to column (1), domestic banks are also more profitable in countries with moderate levels of restriction than in countries with no restrictions, though again, results are not significant.

The interaction between the STRI variables and the indicator of foreign-ownership in column (2) provides some support for the idea that restrictions on foreign entry and operations of foreign firms affect foreign owned firms differently than domestic firms. When there are no barriers to entry or operation of foreign owned banks, foreign firms tend to have net interest margins that are 2 percentage points higher than domestic firms. These results are significant at the 10 percent level. The interaction terms between foreign ownership and STRI25 and STRI50 indicate that the increase in profitability associated with restrictions on foreign affiliates relative to the baseline case of no restrictions is smaller for foreign firms than for domestic firms. This result is statistically significant at the 10 percent level for moderate levels of restriction.

Table 3: Regression results

	(1)	(2)
Dependent variable	**Net interest margin**	**Net interest margin**
STRI25	3.049***	3.855***
	[0.869]	[0.820]
STRI50	-0.308	0.796
	[1.083]	[1.339]
Foreign Owned		2.023*
		[1.188]
STRI25*Foreign Owned		-2.032
		[1.455]
STRI50*Foreign Owned		-2.353*
		[1.383]
lnPopulation	-0.263	-0.231
	[0.223]	[0.227]
GDP per capita	-7.28e-05***	-6.97e-05***
	[2.32e-05]	[2.18e-05]
Constant	9.654**	8.062**
	[3.928]	[4.018]
Observations	5,192	5,192
Adjusted R-Squared	0.020	0.022
*** p<0.01, ** p<0.05, * p<0.1		

Source: Author's estimates
Note: Robust standard errors in brackets.

To better understand the impact of the STRI on foreign firm profitability, table 4 combines the regression coefficients of individual dummy variables to show the overall effect of the STRI on foreign firms. This table compares the overall effect of each level of restrictions for foreign firms to the coefficients for domestic firms, and reports the difference in profitability between foreign-owned and domestic firms at low and moderate levels of restriction. Although foreign-owned firms are significantly more profitable in markets with low levels of restriction than in markets with no restrictions, foreign banks are no longer more profitable than domestic banks at STRI25. Similarly, foreign firms are more profitable in markets with moderate levels of restriction than in markets with no restrictions, but have 0.3 percent smaller net interest margins at STRI50 than domestic firms.

Table 4: Combined regression coefficients by ownership category and STRI level

	Domestic firms	Foreign-owned firms	Difference in profitability (foreign-owned domestic)
Low restrictions (25)	3.855***	3.845***	-0.010
	[0.820]	[1.213]	[0.689]
Moderate restrictions (50)	0.796	0.465	-0.330
	[1.339]	[1.087]	[0.762]
*** p<0.01, ** p<0.05, * p<0.1			

Source: Author's estimates
Note: Robust standard errors in brackets.

The results of this specification suggest that policies explicitly designed to restrict foreign firm participation have different impacts on foreign and domestic firms. While both types of firms benefit from less competitive conditions in markets with restrictions on foreign affiliates, foreign firms are no longer more profitable than domestic firms in these markets. Additionally, for both foreign and domestic firms, the increase in profitability associated with increased restrictions on foreign affiliates is stronger at low levels of restriction than at moderate levels of restriction. This suggests that some of the positive effect of reduced competition on profitability may be dampened by increased inefficiency in markets with moderate levels of restriction.

Because of their size and relative importance in the market, large firms may have more capacity to absorb costs associated with different levels of restriction than small firms, and thus may behave differently than the whole sample. To account for this, both specifications are re-estimated with a reduced sample that includes only the top 25th percentile of bank subsidiaries in terms of total earning assets in each market.[25] Rather than use an absolute size cutoff, which could eliminate small markets from the sample entirely, this approach considers whether the impact of restrictions on the net interest margin are different for firms that are large relative to the size of the market. Results in this specification are similar to the main results, but only the coefficient on STRI25 is significant.

It is also possible that eliminating global parent companies could bias the results if global parents behave differently than their affiliates. As a robustness check, the regression specifications are estimated with global parents added to the sample of domestic firms, under the assumption that the net interest margin of global parents reflects conditions in their home market. Results are robust and significant across both samples.

Finally, the high share of U.S.-based firms in the sample might be driving the positive and significant result for STRI25, since the United States is the largest individual market for financial services. However, re-running these regressions without the U.S. observations also yields similar results.

Conclusion

This paper analyzes the impact of non-tariff measures in the commercial bank sector on profitability of firms in markets where NTMs restrict foreign firm activity. Focusing on measures limiting foreign entry and operations of banks, this paper finds that overall, relative to countries without NTMs, banks are significantly more profitable in countries with low levels of restriction

[25] In cases where there are fewer than four firms in a country, the largest bank in the sample is considered the top 25th percentile.

and less profitable in countries with moderate levels of restriction. This result suggests that some limits on foreign entry and operation of banks may lead to less competitive conditions in a particular market.

Separating the sample into foreign and domestic firms yields more nuanced results. In countries with no restrictions on foreign affiliates, foreign-owned firms are significantly more profitable than domestic firms. Both foreign-owned and domestic firms are significantly more profitable in countries with low levels of restriction than countries with no restrictions, and more profitable in countries with moderate levels of restriction than countries with no restrictions. However, in both cases, the STRI effectively eliminates the difference between foreign and domestic firm profitability seen in countries with no restrictions.

This result suggests that if countries have the goal of increasing the profitability of domestic firms at the expense of foreign firms, NTMs on foreign entry and operations of banks may be an effective mechanism to achieve this goal. From a research perspective, this result highlights the importance of considering the impact of NTMs on foreign and domestic firms separately when analyzing the relationship between NTMs and firm profitability.

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Appendix

Table A.1: Countries included in the sample by STRI score

Country	Number of observations	Average net interest margin	Country	Number of observations	Average net interest margin
No Restrictions (0)					
Albania	1	4.6	Japan	37	1.2
Argentina	1	-66.1	Korea, Republic of	11	2.7
Austria	17	1.2	Kyrgyzstan	1	9.8
Belgium	4	1.5	Lithuania	2	1.9
Bolivia	4	6.1	Mauritius	4	3.1
Bulgaria	10	3.2	Morocco	2	4.0
Cambodia	10	5.1	Netherlands	4	0.8
Czech Republic	3	2.9	New Zealand		2.3
Denmark	2	4.0	Nicaragua	1	6.5
Ecuador	3	6.9	Panama	1	3.0
France	8	1.6	Poland	9	3.6
Georgia	3	8.7	Portugal	1	1.4
Germany	7	1.8	Sweden	1	1.1
Guatemala	6	20.5	Trinidad and Tobago	1	7.4
Honduras	2	23.4	Turkey	12	4.8
Ireland	2	0.7	United Kingdom	14	1.3
Italy	36	2.0	Zambia	2	7.9
Low Restrictions (25)					
Algeria	3	2.2	Lebanon	2	1.9
Botswana	3	7.7	Mozambique	4	7.8
Canada	15	3.2	Nepal	3	3.6
Chile	4	2.3	Nigeria	3	9.0
China	8	3.3	Paraguay	2	3.8
Colombia	9	2.9	Peru	13	11.2
Costa Rica	3	5.6	South Africa	2	20.3
Cote d'Ivoire	3	3.5	Sri Lanka	4	2.8
Finland	1	0.7	Tunisia	3	5.1
Ghana	3	9.4	Uganda	4	2.5
Indonesia	19	5.7	Ukraine	19	9.9
Kazakhstan	10	4.3	United States	4,722	3.8
Kenya	3	9.7			
Moderate Restrictions (50)					
Bahrain	1	1.9	Malaysia	4	2.1
Bangladesh	3	2.3	Pakistan	12	3.5
Belarus	15	4.3	Philippines	1	9.2
Brazil	12	6.9	Russian Federation	10	4.0
Egypt	7	4.6	Saudi Arabia	1	3.0
India	25	2.6	Thailand	7	3.2
Jordan	2	3.5	Viet Nam	3	3.8
Kuwait	1	2.3	Zimbabwe	4	8.6

Source: Author's calculations using data from Bureau van Dijk, Orbis Database (accessed November 4, 2016) and the World Bank STRI.