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# Nontariff Measures in the Global Retailing Industry

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**Abstract**

This paper introduces a new measure of policies and regulations affecting the retailing industry. Our retail restrictiveness index addresses 13 categories of nontariff measures (NTMs), including market entry restrictions and operational regulations. We produce index scores for 75 countries. Southeast Asian countries including Indonesia, Malaysia, and Thailand are among the most restrictive retail markets as measured by our index, while the United States is one of the world's most open. We use econometric "gravity" models to examine how restrictiveness affects sales of multinational retailers' foreign affiliates, and find that high (restrictive) scores on our index are associated with decreased affiliate sales.

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# Introduction

The retailing industry plays a vital role in the global economy. Efficient retailers expand producers' access to customers and enable consumers to access a wide assortment of goods at the best prices. It also accounts for a substantial share of employment and output in many countries. For example, the industry accounted for 13.4 percent of U.S. employment (14.7 million workers)[2] and 6.1 percent of value added as a share of U.S. gross domestic product ($884.9 billion)[3] in 2010.

Competition in the retailing industry benefits supplying industries as well as consumers: one recent study found that when foreign retailers enter new markets, they increase the productivity of suppliers.[4] Despite these benefits, many countries maintain policies and regulations that make it harder for firms to start up and operate. Countries often employ such nontariff measures (NTMs) with the ostensible goal of achieving welfare-enhancing objectives such as sound urban planning, environmental stewardship, and protection of groups deemed vulnerable (e.g., small-scale retailers and local suppliers). However, if such measures are designed in ways that unduly restrict competition or hinder efficient operations, they may impose costs on consumers, such as reduced product assortments and more expensive merchandise.

The objectives of this study are twofold. First, we introduce a new measure of countries' policies and regulations toward the retailing industry. Our retail restrictiveness index and sub-indices are built from a rich new dataset of retailing industry policies in 75 countries. We then demonstrate a new way to measure the impact of such policies: estimating their effect on sales of retailers' foreign affiliates using econometric "gravity" models. We show that higher scores on our index (reflecting more restrictive policies) are associated with modest but statistically significant declines in affiliate sales. To our knowledge, ours is the first study to examine the effects of retailing industry restrictiveness using such models.

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[2] USDOL, BLS, Employment, Hours, and Earnings—National Database. Seasonally adjusted statistics; figures quoted are for December 2011.

[3] USDOC, BEA, "Value Added by Industry" (accessed November 8, 2011 and December 2, 2011).

[4] Javorcik and Li, "Do the Biggest Aisles Serve a Brighter Future?" 2008, 1.

The paper is structured as follows. First, we provide a brief overview of the global retailing industry. Next, we review the existing literature on retailing industry restrictiveness, describe our research methodology, and present our index and sub-indices. We then explain our empirical estimation strategy and present our results. A brief concluding section summarizes the paper's principal findings, and appendices provide supplementary data.

# Industry Overview

Retailing represents the final chain in the distribution process that links manufacturers of merchandise to consumers. Retailers typically purchase merchandise from manufacturers, wholesalers, or other retailers, then sell it in small quantities to the public. They operate via physical stores as well as non-store outlets, including Web sites, catalogs, and direct sellers. Retailers may specialize in specific products (e.g., food or clothes) or sell a diverse range of merchandise.

Retail sales totaled $16.5 trillion worldwide in 2010—equal to about one-quarter of global GDP.[5] The United States was the world's largest retail market in 2010, with sales totaling over $3 trillion. The U.S. total was nearly twice that for the next largest market (China, at $1.6 trillion).[6] However, retail markets in developing countries are growing faster than developed ones. The "BRIC" countries (Brazil, Russia, India, and China) alone increased their share of global retail sales by nine percentage points between 2005 and 2010, to 24 percent (figure 1). Rapid economic growth in many developing countries has made them attractive targets for expansion by large retailers based in developed countries, where growth has been slower and markets more saturated. Concentration in the industry varies widely by country and industry segment, but is generally higher in developed countries than in developing ones. For example, the top five grocery retailers in Finland captured over 90 percent of

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[5] Planet Retail, Planet Retail Database (accessed June 16, 2011); World Bank, World Development Indicators Database.
[6] Planet Retail, Planet Retail Database (accessed June 16, 2011).

**FIGURE 1** Retail sales, by country, 2005 and 2010

**2005**

Japan 11%

China 6%

United Kingdom 4%

Italy 4%

France 4%

Germany 4%

Brazil 4%

India 3%

Mexico 2%

United States 24%

All other 34%

**Total: $11.5 trillion**

**2010**

China 10%

Japan 9%

Brazil 6%

India 5%

Russia 3%

France 3%

Italy 3%

United Kingdom 3%

Germany 3%

United States 19%

All other 36%

**Total: $ 16.2 trillion**
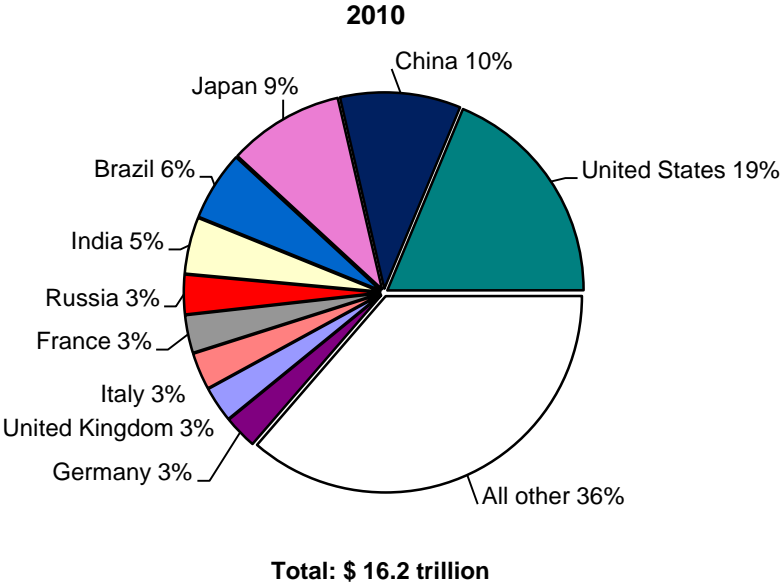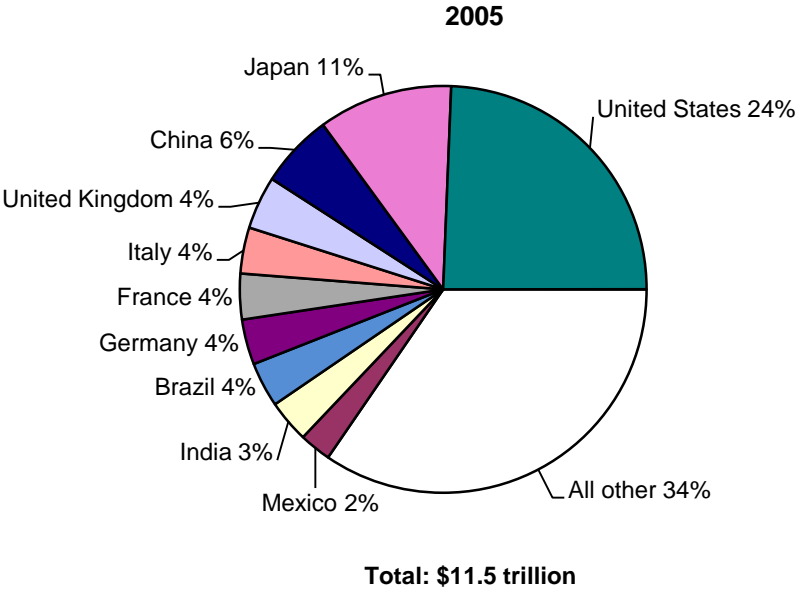
*Source:* Planet Retail database (accessed August 22, 2011).

*Note:* Figures may not total 100 percent due to rounding.

grocery sales in that country in 2010, compared to less than one-half of one percent of grocery sales for the top five grocers in India. [7]

The operations of the world's largest retailers illustrate the importance of international expansion for major firms in the industry. For example, all but two of the world's ten largest grocery retailers operate in markets outside their home country (table 1).

**TABLE 1** Top 10 retailers, by global grocery sales, 2010

| Rank | Company | Country[a] | Grocery sales (US$ billions)[b] | Number of countries[c] |
|------|---------|------------|---------------------------------|------------------------|
| 1 | Wal-Mart | United States | 254.3 | 15 |
| 2 | Carrefour | France | 112.3 | 35 |
| 3 | Tesco | United Kingdom | 76.3 | 14 |
| 4 | Kroger | United States | 73.0 | 1 |
| 5 | Schwarz Group | Germany | 72.0 | 25 |
| 6 | Aldi | Germany | 65.5 | 18 |
| 7 | Aeon | Japan | 64.5 | 7 |
| 8 | Walgreens | United States | 63.0 | 1 |
| 9 | Ahold | Netherlands | 55.1 | 10 |
| 10 | Seven & I | Japan | 54.3 | 16 |

*Sources:* Deloitte, "Leaving Home," January 2011; Planet Retail, "Global Retail Rankings 2011"; Planet Retail Database (accessed September 28-29, 2010); company Web sites.
[a]Country represents location of headquarters.
[b]Includes sales of food, beverages, and health and beauty care products only.
[c]Hong Kong counted with China. Puerto Rico counted within the United States. Taiwan counted as a separate country.

Wal-Mart, the world's largest retailer, exemplifies the trend towards globalization. As recently as 1997, the company described its activities outside the United States as "immaterial to total company operations."[8] By 2010, one-quarter of Wal-Mart's sales, one-third of its employees, and nearly half of its stores were outside the United States.[9]

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[7] Planet Retail, Planet Retail Database (accessed August 22, 2011).
[8] Wal-Mart, "Form 10-K," April 21, 1997, 26–27.
[9] Number of retail units from Wal-Mart, *2010 Annual Report* (Online Edition). Sales and employment data from Wal-Mart, "Form 10-K," March 30, 2010. Wal-Mart's fiscal year ends January 31. Sales data for 2010 are for February 1, 2009–January 31, 2010. Employment data are for the last date of the fiscal year.

# Restrictiveness Indices for Retailing: Literature Review

Researchers have been constructing indices to measure countries' restrictiveness toward trade and investment in services since the mid-1990s.[10] The present study follows four efforts by other researchers to prepare comparative, multi-country indices of restrictiveness toward distribution industries.[11] Kalirajan (2000) created indices spanning 38 economies; he prepared separate indices for regulations affecting establishment (start-up), ongoing operations, foreign-invested firms, and domestic firms. He weighted the various indices according to a subjective assessment of their effects on the costs of distribution. The most restrictive countries in his sample were Belgium, France, India, Indonesia, Korea, Malaysia, the Philippines, Switzerland, and Thailand.[12] Kalirajan also used econometric analysis to test the effects of restrictiveness on food distributors' price-cost margins. His results suggested that restrictive regulations raised distributors' costs.[13]

Conway and Nicoletti (2006) developed an indicator of regulatory restrictiveness that included three categories of measures: barriers to entry, operational restrictions, and price controls. Their index was organized and weighted using a statistical technique called factor analysis.[14] Conway and Nicoletti's analysis focused on OECD countries; they have subsequently expanded their dataset to include a select set of non-OECD members. China is the most restrictive country in their index, followed by Luxembourg, Belgium, Austria, and Greece.[15]

Dihel and Shepherd (2007) presented a restrictiveness index for distribution that used Kalirajan's NTM categories, but with weights determined by factor analysis. They also presented results for sub-

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[10] For a review of this broader literature, see Deardorff and Stern, "Empirical Analysis of Barriers to International Services Transactions," 2008.

[11] The OECD's Services Trade Restrictiveness Index project and the World Bank's Trade and International Integration team were in the processing of developing restrictiveness indices for distribution at the time of writing of this working paper.

[12] Kalirajan listed these as the most restrictive countries without placing them in a strict numerical order from most to least restrictive.

[13] Kalirajan, "Restrictions on Trade in Distribution Services," August 16, 2000.

[14] Factor analysis examines the extent to which groups of individual variables move together, and generates weights that reflect the variables' contribution to sample variance. For more details on their approach, see Boylaud and Nicoletti, "Regulatory Reform in Retail Distribution," 2001, 264-5.

[15] Conway and Nicoletti, "Product Market Regulation in Non-manufacturing Sectors in OECD Countries," December 7, 2006. Brazil, China, India, Russia, and South Africa were subsequently added to their dataset, although the data for South Africa and India are incomplete and full scores for them have not been calculated. The full dataset is available at www.oecd.org/eco/pmr.

indices corresponding to the four "modes" for supplying services under the World Trade Organization's General Agreement on Trade in Services.[16] Their analysis covered 19 "developing and transition" economies. The most restrictive countries in their index were Vietnam, India, Malaysia, the Philippines, Indonesia, and Venezuela.[17]

Golub (2009) developed an index for restrictiveness toward foreign direct investment in services for 73 countries. The index includes separate sub-indices for eight service industries, including distribution. Like Kalirajan, he weighted the NTM categories in each sub-index subjectively. Golub's indices placed a heavy emphasis on foreign ownership restrictions; countries that banned foreign investment in retail altogether received a maximally restrictive score. The most restrictive countries in his distribution sub-index were Ethiopia, India, Malaysia, Nigeria, and Saudi Arabia.[18]

Our index departs from these previous efforts in the following ways. First, it covers more countries (75) than any of the individual indices that have heretofore been published. Second, it addresses most of the policies and regulations examined by the studies named above, but in a single index. Third, our dataset is built upon a rich set of data gleaned from a diverse range of primary and secondary sources.

# Research Methodology

Between September 2009 and September 2011, a team of analysts researched the policies and regulations affecting retailing in 75 countries. Analysts focused on regulations affecting the retailing of food through "modern" outlets, such as supermarkets and hypermarkets, but many of the regulations that they studied applied to the broader universe of retailing businesses.[19] Analysts used a variety of primary and secondary sources, including interviews and correspondence with U.S. and foreign government representatives, industry participants, and analysts; review of legislation and press reports; and review of

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[16] The modes are cross-border supply (mode 1), consumption abroad (mode 2), commercial presence (mode 3) and presence of natural persons (mode 4).

[17] Dihel and Shepherd, "Modal Estimates of Services Barriers," 2007.

[18] Golub, "Openness to Foreign Direct Investment in Services," 2009, 1256–8.

[19] We chose to focus on food retailing through modern outlets in order to achieve consistency across countries with respect to the policies and regulations addressed by the index. Grocery stores seemed an obvious choice in light of their prominence within virtually every country's retailing industry.

research reports produced by other institutions. Whenever possible, analysts sought to verify the information collected with at least one "primary" source (a person with expert knowledge of the country in question or legal documents of that country). To the best of our knowledge, all data were accurate as of September 2011.[20]

# Index Components

In order to identify appropriate categories for inclusion in our index, we interviewed representatives of retailers and retailing industry associations; held a focus group with these parties as well as other researchers; and reviewed the existing literature on nontariff measures affecting the retailing industry.[21]

Our index comprises thirteen categories of NTMs:

1. Commercial land restrictions
2. Employment requirements
3. Foreign ownership restrictions
4. Infringement of intellectual property rights
5. Investment screening
6. Large store regulations
7. Restrictions on long-term stays
8. Management requirements
9. Operating hours restrictions
10. Performance requirements
11. Price controls
12. Promotional restrictions
13. Restrictions on temporary visits

The organization and scoring method for our index draw upon the studies described in the literature review above.[22] When entering information into our database, analysts selected among options in a multiple choice list to code each country's policies (table 2).

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[20] The full dataset is available upon request.
[21] Studies that proved particularly useful include Kalirajan, "Restrictions on Trade in Distribution Services," August 2000; Pilat, "Regulation and Performance in the Distribution Sector,"1997; and Boylaud and Nicoletti, "Regulatory Reform in Retail Distribution," 2001. Researchers at the World Bank and OECD; participants in the OECD's Experts Meeting on Distribution Services (held in Paris in November 2010) and representatives from several large U.S. retailers and industry associations also provided invaluable insights.
[22] Our index most closely resembles Kalirajan's, although there are some differences in the NTMs covered by his index and ours.

**TABLE 2** Scoring method for retail restrictiveness index components

| NTM Categories | Summary Descriptors of Measures | Score |
|---|---|---|
| **Commercial land restrictions** | Acquisition of commercial land prohibited | 1 |
| | Acquisitions restricted to a certain size (and/or duration for leases) | 0.5 |
| | No restrictions on acquisition of commercial land | 0 |
| **Employment requirements** | Number or share of foreign employees is limited | 1 |
| | Number or share of foreign employees is not limited | 0 |
| **Foreign ownership restrictions** | Foreign ownership is limited | 1-max. foreign equity share |
| | No limits on foreign ownership | 0 |
| **Intellectual property rights** | On USTR's Special 301 Priority Watch List | 1 |
| | On USTR's Special 301 Watch List | 0.5 |
| | Not on USTR's Special 301 watch lists | 0 |
| **Investment screening** | Screening and prior approval required | 1 |
| | No screening | 0 |
| **Large store regulations** | Large-scale stores are regulated | 1 |
| | No large-scale store regulations | 0 |
| **Restrictions on long-term stays** | No long-term stays of executives and senior managers | 1 |
| | Limit for stays of executives and senior managers is 1 year or less | 0.75 |
| | Limit for stays of executives and senior managers is >1 and <= 3 years | 0.5 |
| | Limit for stays of executives and senior managers is >3 and <= 5 years | 0.25 |
| | Limit for stays of executives and senior managers is >5 years (or unlimited) | 0 |
| **Management requirements** | Majority or all directors and/or managers must be nationals or residents | 1 |
| | At least 1 director and/or manager must be a national or resident | 0.5 |
| | No nationality or residency requirements for directors and/or managers | 0 |
| **Operating hours restrictions** | Store operating hours are regulated | 1 |
| | No regulation of operating hours | 0 |
| **Performance requirements** | Investors must meet performance requirements | 1 |
| | No performance requirements | 0 |
| **Price controls** | Price controls for some foods | 1 |
| | No price controls for foods | 0 |
| **Promotional restrictions** | Promotional techniques are restricted | 1 |
| | Promotional techniques are not restricted | 0 |
| **Restrictions on temporary visits** | No temporary visits of executives and senior managers | 1 |
| | Visits of executives and senior managers for up to 30 days | 0.75 |
| | Visits of executives and senior managers for 31-60 days | 0.5 |
| | Visits of executives and senior managers for 61-90 days | 0.25 |
| | Visits of executives and senior managers for more than 90 days | 0 |

Industry representatives identified a broad set of factors that impede their ability to do business, many of which affect businesses across the economy. These include:

- Corruption in customs
- Customs delays
- Opaque arrangements in dealer distribution networks
- Red tape associated with import licenses
- High tariffs on select merchandise categories
- Burdensome regulations on food and plant imports (sanitary and phytosanitary measures)
- Burdensome local and provincial approval processes (licenses and zoning)[23]
- Insufficient regulatory transparency—especially unpredictability in regulatory decision-making and the time required to complete procedures.
- Restrictive labor laws
- Discriminatory procedures for repatriation of capital
- Insufficient access to investment capital
- Insufficient access to high-quality financial services, telecommunications services, and advertising
- Poor quality of the local workforce
- Poor quality of local infrastructure

Examination of these broader aspects of the business environment and their relationship to retailing industry performance would be useful, but falls outside the scope of this study.

# The Retail Restrictiveness Index and Sub-indices

The principal version of our index makes no *a priori* judgments on the relative importance of the various components (put another way, the components all carry equal weight within the index). To calculate the score for each country, we sum its scores on the components—each of which has a maximum score of one—then divide by the total number of components (13). Thus, the maximum possible score is one (most restrictive), and the minimum possible is zero (least restrictive).

To test the index's sensitivity to the weighting of the various components, we present an alternate version that weights the measures in accordance with our understanding of their relative importance to

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[23] Where such approval processes involve screening of proposed retail investments for fulfillment of specific criteria (e.g., economic needs tests), we sought to capture such processes in the investment screening component of our index.

retailers. The maximum possible score in the weighted index remains one and the minimum zero

(Appendix 1).

We also calculate results for four sub-indices.[24] The sub-indices are intended to enable analysis

and comparison of different dimensions of restrictiveness. The sub-indices are:

1. Foreign. This sub-index includes those NTMs that are typically applied in a manner that discriminates against foreign-invested firms.

2. Domestic. Includes NTMs that are typically applied on a non-discriminatory basis, thereby affecting domestic and foreign-invested firms alike.

3. Establishment. Includes NTMs that affect a firm's ability to enter a market. These restrictions may be discriminatory or non-discriminatory.

4. Operations: includes NTMs (discriminatory or non-discriminatory) that affect a retailer's operations after it has begun doing business.

The foreign and domestic sub-indices are mutually exclusive, as are the

establishment and operations sub-indices. Table 3 indicates the assignments of measures to each sub-

index.[25]

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[24] Kalirajan also created sub-indices titled foreign, domestic, establishment, and operations, although their composition differed somewhat from ours.

[25] Many NTMs affect establishment and operations, fixed costs as well as variable costs, and foreign as well as domestic firms. The assignments made here reflect our understanding of the predominant ways that each type of NTM affects firms. It would be worthwhile to test our findings with alternative assignments.

**TABLE 3** Retail restrictiveness sub-indices

| Category | Foreign | Domestic | Establishment | Operations |
|---|---|---|---|---|
| Land restrictions | ✔ | | ✔ | |
| Employment requirements | | ✔ | | ✔ |
| Foreign ownership | ✔ | | ✔ | |
| Intellectual property rights | | ✔ | | ✔ |
| Investment screening | ✔ | | ✔ | |
| Large store regulations | | ✔ | ✔ | |
| Long-term stays | ✔ | | | ✔ |
| Management requirements | ✔ | | | ✔ |
| Operating hours restrictions | | ✔ | | ✔ |
| Performance Requirements | ✔ | | | ✔ |
| Price controls | | ✔ | | ✔ |
| Promotional Restrictions | | ✔ | | ✔ |
| Temporary Visits | ✔ | | | ✔ |

We calculate the sub-indices with and without the weights presented in Appendix 1. Like the overall index, the maximum possible score for each sub-index is one and the minimum possible is zero (see Appendix 2 for a more detailed discussion of scoring for the sub-indices).

## Index Results

Figure 2 depicts the results for the unweighted retail restrictiveness index, while table 4 provides summary data about it.

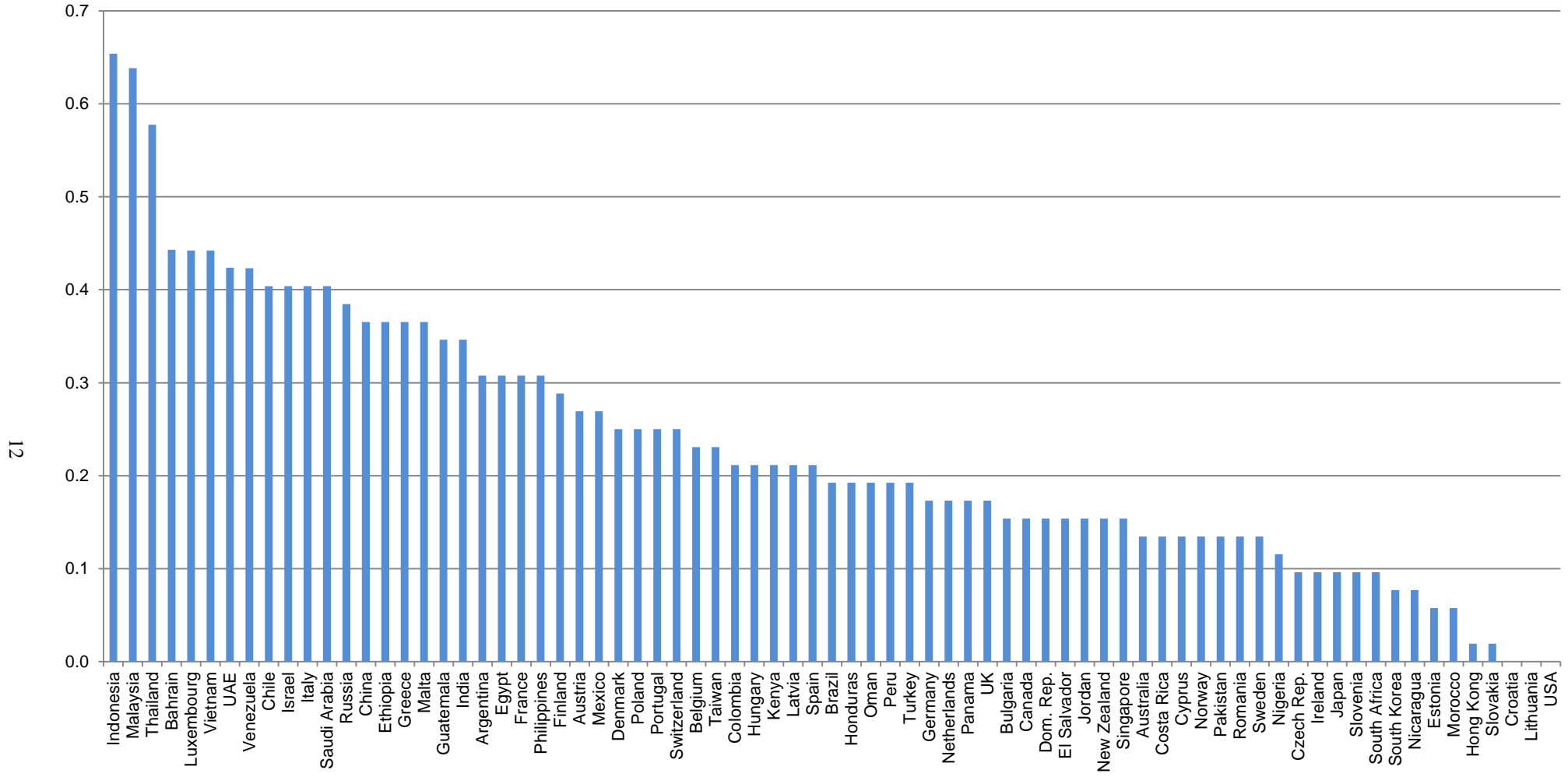**FIGURE 2** Retail restrictiveness index (unweighted)

**TABLE 4** Descriptive statistics for retail restrictiveness index (unweighted)

| Mean | Standard deviation | Min | Max | Zero-valued observations |
|------|--------------------|-----|-----|--------------------------|
| 0.23 | 0.14 | 0.00 | 0.65 | 3 |

Three countries—the United States, Lithuania, and Croatia—scored zero, meaning that they did not maintain restrictive policies or regulations in the categories included in our index. Among the fourteen least restrictive countries (those with a composite score of 0.10 or lower), there were no other countries from North America and only one from Western Europe (Ireland). In contrast, there were six from Eastern Europe (Lithuania and Croatia as well as Slovakia, Estonia, Slovenia, and the Czech Republic).[26]

Conversely, the three most restrictive countries were all in Southeast Asia: Indonesia, Malaysia and Thailand. Among the twelve most restrictive countries, four are in the Middle East (Bahrain, the United Arab Emirates, Israel, and Saudi Arabia). That region is home to several of the handful of countries worldwide that place explicit caps on foreign direct investment in retailing (the aforementioned countries—except Israel—as well as Jordan). Among the BRIC countries, all but one (Brazil) appeared among the twenty most restrictive in the index. The results for the weighted index were similar but not identical to the unweighted version (Appendix 1).

The sub-indices yield a more detailed picture of restrictiveness among the countries in the index (Appendix 2).[27] The most and least restrictive countries in the establishment sub-index are broadly similar to those in the overall index, although there are a few notable shifts: Oman, China, India, Ethiopia, and Malta all score substantially higher (more restrictively) on this sub-index than the overall index. All five countries limit foreign ownership and screen proposed investments, while India and Ethiopia restrict FDI in retail. For operations, Argentina, Colombia, Spain, Honduras, and Turkey have the largest gaps between their sub-index and overall scores. All except Honduras appear on one of USTR's lists of

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[26] The presence of so many Eastern European countries in the least restrictive group may surprise readers familiar with the region's reputation for burdensome regulation. Our research and other studies suggest that the reality is more nuanced. For example, the World Bank's most recent rankings of countries for ease of doing business includes five former communist East European countries in its top quartile (six if Georgia is also included) and only one in the bottom quartile (Ukraine). World Bank, Doing Business Project Web site, http://www.doingbusiness.org/rankings (accessed November 15, 2011).

[27] The analysis that follows focuses on the unweighted versions of the sub-indices. The weighted versions, which yield broadly similar but not identical results, are presented along with the unweighted ones in Appendix 2.

countries where intellectual property protection is a problem, and all except Spain control prices to some extent.

The countries that score highly on the foreign sub-index tend to cap foreign equity, restrict land ownership, and screen foreign investments in retailing. The countries with the most restrictive scores on this sub-index tend to be among the highest (most restrictive) scorers on the overall index, although a few countries, such as Kenya and Australia, appear more restrictive on the foreign sub-index than the overall index. Both Kenya an Australia screen foreign investments.

There are significant differences in countries' placements on the domestic sub-index and the foreign one. Countries such as Italy, Israel, Greece, and France are among the more restrictive countries on the former but notably less so on the latter. Western European countries tend to appear more restrictive on the domestic than the foreign sub-index, suggesting that the region regulates retail heavily but is not especially discriminatory toward foreign-invested firms.

The United States, Lithuania and Croatia score zero on all sub-indices; several other countries, such as Slovakia and Hong Kong, are also relatively unrestrictive across the sub-indices. Malaysia, Thailand, and Indonesia consistently score among the most restrictive countries.

## Empirical Analysis

We use gravity models to explore the extent to which our index and sub-indices affect retail sales of foreign affiliates. Focusing on sales of foreign affiliates enables us to identify the effects of NTMs on trade in retail services via mode 3 (commercial presence)—the dominant mode for trade in such services.[28]

Pioneered by Tinbergen (1962), gravity models express the volume of trade between two countries as a function of their respective incomes, the distance between them, and other factors that may

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[28] For an example of a study that regressed affiliate sales on a restrictiveness index for a different service industry, see USITC, *Property and Casualty Insurance Services,* March 2009.

promote or discourage trade.[29] Economists have produced a vast literature on gravity models since

Tinbergen's landmark study, and the great majority of these studies have applied the model to cross-

border trade. However, a number of authors in the last decade have used gravity models in the context of

foreign direct investment and affiliate sales, including Brainard (1997), Bergstrand and Egger (2007) and

Kleinert and Toubal (2010).[30]

In basic equation form, the gravity model can be written as

$$lnX_{ij} = \alpha_0 + \alpha_1 lnY_i + \alpha_2 lnY_j + \alpha_3 lnT_{ij} + \eta_{ij} \ (1)$$

where $X_{ij}$ is the volume of trade between countries $i$ and $j$, $Y_i$ and $Y_j$ are each country's economic output,

and $T_{ij}$ is a vector of observable variables that affect the cost to trade (e.g., distance, shared languages,

historical ties, and preferential trading arrangements).[31] $\eta_{ij}$ is an error term independent of the other

variables that accounts for variations of $X_{ij}$ from the values predicted by those variables, and $\alpha_0$, $\alpha_1$, $\alpha_2$,

and $\alpha_3$ are unknown parameters. Ordinary least squares (OLS) regression is a commonly-used estimation

approach.

Anderson and Van Wincoop (2003) argued convincingly that in order to be consistent, gravity

models must account not only for the costs to trade between countries $i$ and $j$, but the costs that each

partner faces vis-à-vis other trading partners—what Anderson and Van Wincoop call "multilateral

resistance."[32] To illustrate this concept, consider New Zealand and Australia: their likelihood of trading

with each other is high because they are close to each other *and* because they far away from most of their

other trading partners.

From a computational perspective, the easiest way to deal with multilateral resistance is to

introduce importer and exporter fixed effects into the regression. However, fixed effects do not allow the

researcher to simultaneously introduce country-specific, time-invariant variables, such as our

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[29] Tinbergen, "Shaping the World Economy," 1962.
[30] Brainard, "An Empirical Assessment of the Proximity—Concentration Trade-off," September 1997; Bergstrand and Egger, "A Knowledge-and-physical-capital Model of International Trade," 2007; Kleinert and Toubal, "Gravity for FDI," 2010.
[31] Adapted from Santos Silva and Tenreyro, "The Log of Gravity," 2006.
[32] Anderson and Van Wincoop, "Gravity with Gravitas," March 2003.

restrictiveness indices.[33] Baier and Bergstrand (2009)[34] demonstrate an alternative method for incorporating multilateral resistance into an OLS model, where

$$lnX_{ij} = \alpha_0 + \alpha_1 lnY_i + \alpha_2 lnY_j + \alpha_3 lnT_{ij} + MR_{ij} + \eta_{ij} \ (2)$$

and

$$MR_{ij} = \left(\sum_{k=1}^{N} \theta_k lnT_{ik}\right) + \left(\sum_{m=1}^{N} \theta_m lnT_{mj}\right) - \left(\sum_{k=1}^{N} \sum_{m=1}^{N} \theta_k \theta_m ln T_{km}\right) \ (3)$$

In words, the multilateral resistance term $MR_{ij}$ is the sum of trade costs between exporter $i$ and its trading partners $k$, weighted for each partner's share of global GDP ($\theta_k$); the sum of trade costs between importer $j$ and its trading partners $m$, weighted for each partner's share of global GDP ($\theta_m$), minus the weighted sum of the trade costs between all partners k and m. When estimated empirically, $MR_{ij}$ is calculated separately for each trade cost $T$.

Santos Silva and Tenreyro (2006) identify two problems with the traditional OLS estimation strategy: log-linearized OLS models produce biased results in the presence of heteroskedastic standard errors (which are likely), and they force zero-valued observations of the dependent variable to drop from the model, even though those observations may contain meaningful information. Their proposed solution is a model that uses count data for the dependent variable (e.g., the dollar value of trade between countries $i$ and $j$ instead of the natural logarithm of that value).[35] Santos Silva and Tenreyro recommend Poisson Pseudo Maximum Likelihood (PPML) estimation, but De Benedictis and Taglioni (2011) note that other count models may be more appropriate depending on the data's characteristics. In particular, they note that when data are overdispersed (i.e., variances are larger than the mean) and zeroes are very prevalent, a Zero-Inflated Negative Binomial (ZINB) model may be the best choice to ensure consistent estimation of the dependent variable and accurate standard errors.[36]

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[33] We have calculated a single score for each country for each of our indices, reflecting our knowledge of present policies. Ideally, indices such as ours would be constructed as series that vary over time, to reflect changes in policy from year to year. This would be a promising avenue for future research.

[34] Baier and Bergstrand, "*Bonus Vetus* OLS," February 2009.

[35] Santos Silva and Tenreyro, "The Log of Gravity," 2006.

[36] De Benedictis and Taglioni, "The Gravity Model in International Trade," 2011.

Our models are adapted from the general forms described above. The first, estimated using OLS, is

$$lnRAS_{ijt} = \beta_0 + \beta_1 lnGDP_{it} + \beta_2 lnGDP_{jt} + \beta_3 lnD_{ij} + \beta_4 MRD_{ijt} + \beta_5 BOR_{ij} + \beta_6 MRBOR_{ijt} +$$

$$\beta_7 lnRRI_j + \beta_8 LAN_{ij} + \varepsilon_{ij} \ (4)$$

where

- $lnRAS_{ij}$ is the natural logarithm of sales by foreign affiliates in the retailing industry controlled by firms from country $i$ (the "home country") in country $j$ (the "host country") during time period $t$.

- $lnGDP_{it}$ is the natural logarithm of the gross domestic product of home country $i$ in time period $t$. The expected sign of its coefficient is positive: countries with greater economic "weight" are expected to produce greater outward affiliate sales.

- $lnGDP_{jt}$ is the natural logarithm of the gross domestic product of host country $j$ during time period $t$. Its expected sign is positive: countries with greater economic "weight" are expected to generate greater inward affiliate sales.

- $lnD_{ij}$ is the natural logarithm of the distance between the capitals of home country $i$ and host country $j$. Its expected sign is negative: it is assumed that the cost of establishing an affiliate is greater the farther the host country is from the home country.

- $MRD_{ijt}$ is a multilateral resistance term for the distance between home country $i$ and host country $j$ in time period $t$. It is calculated as specified in equation (3) above, with distance $D$ replacing the generic trade cost $T$. Its expected sign is positive: the greater the resistance that $i$ and $j$ face vis-à-vis the rest of the world (in this case, how far they are from other trading partners), the more they can be expected to trade with each other.
- $BOR_{ij}$ is a dummy variable that takes a value of one if home country $i$ and host country $j$ share a border, and zero if they do not. [37] Its expected sign is positive: we assume that it is less costly for a firm to establish affiliates in a contiguous country than a non-contiguous one, due to factors such as transport links and cultural familiarity.

- $MRBOR_{ijt}$ is a multilateral resistance term for the presence of a border between home country $i$ and host country $j$ in time period $t$. It is calculated as specified in equation (4) above, with the dummy variable $BOR$ replacing the generic trade cost $T$.[38] Its expected sign is negative: the more countries with which $i$ and $j$ share borders—and the larger, economically speaking, those bordering countries are—the less $i$ and $j$ may be expected to trade with each other.

- $lnRRI_j$ is the natural logarithm of host country j's unweighted retail restrictiveness index score. Its expected sign is negative: the more restrictive a country is toward retail activity, the less it is expected to generate inward investment and affiliate sales.

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[37] We also assign a value of one to pairs where the countries are separated by a small body of water.
[38] One might wish to compare our results to a specification that includes MR terms for additional trade costs. See Powers, "Endogenous Liberalization and Sectoral Trade," June 2007, 8–9.

- $LAN_{ij}$ is a dummy variable that takes a value of one if home country $i$ and host country $j$ have a common official or dominant language and zero if they do not. Its expected sign is positive: a common language is assumed to facilitate investment, thereby favoring greater affiliate sales.

- $\beta_0$ is the coefficient for the constant term.

- $\varepsilon_{ij}$ is an error term.

Our second model is estimated using zero-inflated negative binomial regression, and is:

$$RAS_{ijt} = \beta_0 + \beta_1 lnGDP_{it} + \beta_2 lnGDP_{jt} + \beta_3 lnD_{ij} + \beta_4 MRD_{ijt} + \beta_5 BOR_{ij} + \beta_6 MRBOR_{ijt} +$$

$$\beta_7 lnRRI_j + \beta_8 LAN_{ij} + \varepsilon_{ij}\ (5)$$

where the independent variables are the same as in the OLS model, but the dependent variable is the value

of sales by foreign affiliates in the retailing industry controlled by firms from country $i$ in country $j$ during

time period $t$. Zero-valued observations of $RAS_{ijt}$ are predicted ("inflated") using the values of $lnGDP_{it}$.

In addition, we separately test the weighted version of the overall index and the unweighted and

weighted sub-indices described above. In each such instance, the index or sub-index replaces the

unweighted, overall index in equations (4) and (5).[39]

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[39] The subindices are entered into the regressions in count form rather than logarithms in order to preserve zero-valued observations. We use the logarithmic form for the overall index with no loss of observations because there are no zero-values for it in our dataset.

# Description of the Data

Data on the operations of foreign affiliates are scarce in general, and even more so when specific to one industry. We constructed a panel dataset of affiliate sales in the retailing industry using the Operations of Multinational Companies database[40] of the Bureau of Economic Analysis at the U.S. Department of Commerce, and the Structural Business Statistics database maintained by Eurostat.[41]

The data cover the period 2004 through 2008. The dataset is quite small (110 bilateral pairs) because we constrained the set to include the same universe of home and host countries for each year. This was necessary to ensure that changes in our multilateral resistance terms were due only to shifts in the GDP shares of each constituent country rather than shifts in the composition of the countries.[42] The home countries (where the parent firms generating outward affiliate sales are located) are Belgium, the Czech Republic, Finland, Germany, Greece, Slovakia, and the United States. The host countries (where the affiliates are located and sales occur) are Australia, Brazil, Canada, China, France, Germany, Hong Kong,[43] Japan, the Netherlands, Russia, Switzerland, and the United Kingdom.

Descriptive statistics for the dataset appear in Appendix 3.

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[40] Available at http://www.bea.gov/iTable/index_MNC.cfm.
[41] Available at http://epp.eurostat.ec.europa.eu/portal/page/portal/european_business/data/database.
[42] We thank William Powers of the USITC's Office of Economics for suggesting this approach.
[43] Treated as a separate country for the purpose of this analysis.

# Results

Table 5 summarizes our findings. Columns (1) and (2) report results using the unweighted retail restrictiveness index in OLS and ZINB regressions, respectively. The results are similar: all coefficients are statistically significant in both regressions,[44] although the coefficients for three variables (home country GDP and multilateral resistance for distance and border) have a stronger level of significance in the ZINB regression. A 1 percent increase in a country's unweighted, overall index score is associated with a decrease in retail affiliate sales of 1.5 to 1.6 percent.

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[44] The coefficient for the border variable does not take the expected sign in any of our regressions (although its significance varies). This puzzling finding may be due to the limitations of our sample. Most of the country-pairs for which we have data are non-contiguous, and a large share of our non-zero observations involve as the United States as the home country (and it borders only one of the host countries in our dataset). A dataset including a large, more diverse assortment of contiguous country-pairs might produce different results for the border variable.

**TABLE 5** Gravity models for unweighted retail restrictiveness indices

| Variable | Model / Label | OLS (1) | ZINB (2) | OLS (3) | ZINB (4) | ZINB (5) | ZINB (6) | ZINB (7) |
|---|---|---|---|---|---|---|---|---|
| dependent variable = ln(affiliate sales) | | * | | * | | | | |
| dependent variable = affiliate sales | | | * | | * | * | * | * |
| Host country GDP | $lnY_j$ | 0.61*** (0.18) | 0.65*** (0.13) | 0.41*** (0.14) | 0.46*** (0.11) | 0.86*** (0.18) | 0.75*** (0.16) | 0.96*** (0.10) |
| Home country GDP | $lnY_i$ | 0.99** (0.39) | 0.88*** (0.24) | 0.10 (0.14) | 0.09 (0.11) | -0.20 (0.18) | -0.06 (0.14) | 0.33** (0.17) |
| Distance | $lnD_{ij}$ | -2.81*** (0.33) | -2.86*** (0.35) | -1.84*** (0.19) | -1.89*** (0.17) | -2.41*** (0.55) | -2.72*** (0.50) | -2.94*** (0.23) |
| Common language | $LAN_{ij}$ | 1.24*** (0.30) | 1.22*** (0.24) | 1.86*** (0.19) | 1.72*** (0.14) | 1.14*** (0.34) | 1.07*** (0.31) | 1.38*** (0.21) |
| Shared border | $BOR_{ij}$ | -2.42*** (0.78) | -2.28*** (0.69) | -0.46 (0.47) | -0.22 (0.39) | -1.25 (0.94) | -1.58* (0.87) | -3.16*** (0.58) |
| Multilateral resistance—distance | $MRD_{ij}$ | 1.08** (0.53) | 1.31*** (0.36) | 1.78*** (0.31) | 1.87*** (0.26) | 2.41*** (0.37) | 2.34*** (0.36) | 1.56*** (0.31) |
| Multilateral resistance—border | $MRBOR_{ij}$ | -6.80** (2.55) | -7.88*** (2.24) | -4.78** (2.13) | -5.82*** (1.66) | -6.21** (2.48) | -7.55*** (2.54) | -4.88** (2.09) |
| Retail restrictiveness index (RRI)—host country | $lnRRI_j$ | -1.62*** (0.43) | -1.46*** (0.29) | | | | | |
| RRI—foreign | $FOR_j$ | | | -10.09*** (1.10) | -9.91*** (0.91) | | | |
| RRI—domestic | $DOM_j$ | | | | | -0.70 (0.58) | | |
| RRI—operations | $OPR_j$ | | | | | | -3.54*** (0.97) | |
| RRI—establishment | $EST_j$ | | | | | | | -8.99*** (1.42) |
| Constant | | -23.78*** (5.97) | -22.25*** (4.47) | -1.06 (2.18) | -2.45 (1.69) | -3.75 (4.04) | -1.24 (3.94) | -10.64*** (1.73) |
| Number of observations | | 55 | 110 | 55 | 110 | | 110 | 110 |
| Adjusted $r^2$ (OLS only) | | 0.89 | | 0.94 | | | | |

*Notes:* Robust standard errors are in parentheses. ***, **, * = significantly different from 0 at the 1, 5, and 10 percent levels, respectively. Variables expressed in logs include an *ln* prefix in their label. All models include time (year) dummy variables.

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Table 6 illustrates the potential magnitude of this effect. The table lists inward foreign affiliate revenues in the retailing industry for seven European countries in 2008,[45] as well as each country's unweighted, overall index score; the percentage change needed to reach the mean index score for the 75 countries in our study (0.23); and the potential effect on affiliate sales of liberalizing to the mean, calculated using the coefficient for the index in column (2) of table 5. For these 7 countries together, the sales of retail foreign affiliates are predicted to increase by nearly $75 billion.[46]

**TABLE 6** Potential effect of liberalization to mean level of restrictiveness

| Country | Revenues of retail foreign affiliates, 2008 ($ millions) | Index score | Percentage reduction required to reach mean restrictiveness (0.23) | Predicted increase in affiliate sales ($ millions) |
|---|---|---|---|---|
| Denmark | 9,904 | 0.25 | 7.5 | 1,080 |
| France | 68,391 | 0.31 | 24.8 | 24,821 |
| Italy | 58,152 | 0.40 | 42.7 | 36,336 |
| Austria | 26,727 | 0.27 | 14.1 | 5,500 |
| Poland | 37,074 | 0.25 | 7.5 | 4,043 |
| Portugal | 9,208 | 0.25 | 7.5 | 1,004 |
| Finland | 6,486 | 0.29 | 19.8 | 1,878 |
| **TOTAL** | 215,942 | | | 74,662 |

*Sources:* Eurostat, Structural Business Statistics Database (accessed November 17, 2011); authors' calculations. Euros converted to dollars at a rate of $1 = €1.4715 (Oanda Historical Exchange Rates converter, http://www.oanda.com/currency/historical-rates/).

Columns (3) and (4) of table 5 report the results for the foreign sub-index. Again, the results are similar but not identical for both models—a pattern that holds true for the other sub-indices (we present only the ZINB results for the other indices for space considerations). All of the sub-indices took the expected (negative) sign, and all except one, the domestic sub-index, were significant at the 1 percent level. The largest effects are associated with the foreign and establishment sub-indices.

As a robustness check, we ran the same regressions using the weighted versions of the index and sub-indices (table 7). Their signs and significance levels remain unchanged, with the exception of the

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[45] Eurostat, Structural Business Statistics Database (accessed November 17, 2011). The countries selected were those for which data were available and that had index scores higher than the mean. The database provides statistics on revenues rather than sales; we treat the two concepts as analogous.

[46] The coefficient for our restrictiveness index captures an average effect for our sample, but the effect of liberalization might vary from country to country. One factor that might influence the magnitude of the effect is the size of the retail market prior to liberalization; it seems likely that the effect of liberalization in percentage terms would be larger in smaller markets (at least in the short run), as the entrance of just a few foreign retailers would have a comparatively large effect on the overall volume of sales by foreign affiliates. Also, cross-elasticities between foreign affiliate retail sales and other elements of consumer spending (e.g., sales by domestically-owned retailers and sales of other consumer services) might vary depending on country-specific factors.

domestic sub-index, whose coefficient becomes positive (but remains insignificant). However, the

coefficients shift to varying extents. [47] One should take care not overstate their precision when estimating

the magnitude of the potential effects of liberalization.

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[47] We also experimented with weights generated via factor analysis. Like the subjective weights, these weights did lead to some shifts in the coefficients, as well as changes to levels of significance in a few instances (chiefly for variables other than the restrictiveness indices). However, our broader conclusions were unaffected, as, the results for the restrictiveness index and sub-indices were very similar to those reported above (however, the coefficient for one sub-index—operations— did lose significance).

**TABLE 7** Gravity models for weighted retail restrictiveness indices

| Variable | Model | OLS | ZINB | OLS | ZINB | ZINB | ZINB | ZINB |
|---|---|---|---|---|---|---|---|---|
| | Label | (1) | (2) | (3) | (4) | (5) | (6) | (7) |
| dependent variable = ln(affiliate sales) | | * | | * | | | | |
| dependent variable = affiliate sales | | | * | | * | * | * | * |
| Host country GDP | $lnY_j$ | 0.64*** | 0.67*** | 0.62*** | 0.67*** | 0.86*** | 0.75*** | 0.89*** |
| | | (0.12) | (0.10) | (0.13) | (0.10) | (0.17) | (0.16) | (0.09) |
| Home country GDP | $lnY_i$ | 1.46*** | 1.44*** | -0.21 | -0.20* | -0.32 | -0.06 | 0.05 |
| | | (0.26) | (0.23) | (0.13) | (0.10) | (0.24) | (0.14) | (0.12) |
| Distance | $lnD_{ij}$ | -2.63*** | -2.66*** | -2.24*** | -2.26*** | -2.11*** | -2.72*** | -2.76*** |
| | | (0.17) | (0.15) | (0.18) | (0.16) | (0.48) | (0.50) | (0.18) |
| Common language | $LAN_{ij}$ | 1.72*** | 1.58*** | 1.84*** | 1.67*** | 1.22*** | 1.07*** | 1.59*** |
| | | (0.20) | (0.16) | (0.20) | (0.16) | (0.32) | (0.31) | (0.19) |
| Shared border | $BOR_{ij}$ | -3.12*** | -2.81*** | -1.96*** | -1.61*** | -0.63 | -1.58* | -3.04*** |
| | | (0.51) | (0.44) | (0.52) | (0.42) | (0.92) | (0.87) | (0.49) |
| Multilateral resistance—distance | $MRD_{ij}$ | 0.44 | 0.54 | 2.26*** | 2.33*** | 2.53*** | 2.34*** | 1.94*** |
| | | (0.42) | (0.37) | (0.30) | (0.26) | (0.42) | (0.36) | (0.29) |
| Multilateral resistance—border | $MRBOR_{ij}$ | -3.05 | -4.34** | 0.03 | -1.29 | -5.40** | -7.55*** | -1.67 |
| | | (1.98) | (1.72) | (2.46) | (1.99) | (2.52) | (2.54) | (2.12) |
| Retail restrictiveness index (RRI)—host country | $lnRRI_j$ | -2.03*** | -2.00*** | | | | | |
| | | (0.22) | (0.20) | | | | | |
| RRI—foreign | $FOR_j$ | | | -6.20*** | -6.14*** | | | |
| | | | | (0.69) | (0.59) | | | |
| RRI—domestic | $DOM_j$ | | | | | 0.39 | | |
| | | | | | | (0.93) | | |
| RRI—operations | $OPR_j$ | | | | | | -3.54*** | |
| | | | | | | | (0.97) | |
| RRI—establishment | $EST_j$ | | | | | | | -7.52*** |
| | | | | | | | | (0.81) |
| Constant | | -37.12*** | -37.75*** | 2.23 | 0.36 | -4.06 | -1.24 | -5.07*** |
| | | (4.27) | (3.94) | (2.61) | (2.00) | (3.78) | (3.94) | (1.75) |
| Number of observations | | 55 | 110 | 55 | 110 | 110 | 110 | 110 |
| Adjusted $r^2$ (OLS only) | | 0.95 | | 0.93 | | | | |

*Notes:* Robust standard errors are in parentheses. \*\*\*, \*\*, \* = significantly different from 0 at the 1, 5, and 10 percent levels, respectively. Variables expressed in logs include an *ln* prefix in their label. All models include time (year) dummy variables. Boldface indicates a change in level of significance from the models using unweighted indices.

# Conclusion

In this paper, we have presented a new tool with which to measure the restrictiveness of countries' policies toward the retailing industry. Our retail restrictiveness index and sub-indices show that countries vary greatly in the extent to which they regulate market entry and ongoing operations in the retailing industry, among domestic as well as foreign-invested firms. Southeast Asia is home to a number of the most restrictive countries, notably Indonesia, Malaysia, and Thailand. Relatively few countries from North America and Europe appear among the most restrictive countries, although European countries appear more restrictive on our domestic sub-index. The United States, Lithuania, and Croatia are the most open countries, and several others (e.g., Slovakia and Hong Kong) maintain few restrictions on the industry.

Our econometric analysis suggests that the measures captured in our restrictiveness index have a statistically significant effect on sales by affiliates of multinational retailers. Discriminatory NTMs and restrictions on market entry (categories with significant overlap) have particularly strong effects.

# Suggestions for Future Research

Natural extensions of the present exercise would include examining the effects of restrictiveness on other outcomes, such as industry profit margins, overall retail sales (as opposed to sales of foreign affiliates only), foreign direct investment, productivity, and overall economic welfare. Computable general equilibrium modeling as well as further use of econometrics could prove useful for exploring these topics. In addition, our dataset could be enriched by updating it periodically and creating a time series that enables analysis as countries' policies evolve.

# Appendix 1: Weighted retail restrictiveness index

The table below describes the weights used in the weighted version of the retail restrictiveness index.

**TABLE A.1.1** Weighting scheme for the weighted retail restrictiveness index

| Weight | NTM Categories | Summary Descriptors of Measures | Score |
|---|---|---|---|
| **0.10** | | Acquisition of commercial land prohibited | 1 |
| | Commercial land restrictions | Acquisitions restricted to a certain size (and/or duration for leases) | 0.5 |
| | | No restrictions on acquisition of commercial land | 0 |
| **0.05** | Employment requirements | Number or share of foreign employees is limited | 1 |
| | | Number or share of foreign employees is not limited | 0 |
| **0.20** | | Foreign ownership is limited | 1*(1-max. foreign equity) |
| | Foreign ownership | No limits on foreign ownership | 0 |
| **0.05** | | On USTR's Special 301 Priority Watch List | 1 |
| | Intellectual property rights | On USTR's Special 301 Watch List | 0.5 |
| | | Not on USTR's Special 301 watch lists | 0 |
| **0.15** | Investment screening | Screening and prior approval required | 1 |
| | | No screening | 0 |
| **0.10** | Large store regulations | Large-scale stores are regulated | 1 |
| | | No large-scale store regulations | 0 |
| **0.05** | | No long-term stays of executives and senior managers | 1 |
| | | Limit for stays of executives and senior managers is 1 year or less | 0.75 |
| | Long-term stays | Limit for stays of executives and senior managers is >1 and <= 3 years | 0.5 |
| | | Limit for stays of executives and senior managers is >3 and <= 5 years | 0.25 |
| | | Limit for stays of executives and senior managers is >5 years (or unlimited) | 0 |
| **0.05** | | Majority or all directors and/or managers must be nationals or residents | 1 |
| | Management requirements | At least 1 director and/or manager must be a national or resident | 0.5 |
| | | No nationality or residency requirements for directors and/or managers | 0 |
| **0.05** | Operating hours restrictions | Store operating hours are regulated | 1 |
| | | No regulation of operating hours | 0 |
| **0.05** | Performance requirements | Investors must meet performance requirements | 1 |
| | | No performance requirements | 0 |
| **0.05** | Price controls | Price controls for some foods | 1 |
| | | No price controls for foods | 0 |
| **0.05** | Promotional restrictions | Promotional techniques are restricted | 1 |
| | | Promotional techniques are not restricted | 0 |
| **0.05** | | No temporary visits of executives and senior managers | 1 |
| | | Visits of executives and senior managers for up to 30 days | 0.75 |
| | Temporary visits | Visits of executives and senior managers for 31-60 days | 0.5 |
| | | Visits of executives and senior managers for 61-90 days | 0.25 |
| | | Visits of executives and senior managers for more than 90 days | 0 |

Table A.1.2 provides summary data about the weighted index.

**TABLE A.1.2** Descriptive statistics for retail restrictiveness index (weighted)

| Mean | Standard deviation | Min | Max | Zero-valued observations |
|------|--------------------|-----|-----|--------------------------|
| 0.22 | 0.15 | 0.00 | 0.61 | 3 |

The ordering of countries in the weighted index is similar but not identical to that in the unweighted version (figure A.2.1). Countries that appear more restrictive in the weighted index include Oman, due to its large store regulations, land ownership restrictions, and screening procedures; Australia, due to its screening procedures; and Panama, due its ban on foreign investment in retailing. Among the BRICs, Russia, India, and China remain among the most restrictive twenty countries while Brazil remains outside this group. Ethiopia and India move close to the most restrictive end of the list due to their heavy restrictions on foreign equity.

**FIGURE A.1.1** Retail restrictiveness index (weighted)
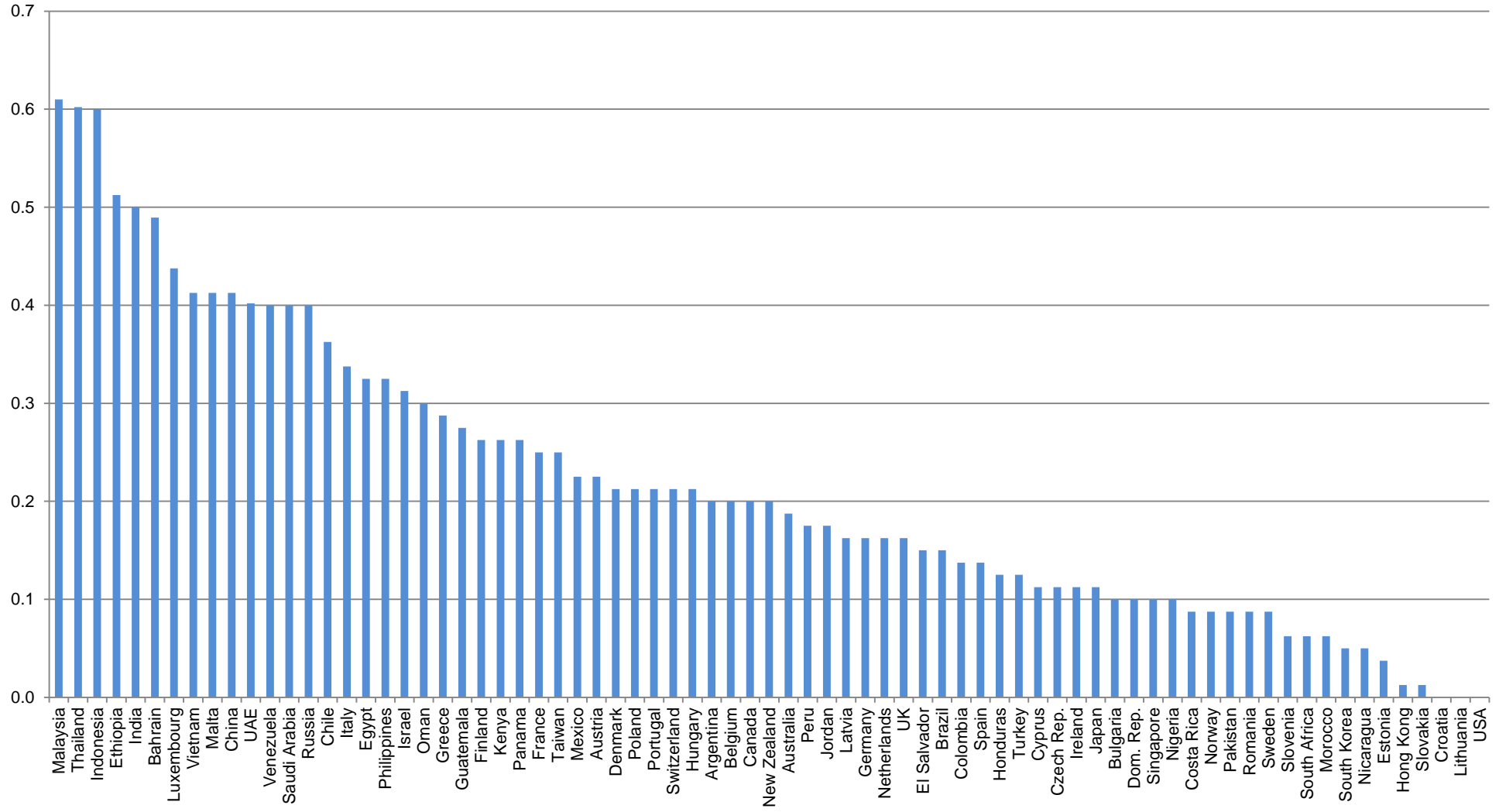
# Appendix 2: Retail restrictiveness sub-indices

To score each unweighted sub-index, we sum a country's scores for the components included in that sub-index, then divide by the number of components. For the weighted versions, we multiply each component by the weight assigned to it in Table A.2.1, then multiply by a constant that places the sub-index on a 0-1 scale.

To illustrate, we use show how we calculate Indonesia's scores for the establishment sub-index. The components included in that sub-index are commercial land restrictions, foreign ownership, investment screening, and large store regulations. Indonesia's score for those components are as follows:

- Commercial land restrictions: 0.5

- Foreign ownership: 0

- Investment screening: 1

- Large store regulations: 1

Indonesia's score on the unweighted establishment sub-index is thus:

$$0.5 + 0 + 1 + 1 = 2.5$$

$$\frac{2.5}{4} = \mathbf{0.625}$$

For the weighted establishment sub-index, we first multiply the component scores by their weights from Table A.2.1:

$$0.5(0.1) + 0(0.2) + 1(0.15) + 1(0.1) = 0.30$$

We then need to multiply by a constant that places the score on a 0-1 scale. The constant is calculated as follows. For the establishment sub-index, the maximum score on the weighted sub-index (before multiplying by the constant) is:

$$1(0.1) + 1(0.2) + 1(0.15) + 1(0.1) = 0.55$$

To determine the appropriate constant, we use algebra:

$$0.55x = 1$$

$$x = \left(\frac{1}{0.55}\right)$$

Finally, we multiply Indonesia's base score on the sub-index by the constant:

$$0.30 * \left(\frac{1}{0.55}\right) = \mathbf{0.545}$$

Table A.2.1 provides summary statistics about the sub-indices. The sub-indices appear after the

table in alphabetical order by name of the sub-index.[48]

**TABLE A.2.1** Descriptive statistics for sub-indices

| Sub-index | Mean | Standard deviation | Min | Max | Zero-valued observations |
|---|---|---|---|---|---|
| *Unweighted* | | | | | |
| Establishment | 0.23 | 0.20 | 0.00 | 0.63 | 23 |
| Operations | 0.23 | 0.15 | 0.00 | 0.67 | 4 |
| Foreign | 0.14 | 0.13 | 0.00 | 0.50 | 12 |
| Domestic | 0.34 | 0.23 | 0.00 | 0.92 | 10 |
| *Weighted* | | | | | |
| Establishment | 0.21 | 0.20 | 0.00 | 0.73 | 23 |
| Foreign | 0.15 | 0.17 | 0.00 | 0.63 | 12 |
| Domestic | 0.35 | 0.24 | 0.00 | 0.93 | 10 |

*Source:* USITC staff calculations.

*Note*: There are 75 observations for each sub-index.

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[48]The weighted and unweighted operations sub-indices have identical values, so a single graph is presented for operations).
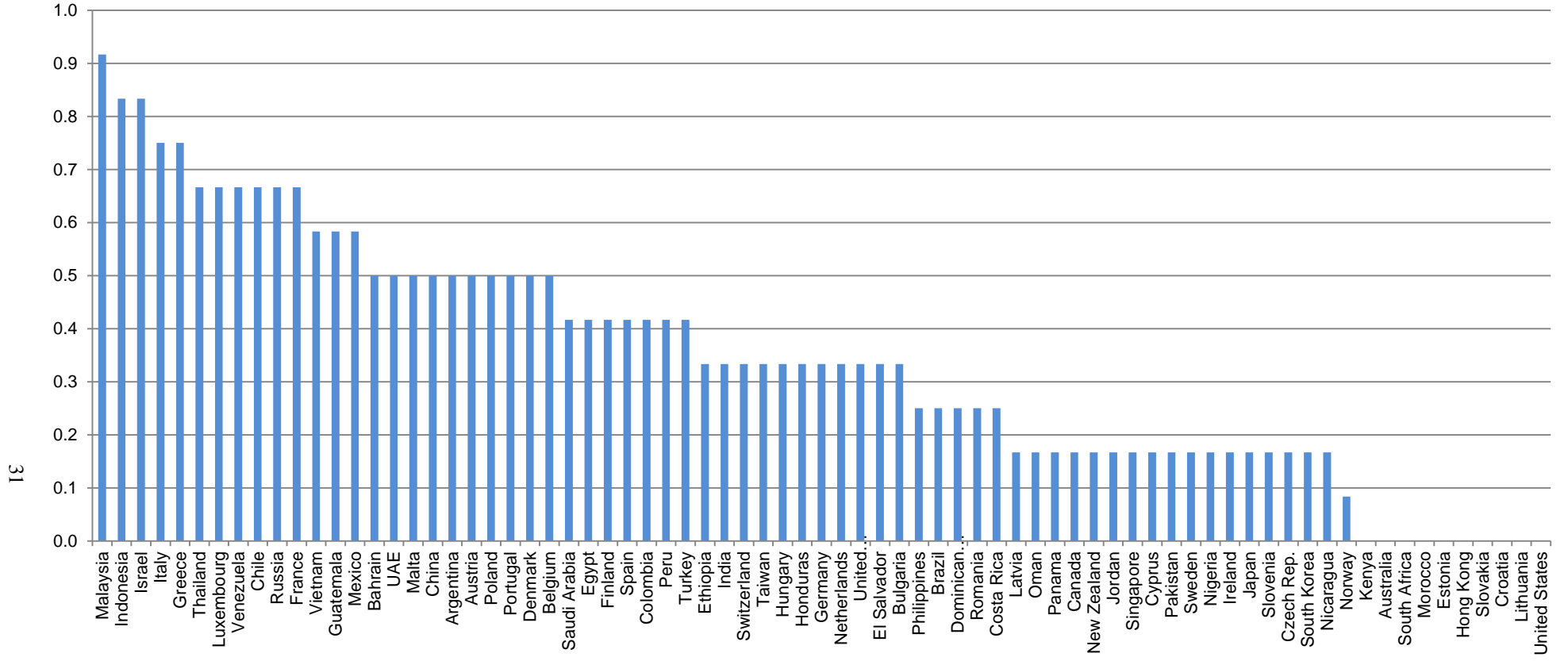
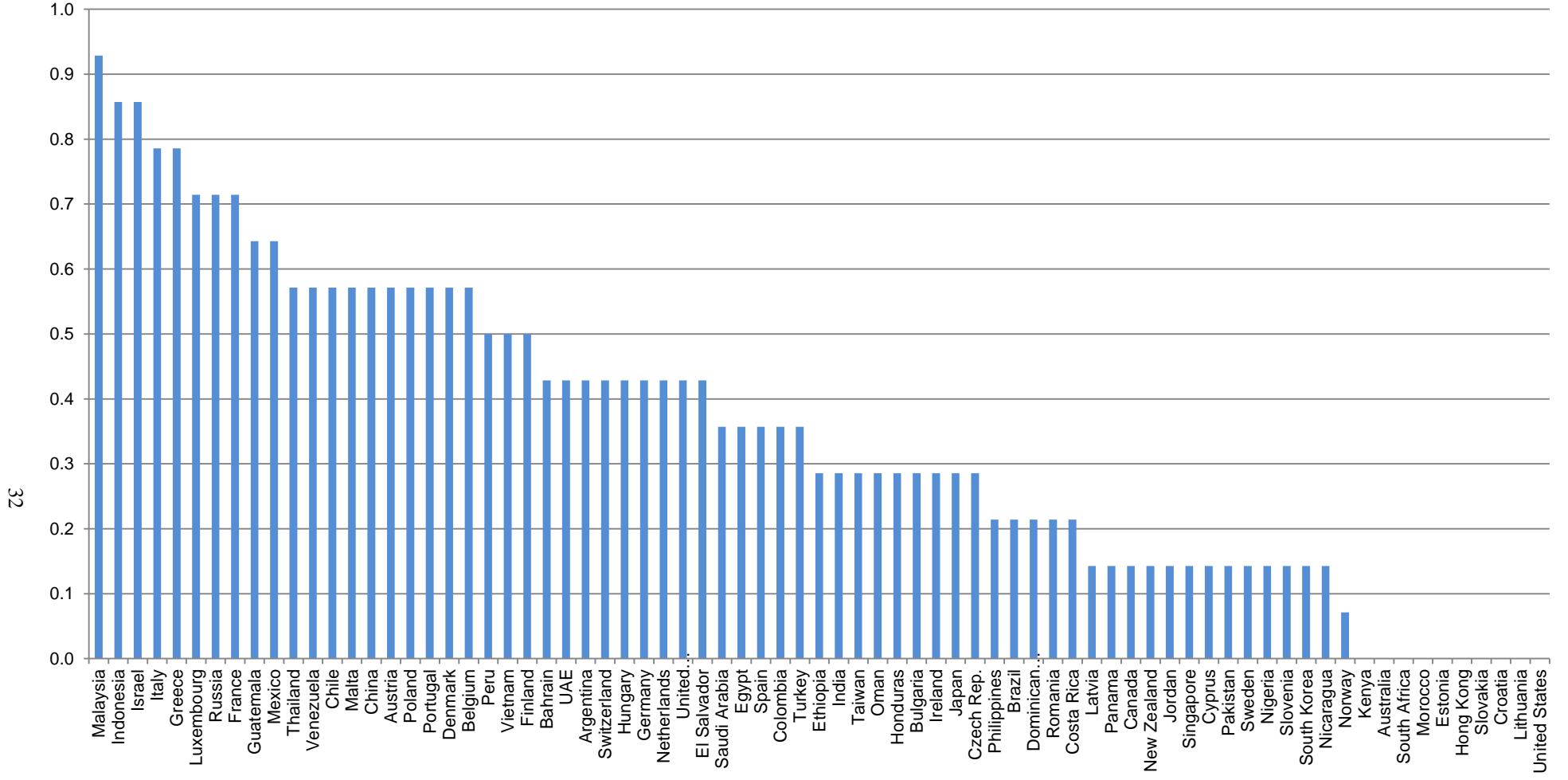**FIGURE A.2.1** Domestic (unweighted)

**FIGURE A.2.2** Domestic (weighted)
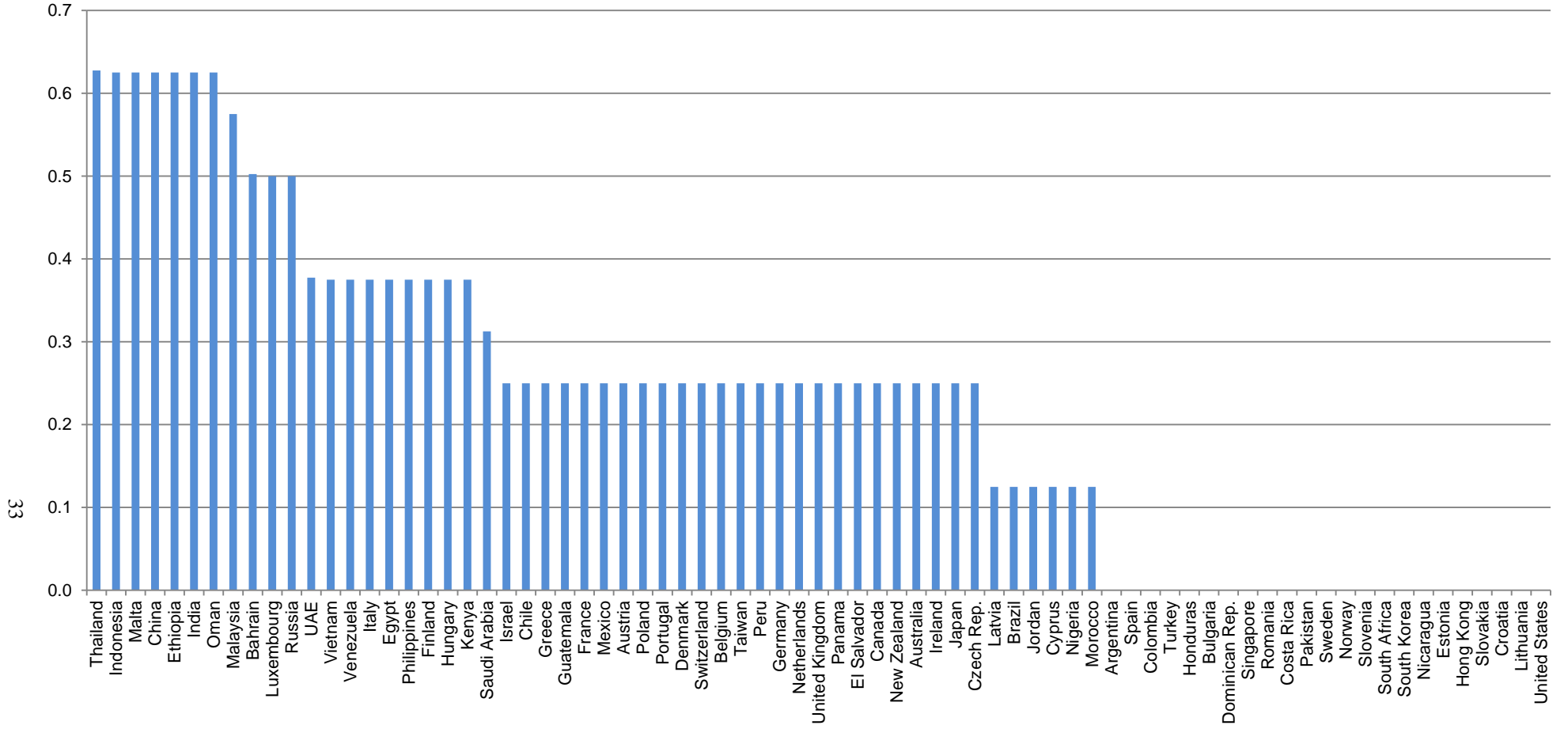
**FIGURE A.2.3** Establishment (unweighted)
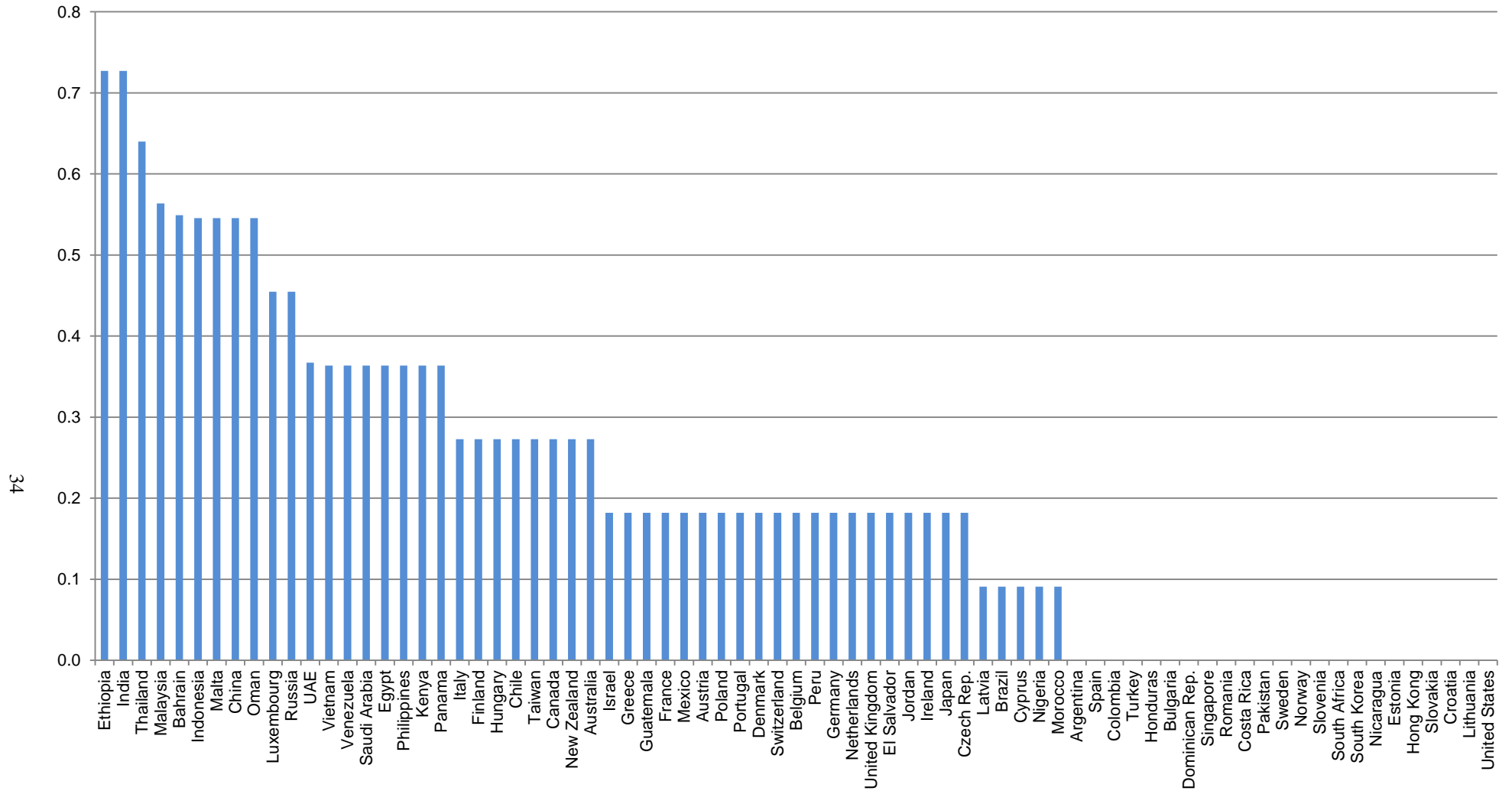
**FIGURE A.2.4** Establishment (weighted)

34

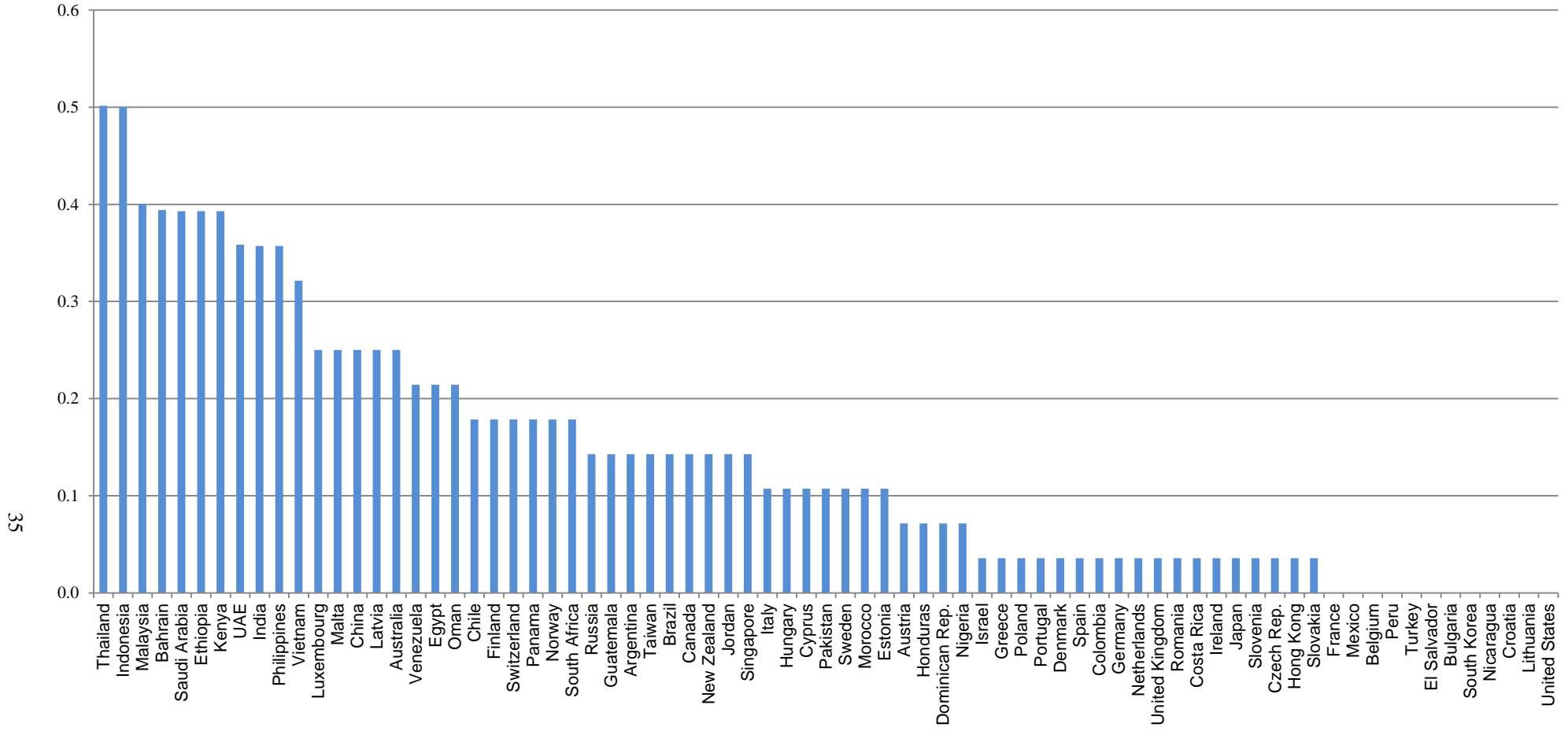**FIGURE A.2.5** Foreign (unweighted)
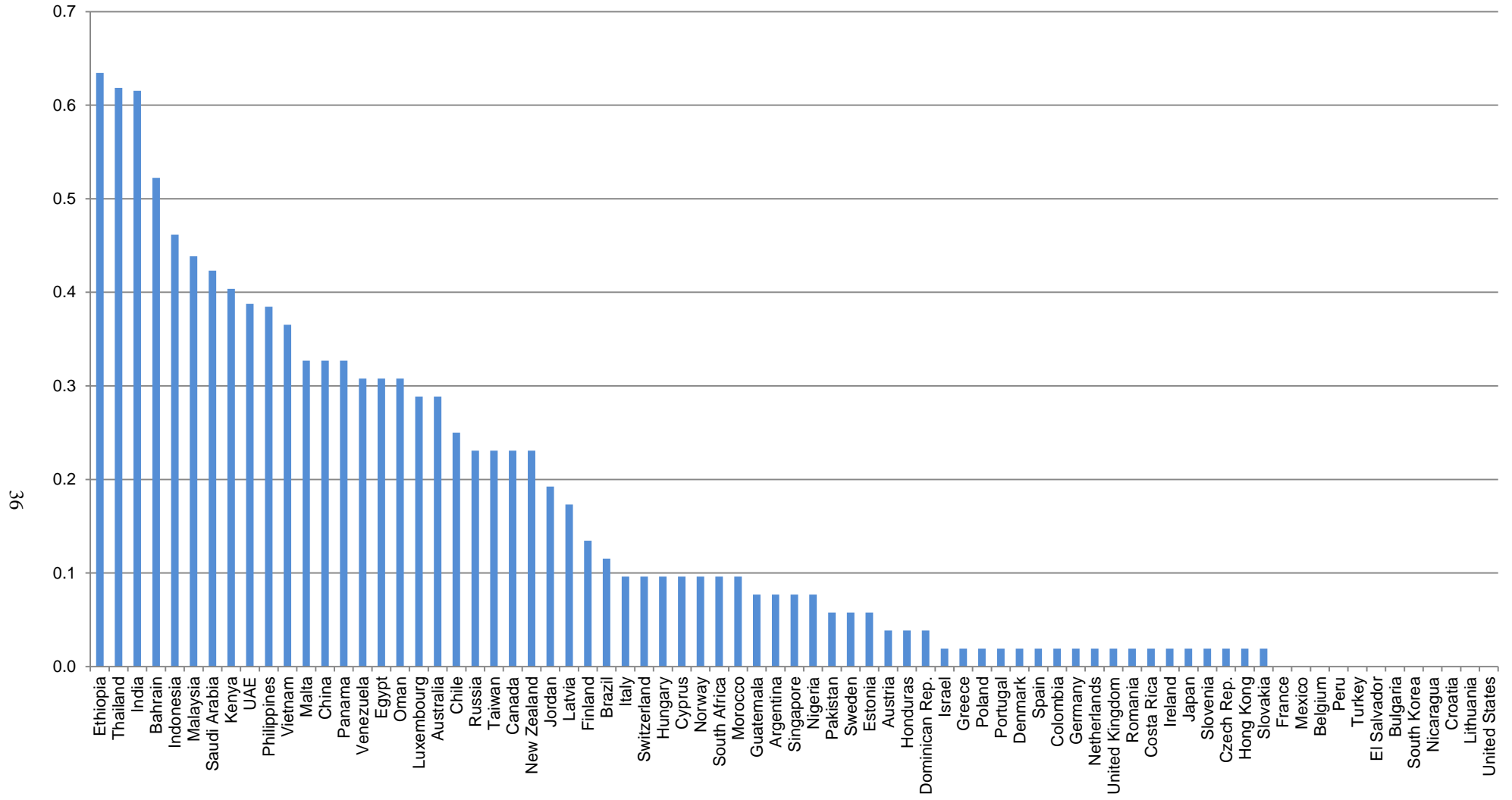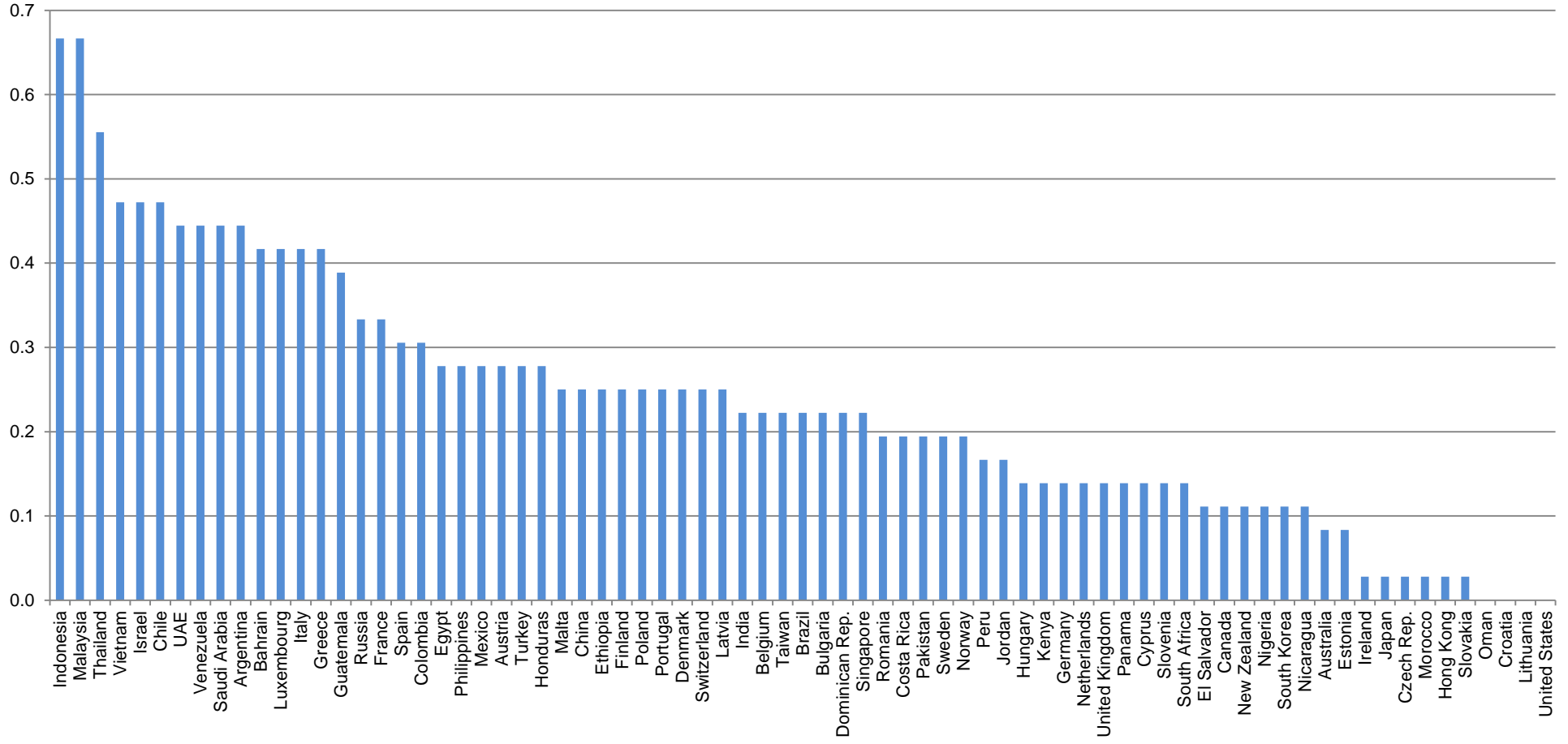
**FIGURE A.2.6** Foreign (weighted)

**FIGURE A.2.7** Operations (unweighted/weighted)

# Appendix 3: Descriptive statistics for gravity model dataset

**TABLE A.3.1** Descriptive statistics for selected variables

| Variable | Mean | Standard deviation | Min | Max |
|---|---|---|---|---|
| Affiliate sales (millions) | 5,182.5 | 13,390.0 | 0 | 60,732.0 |
| Host country GDP (billions) | 1,630.9 | 1,459.8 | 165.9 | 4,879.9 |
| Home country GDP (billions) | 4,728.1 | 5,890.3 | 56.0 | 14,296.9 |
| Distance (kilometers) | 6,058.2 | 3,855.6 | 623.4 | 15,962.0 |
| Unweighted index | 0.19 | 0.12 | 0.02 | 0.38 |
| Weighted index | 0.20 | 0.12 | 0.01 | 0.41 |

*Source:* USITC staff calculations.

*Note*: There are 110 observations in the dataset for all variables.

**FIGURE A.3.1** Affiliate sales, frequency by value (in millions US dollars)
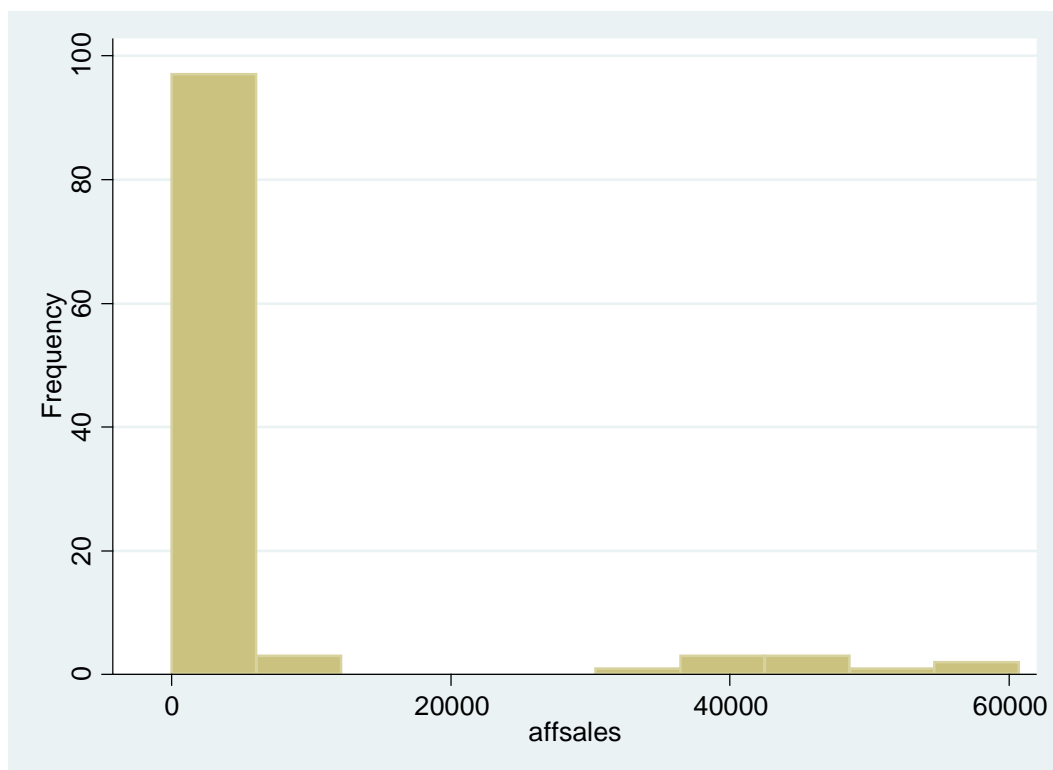
**TABLE A.3.2** Host and home countries in the dataset

| Host countries | | Home countries | |
|---|---|---|---|
| Country | Frequency | Country | Frequency |
| Australia | 5 | Belgium | 5 |
| Brazil | 2 | Czech Republic | 15 |
| Canada | 20 | Finland | 5 |
| China | 5 | Germany | 15 |
| France | 4 | Greece | 25 |
| Germany | 5 | Slovakia | 10 |
| Hong Kong | 15 | United States | <u>35</u> |
| Japan | 15 | Total | 110 |
| Netherlands | 4 | | |
| Russia | 15 | | |
| Switzerland | 15 | | |
| United Kingdom | <u>5</u> | | |
| Total | 110 | | |

*Source:* authors.

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