TCER Working Paper Series

Price and Quality Changes in Outsiders of Regional Trade Agreements

Toshiyuki Matsuura
Kazunobu Hayakawa
Nuttawut LAKSANAPANYAKUL
Yuta Watabe

October 2014

Working Paper E-84
http://tcer.or.jp/wp/pdf/e84.pdf

TOKYO CENTER FOR ECONOMIC RESEARCH
1-7-10-703 Iidabashi, Chiyoda-ku, Tokyo 102-0072, Japan

Abstract

Countries excluded from a regional trade agreement face disadvantages in tariffs when exporting to member countries. In this context, previous studies found that such excluded countries, i.e., outsiders, lower their export prices. In contrast, this study aims to examine not only prices but also the quality of outsiders' exports. Specifically, we first estimate the quality of products exported from each country to Thailand under certain tariff schemes. In addition to our estimates on cross-price elasticity, we use this measure to compute the potential magnitude of trade diversion for outsiders. Then, we investigate the relationship between this trade diversion and changes in the quality of exports from outsiders. Consequently, we found that only outsiders exporting higher quality products exhibited a greater improvement in quality to decrease the negative effect of tariff disadvantages.

Toshiyuki Matsuura
Keio University
Keio Economic Observatory
2-15-45, Mita, Minato-ku, Tokyo, Japan
matsuura@sanken.keio.ac.jp

Kazunobu Hayakawa
Institute of Developing Economies
Bangkok Research Center
Building, 161 Rajadamri Road, Pathumwan,
Bangkok 10330, Thailand
kazunobu_hayakawa@ide-jetro.org

Nuttawut LAKSANAPANYAKUL
Thailand Development Research Institute
Science and Technology Development Program
565 Ramkhamhaeng 39, Ramkhamhaeng Road,
Wangthonlang, BKK, Thailand 10310
nuttawut@tdri.or.th

Yuta Watabe
Keio University
Graduate School of Economics
2-15-45, Mita, Minato-ku, Tokyo, 108-8345,
Japan
yutawatabe@gmail.com

Price and Quality Changes in Outsiders of Regional Trade Agreements

Kazunobu HAYAKAWA[§]
Bangkok Research Center, Institute of Developing Economies, Thailand

Nuttawut LAKSANAPANYAKUL
Science and Technology Development Program, Thailand Development Research Institute, Thailand

Toshiyuki MATSUURA[#]
Institute for Economic and Industrial Studies, Keio University, Japan

Yuta WATABE
Graduate School of Economics, Keio University, Japan

Abstract: Countries excluded from a regional trade agreement face disadvantages in tariffs when exporting to member countries. In this context, previous studies found that such excluded countries, i.e., outsiders, lower their export prices. In contrast, this study aims to examine not only prices but also the quality of outsiders' exports. Specifically, we first estimate the quality of products exported from each country to Thailand under certain tariff schemes. In addition to our estimates on cross-price elasticity, we use this measure to compute the potential magnitude of trade diversion for outsiders. Then, we investigate the relationship between this trade diversion and changes in the quality of exports from outsiders. Consequently, we found that only outsiders exporting higher quality products exhibited a greater improvement in quality to decrease the negative effect of tariff disadvantages.

Keywords: RTA; Trade diversion; Quality

JEL Classification: F15; F53

[§] This research was funded by the TIFO-TCER fellowship program. We would like to thank the Tokyo Center for Economic Research for providing us the opportunity to conduct this study.
[#] Corresponding author: Toshiyuki Matsuura; Address: Keio Economic Observatory, Keio University, 2-15-45, Mita, Minato-ku, Tokyo, 108-8345, Japan; e-mail: matsuura@sanken.keio.ac.jp

1. Introduction

The disadvantages in tariff rates to outsiders of regional trade agreements (RTAs) change their exporting behavior to insiders. While outsiders use most favored nation (MFN) rates, insiders are allowed to use not only MFN rates but also RTA preferential rates, which are lower than the MFN rates. Consequently, insiders may stop importing from outsiders and begin importing from other insiders instead. This switch is called "trade diversion" (Viner, 1950). Even if imports from outsiders survive, outsiders are expected to reduce their export prices to decrease the effect of tariff disadvantages on profits, i.e., the effect of a reduction in the market prices of insiders' products through the use of RTA rates.

Several studies examined such changes in outsiders' exports to insiders. Studies on trade diversion are divided into two types. One type is ex-ante studies, including Kreinin and Plummer (1992), Wylie (1995), Karemera and Ojah (1998), and Clausing (2001), which quantify trade diversion using the price elasticity of demand obtained by estimating a demand function. Although estimates on trade diversion in these studies are severely affected by the estimated elasticity, all these studies present some amount of absolute values on trade diversion. The other type is ex-post studies, which primarily estimate the gravity equation that includes various RTA dummy variables. Recent examples include Soloaga and Winters (2001), Magee (2008), Carrere (2006), Dai et al. (2014), and Yang and Martinez-Zarzoso (2014), which found little evidence of trade diversion. In contrast, Winters and Chang (2000) and Chang and Winters (2002) found that outsiders significantly lower their export (unit) prices to insiders.

This study aims to examine both the prices and the quality of outsiders' exports. Recently, the literature on the trade quality nexus has been growing. In particular, recent empirical studies, such as Khandelwal (2010) and Amiti and Khandelwal (2013), used the discrete choice framework to estimate a product's quality from import prices and market share information—a common practice in the new empirical industrial organization literature. For the differentiated goods market, outsiders may change both the prices and the quality of products when insiders reduce their prices. Thus, paying attention to the quality of exports in the effect of RTAs on outsiders is natural. For example, outsiders may be able to avoid suffering from the negative effects of being excluded from RTAs when their products are of a higher quality. Therefore, at least three types of effects exist on outsiders' exporting. First, outsiders may improve their product quality (upgrading). Second, rather than upgrading the quality, outsiders may change their exports from low to high quality products (product change). Third, only outsiders with high quality product may be able to survive in markets that export to RTA

insiders (sorting).

More specifically, we examine how the potential magnitude of trade diversion affects the quality of outsiders' exports. To compute export product quality, we follow the abovementioned method employed in Khandelwal (2010) and Amiti and Khandelwal (2013). We apply this method to import data as per tariff schemes (e.g., RTA or MFN scheme) in Thailand.[1] This study is the first to compute export product quality using such trade data. As simply demonstrated in Demidova and Krishna (2008), exporters using RTA and MFN schemes are qualitatively different such as in terms of productivity. Because export product quality (measured in export prices) is higher in more productive firms, as found in Gorg et al. (2010), differentiating imports as per tariff schemes is important. We use such a quality measure to investigate whether the fear of trade diversion improves the average quality of outsiders' exports. In particular, we employ import data from a short period, i.e., 2007–2011. Thus, if upgrading product quality takes time, the changes in quality observed in this study might be primarily the result of a product change and/or sorting.

Our estimation of the demand function provides us both the product quality and the potential magnitude of trade diversion. This function enables us to easily compute the cross-price elasticity of demand. Unlike the abovementioned ex-ante studies on trade diversion, this computation is possible under taking other products' prices into account. In the case of the order structure approach (Bresnahan, 1987), when 50 competing products exist, the demand for each product depends on its price and the prices of the other products, implying that 2,500 separate elasticities exist—also called the "curse of dimensionality." In contrast, by assuming that consumer utility is a function of product characteristics instead of product demand itself, we estimate the product market share function, which depends on certain product characteristics. This approach enables us to derive cross-price elasticity practically. Using such cross-price elasticity in addition to the preferential margin (i.e., the difference between MFN and RTA rates), we compute the magnitude of trade diversion. Furthermore, cross-price elasticity is computed using import data from RTA members under RTA schemes and not MFN schemes. Thus, our measure of trade diversion is more consistent with the

[1] Such data were employed in several studies, including studies on the determinants of the utilization rates of preferential trade and the price effects of RTAs on insiders. The former type of studies include Bureau et al. (2007), Cadot et al. (2006), Francois et al. (2006), Manchin (2006), and Hakobyan (2013). Those studies found that the utilization of preferential schemes is higher for products with a larger tariff margin, larger volumes, and less restrictive RoOs. Examples of the latter type of studies include Cadot et al. (2005), Olarreaga and Ozden (2005), and Ozden and Sharma (2006), which found an increase in export prices after RTA schemes are utilized.

original concept of trade diversion. For example, the measure does not include trade expansion by insiders attributable to elements other than their utilization of RTA schemes.

The remainder of this study is as follows. The next section introduces our empirical methodology. In Section 3, we explain our dataset and provide an overview of price changes by insiders and outsiders. After presenting our estimates on export product quality and trade diversion in Section 4, we report our estimation results on the relationship between trade diversion and product quality in Section 5. Section 6 concludes the study.

2. Methodology

In our empirical study, following Khandelwal (2010) and Amiti and Khandelwal (2013), we estimate product quality by applying the nested logit demand framework in custom import data on Thailand.[2] We define "product" as a harmonized system (HS) eight-digit code (Thailand's tariff line level) and consider a *product* from each country *c* as "variety." The product group for an HS four-digit code is called "industry." We assume the indirect utility function for a variety, an import from country *c* within product *p* for consumer *n*, as follows:

$$V_{cpt} = \mathrm{z}_{cpt} - \alpha p_{cpt} + \sum_{p=1}^{P} \mu_{npt} d_{cp} + (1-\sigma)\varepsilon_{ncpt}, \quad (1)$$

where p_{cpt} is the price for product *p* from country *c* in year *t*, which is measured by unit values (i.e., import values divided by import quantity). z_{cpt} captures quality factors. μ_{npt} is the valuation by consumer *n* for product *p* and interacts with the dummy variables d_{cp}, which takes the value of one if exported goods from country *c* lie within product *p*. Finally, we assume that ε_{ncpt} follows an identical independent type I extreme distribution.

To complete the demand system, we introduce the utility of "outside goods," which does not allow consumers to buy any products. The utility for "outside goods" is given by the following equation:

$$V_{not} = \mathrm{z}_{ot} + -\alpha p_{ot} + \mu_{npt} + (1-\sigma)\varepsilon_{ot}. \quad (2)$$

Because ε_{ncpt} is assumed to follow an identical independent type I extreme distribution, we obtain the following equation by setting the choice probability equal to the market

[2] The previous studies on international trade use unit values as a proxy for quality. However, unit values reflect both the quality and the production cost or productivity. In contrast, although our approach requires assumptions on consumer preferences, it enables us to distinguish price and quality related to horizontal product attributes.

share of product *p* from country *c* in the total demand in each industry:

$$\ln s_{cpt} - \ln s_{Ot} = -\alpha p_{cpt} + z_{cpt} + \sigma \ln(nests_{pt}), \quad (3)$$

where s_{cpt} is the market share for product *p* produced by country *c* in year *t*, s_{ot} is the share of "outside goods" in year *t*, p_{cpt} is the price, and *nests* is a nest share, namely the share of imports from country *c* within product *p* in the total demand in each industry. We assume that product quality z_{cpt} may be decomposed into three factors, $\delta_t + \delta_{cp} + \delta_{cpt}$, namely time fixed effects, variety fixed effects, and the variety-time deviation from fixed effects, respectively. While the first two factors control for time and country-product fixed effects, the third factor is unobservable to researchers. Therefore, we consider δ_{cpt} as residuals. The equation to be estimated becomes

$$\ln s_{cpt} - \ln s_{Ot} = -\alpha p_{cpt} + \delta_t + \delta_{cp} + \sigma \ln(nests_{pt}) + \delta_{cpt}. \quad (4)$$

Once we obtain the estimates in equation (4), product quality is recovered using the following equation:

$$\hat{q}_{cpt} = \hat{\delta}_t + \hat{\delta}_{cp} + \hat{\delta}_{cpt}.$$

Because price and nest share are endogenous variables, we estimate the previous equation using instrumental variable estimation techniques. Four instrument variables are used. First, we use exchange rates and the average price for competing products from other countries regarding product *p*, both of which are the instruments of product price. Exchange rates are independent of product quality but affect import prices. Competitors' prices also affect producers' pricing strategies in country *c*; however, they are independent of quality since adjusting product quality immediately after competitors' prices change is not easy. Second, we use two indicators related to the competitive environment for each market as instrument variables for the nest share, namely the number of competing products in the same market and the number of exported products from the same source country.

Another advantage to using this demand function is that the own- and cross-price elasticities depend only on the price coefficient, α, and the observed market share.[3] The own price elasticity, i.e., the percentage change in the market share of product *j* with respect to a one percent change in own price, is expressed as follows:

$$\frac{\partial ln s_{jpt}}{\partial ln p_{jpt}} = -\frac{\alpha}{1-\rho}\left[1 - \rho \cdot nests_{pt} - (1-\rho)s_{jpt}\right]p_{jpt}. \quad (5)$$

The cross-price elasticity for a product from country *j* with respect to a change in the price of a product from country *k* is defined as follows:

[3] For more details, refer to Berry (1994) and Nevo (2000).

$$\frac{\partial lns_{jpt}}{\partial lnp_{kpt}} = \frac{\alpha}{1-\rho}\left[\rho \cdot nests_{pt} + (1-\rho)s_{kpt}\right]p_{kpt}. \quad (6)$$

We consider the cross-price elasticity for outsiders' demand with respect to changes in tariffs as the trade diversion effect. More specifically, we calculate the trade diversion effect as a summation of the cross-price effect attributable to changes in the tariff margin for all RTA member countries.

$$Diversion_{pt} = \sum_{c \in RTA}\left(\frac{\partial lns_{jpt-1}}{\partial lnp_{cpt-1}} \cdot \Delta M_{cpt}\right),$$

$$= \frac{\alpha}{1-\rho}\sum_{c \in RTA}\left(p_{cpt-1} \Delta M_{cpt}\left\{\rho \cdot nests_{pt-1} + (1-\rho)s_{cpt-1}\right\}\right), \quad (7)$$

where ΔM_{cpt} indicates changes in the tariff margin from $t-1$ to t.

Then, we examine how changes in RTA members' tariff reduction affect outsiders' price and quality by estimating the following equations:

$$\Delta p_{cpt} = \beta_{10} + \beta_{11} Diversion_{pt} + \mathbf{X}\boldsymbol{\gamma}_1 + \lambda_{ct} + \varepsilon_{cpt}, \quad (8)$$

$$\Delta q_{cpt} = \beta_{20} + \beta_{21} Diversion_{pt} + \mathbf{X}\boldsymbol{\gamma}_2 + \varphi_{ct} + \varepsilon_{cpt}, \quad (9)$$

where Δp and Δq represent changes in unit values and quality for a non-RTA member country c, respectively. $\mathbf{X}$ indicates a vector of control variables. To examine the role of the current quality level, we follow Amiti and Khandelwal (2013) and introduce a quality frontier (f_{cpt}) indicator, which is defined as $f_{cpt} = \exp(q_{cpt})/\max_c[\exp(q_{cpt})]$, and its interaction term with *Diversion* as control variables. λ_{ct} and φ_{ct} are export country-year fixed effects.

3. Data Issues

In this section, we provide an overview of our trade dataset for Thailand. Our dataset is obtained from the customs office of the Kingdom of Thailand and contains import data from 2007 to 2011 that covers all commodity imports in Thailand. During such a sample period, our analysis maintains a consistent HS version for product classification, i.e., HS2007. One advantage to our dataset is that it contains import values in Thai Baht and quantities based on tariff scheme (e.g., RTA and MFN). For conciseness, although we did not add a subscript to the tariff schemes in the previous section, we treat imported goods in a different tariff scheme as different imported goods even if they are imported from the same country.

We classify tariff schemes into three categories, i.e., MFN, RTA, and other. The other schemes include bonded warehouses, free zones, investment promotion, duty drawbacks under Section 19 bis, and duty drawbacks for re-exports. Consequently,

importers under the other schemes are able to use preferential tariff rates. Although such rates are not necessarily zero, we set them to zero for simplicity. Moreover, as subsequently noted, Thailand has multiple RTAs with certain countries, such as the Japan–Thailand Economic Partnership Agreement (JTEPA) and the ASEAN-Japan Comprehensive Economic Partnership (AJCEP) with Japan. In this case, imports from Japan under RTA schemes are differentiated between that under JTEPA and AJCEP.

During our sample period, Thailand has 10 RTAs, most of which overlap in their country coverage (see Appendix). Thailand's RTA partners are as follows: Korea, China, Japan, India, Philippines, Vietnam, Cambodia, Laos, Myanmar, Malaysia, Indonesia, Brunei, Singapore, New Zealand, and Australia. Except for Korea, which became an RTA partner for Thailand in 2010, all these countries have been RTA partner countries for Thailand since the beginning of our sample period, i.e., 2007. In this study, these countries are called "insiders," i.e., RTA member countries. For simplicity, we include Korea in the group of countries that have been RTA members since 2007. Regarding trade among these member countries, not all products necessarily have lower RTA rates than MFN rates. Such product-level RTA eligibility depends not only on RTAs and, thus, on export countries but also on years. To avoid a complicated classification, we do not define RTA membership by country, product, and year, but do only by country. The other countries are called "outsiders," i.e., RTA nonmember countries. Although imports in Thailand from outsiders are under either MFN or other schemes, imports from insiders are under RTA, MFN, or other schemes.

The definitions of the variables in equation (4) are as follows: s_{cpt} represents the market share of imported product p from country c under the tariff scheme based on the total demand in each industry. Industry size is defined as the sum of the import quantities at the HS four-digit level. p_{cpt} represents unit values calculated as imports divided by import quantity under the tariff scheme. Furthermore, to examine market prices, i.e., import prices inclusive of the tariff duty, we multiply the unit values by (one plus) the corresponding tariff rates. Nest share (*nests*) represents the market share of imports from country c under the tariff scheme based on the total imports of product p in Thailand. Our diversion variable, i.e., cross-price elasticity and tariff margin, is computed using information only on imports from insiders under RTA schemes. The data on tariff margins are obtained from the World Integrated Trade Solution database.

As for the share of "outside goods," previous studies used import penetration ratio at the industry level. For Thailand, the import penetration ratio at the detailed industry level is available every five years, with the latest figures available only for 2006. Therefore, our demand function estimation gives up subtracting the share of "outside

goods" from the market share of each product and assumes that it is captured by a constant term and time fixed effects. However, in this case, because time fixed effects may reflect both changes in the share of outside goods and changes in average quality at the industry level, our estimates for quality might be biased. Thus, in our second stage regression analysis, we primarily focus on changes in product price and quality within a variety under controlling for time fixed effects.

The remaining empirical issues are as follows. First, we exclude homogeneous goods using Rauch's (conservative) product classification (Rauch, 1999) because the logit demand system represents the consumer choice behavior based on product quality and is not suitable for homogeneous goods. Second, we trim the data in terms of two criteria. One criterion is the unit of quantity, which sometimes differs even within the same HS eight-digit code. We define the mode of the quantity unit within an HS four-digit code and exclude products with a unit different from the mode. In addition, if no dominant unit exists in an HS four-digit category, i.e., the share of the majority unit is less than 70%, we exclude all products within the HS four-digit code. The other criterion used to drop products is whether unit values fall below the fifth percentile or above the 95^{th} percentile within the industry. Third, equations (8) and (9) are estimated for only imports from outsiders under MFN schemes and not other schemes.

4. Quality and Trade Diversion

We separately estimate equation (4) for 779 industries (HS four-digit categories). The upper panel of Table 1 presents the performance of the demand function estimation. We obtain 295 negatively significant coefficients for prices. In 129 industries, the coefficient for *nests* is significant and lies in unit interval, i.e., [0, 1]. Finally, we check the Sargan p-value and determine that 61 industries do not reject the null hypothesis of overidentification. The lower panel of Table 1 presents basic statistics for demand function estimates for 61 industries. Two points are significant. First, price coefficients are low compared with those in Khandelwal (2010), suggesting that market share is not sensitive to price changes in the case of Thailand. Second, the average of the coefficients for nest share is 0.59, indicating that nest structures are correlated with one another.

=== Table 1 ===

Table 2 shows the averages of the unit values and the quality as per tariff schemes.

In the case of unit values, outsiders have relatively high average values. In particular, imports from outsiders under MFN schemes have high unit values. Among insiders, imports under the Thailand–India Free Trade Agreement (TINFTA), which is a bilateral RTA with India, have the highest unit values. The average unit values are lowest for imports under the ASEAN–Australia–New Zealand FTA (AANZFTA). In contrast, we observe a different order with respect to quality. Average quality is lower with respect to outsiders, in contrast to the case of unit values. In particular, import products from outsiders under MFN have the lowest quality. In addition, among insiders, the lowest quality is found under MFN schemes. Relatively high quality appeared in the case of the ASEAN Free Trade Area (AFTA), TINFTA, and the Thailand–New Zealand Closer Economic Partnership Agreement (TNZCEP).

=== Table 2 ===

We examine more closely the order of quality among tariff schemes. Table 3 reports the results of ordinary least squares for quality. In columns (I) and (III), we introduce only year fixed effects, whereas the other columns show the results for equations with year fixed and product fixed effects. Columns (I) and (II) introduce tariff scheme dummy variables under MFN schemes as a base case. The insiders' dummy variable, which takes the value of one for insiders and zero for outsiders, is included in columns (III) and (IV). We focus on the results for the equation with product fixed effects. Consistent with the results in Table 2, only others have a significantly negative coefficient. In addition, the coefficient for insiders is positively significant. The outstanding difference is in the order among the RTA schemes. The coefficient for ACFTA (i.e., ASEAN–China FTA) is positive and highest, followed by that for TINFTA. Although ACFTA can be used by both China and other ASEAN members, this result shows that imports from China under RTA have the highest quality.

=== Table 3 ===

Finally, we review the magnitude of margin change and diversion by industry. Except for other industries, the expansion of the preferential margin is large in wood and paper products, footwear, and base metal. In contrast, the preferential margin does not change in vegetable products, textiles, plastic or glass products, and transport equipment during our sample period. We also observe that no industries experience a change in the preferential margin from 2010 to 2011. In contrast, our measure of the

potential magnitude of trade diversion shows completely different patterns from margin change. A relatively large magnitude is found in vegetable products, plastics and rubber, textiles, plastic or glass products, and transport equipment. In these industries, outsiders are expected to suffer from serious trade diversion. Moreover, we observe the positive magnitude of diversion in some industries in 2011.

=== Table 4 ===

5. Empirical Results

This section reports our estimation results for the relationship between quality and trade diversion. The basic estimation statistics are provided in Table 5, and our estimation results are reported in Table 6. In column (I), we simply regress a trade diversion variable on quality under controlling for time-variant export country characteristics, i.e., equations (8) and (9). The coefficient of this variable is estimated to be significantly positive, indicating that an improvement in outsiders' quality is greater in products in which a larger trade diversion is expected. This result is consistent with our expectation and may indicate that outsiders change their exports from low to high quality products, or only outsiders with high product quality survive in the export market with RTA insiders. In contrast, when simply introducing a change in the preferential margin instead of our trade diversion measure (column II), we cannot see a significant effect.

=== Tables 5 & 6 ===

Column (II) shows the result for the equation that introduces a quality frontier measure and its interaction term with trade diversion, i.e., equations (8) and (9). While the coefficient for the quality frontier is negatively significant, that for trade diversion is insignificant. The former result implies that an increase in quality is lower in exports with higher quality. Importantly, the coefficient for the interaction term is positively significant. Because the trade diversion coefficient is insignificant, the improvement in quality from the fear of trade diversion is not necessarily observed in all cases. Only outsiders exporting higher quality products exhibit a greater improvement in quality given the fear of trade diversion.

We also examine these specifications for the change in unit values, and the results are reported in columns (IV)–(VI). Most of the variables have insignificant coefficients.

The coefficient for margin change is negative but insignificant. This insignificant result does not necessarily contradict the results in previous studies. For example, the estimation results in Chang and Winters (2002) are not robust across industries. In fact, their estimation by industry (and export country) shows insignificant results for many industries. The coefficient only for the quality frontier is significantly positive, indicating that an increase in unit values is larger for outsiders with higher product quality.

6. Conclusion

Countries excluded from RTA face disadvantages in tariffs when exporting to member countries. In this context, previous studies found that such excluded countries, i.e., outsiders, lower their export prices. In contrast, this study examined not only prices but also qualities of outsiders' exports. Specifically, by employing the method proposed in Khandelwal (2010) and Amiti and Khandelwal (2013), we estimated the quality of products exported from each country to Thailand under certain tariff schemes. In addition to our estimates on cross-price elasticity, we used this measure to compute the potential magnitude of trade diversion for outsiders. Then, we investigated the relationship between this trade diversion and the changes in the quality of exports from outsiders. Moreover, we examined the role of the initial quality level in this relationship. Consequently, we found that only outsiders exporting higher quality products exhibited a greater improvement in quality to decrease the negative effect of tariff disadvantages.

References

Amiti, M., and Khandelwal, A., 2013, Import Competition and Quality Upgrading, *Review of Economics and Statistics*, **95**(2): 476–490.

Berry, S., 1994, Estimating Discrete-Choice Models of Product Differentiation, *The RAND Journal of Economics*, **25**(2): 242–262.

Bresnahan, F., 1987, Competition and Collusion in the American Automobile Industry: The 1955 Price War, *Journal of Industrial Economics*, **35**(4): 457–482.

Bureau, J., Chakir, R., and Gallezot, J., 2007, The Utilisation of Trade Preferences for Developing Countries in the Agri-food Sector, *Journal of Agricultural Economics*, **58**(2): 175–198.

Cadot, O., Carrere, C., de Melo, J., Portugal-Perez, A., 2005, Market Access and Welfare under Free Trade Agreements: Textiles under NAFTA, *The World Bank Economic Review*, **19**(3): 379–405.

Cadot, O., Carrere, C., d Melo, J., and Tumurchudur, B., 2006, Product-specific Rules of Origin in EU and US Preferential Trading Arrangements: An Assessment, *World Trade Review*, **5**(2): 199–224.

Carrere, C., 2006, Revisiting the Effects of Regional Trade Agreements on Trade Flows with Proper Specification of the Gravity Model, *European Economic Review*, **50**(2): 223–247.

Clausing, K., 2001. Trade Creation and Trade Diversion in the Canada–United States Free Trade Agreement, *Canadian Journal of Economics*, **34**(3): 677–696.

Chang, W. and Winters, L.A., 2002, How Regional Blocs Affect Excluded Countries: The Price Effects of MERCOSUR, *American Economic Review*, **92**(4): 889–904.

Dai, M., Yotov, V. Y., and Zylkin, T., 2014, On the Trade-diversion Effects of Free Trade Agreements, *Economic Letters*, **122**(2): 321–325.

Demidova, S. and Krishna, K., 2008, Firm Heterogeneity and Firm Behavior with Conditional Policies, *Economics Letters*, **98**(2): 122–128.

Francois, J., Hoekman, B., and Manchin, M., 2006, Preference Erosion and Multilateral Trade Liberalization, *The World Bank Economic Review*, **20**(2): 197–216.

Gorg, H., Halpern, L., and Murakozy, B., 2010, Why Do Within Firm-product Export Prices Differ across Markets?, Kiel Working Paper, No. 1596.

Hakobyan, S., 2013, Accounting for Underutilization of Trade Preference Programs: U.S. Generalized System of Preferences, Forthcoming in *Canadian Journal of Economics*.

Karemera, D. and Ojah, K., 1998, An Industrial Analysis of Trade Creation and

Diversion Effects of NAFTA, *Journal of Economic Integration*, **13**(3): 400–425.

Khandelwal, A., 2010, The Long and Short (of) Quality Ladders, *The Review of Economic Studies*, **77**(4): 1450–1476.

Kreinin, M. and Plummer, M., 1992, Effects of Economic Integration in Industrial Countries on ASEAN and the Asian NIEs, *World Development*, **20**(9), 1345-1366.

Magee, C., 2008, New Measures of Trade Creation and Trade Diversion, *Journal of International Economics*, **75**(2): 349–362.

Manchin, M., 2006, Preference Utilisation and Tariff Reduction in EU Imports from ACP Countries, *The World Economy*, **29**(9): 1243–1266.

Nevo, A., 2000, A Practitioner's Guide to Estimation of Random Coefficients Logit Models of Demand, *Journal of Economics and Management Strategy*, **9**(4): 513–548.

Olarreaga, M. and Ozden, C., 2005, AGOA and Apparel: Who Captures the Tariff Rent in the Presence of Preferential Market Access?, *The World Economy*, **28**(1): 63–77.

Ozden, C. and Sharma, G., 2006, Price Effects of Preferential Market Access: Caribbean Basin Initiative and the Apparel Sector, *The World Bank Economic Review*, **20**(2): 241–259.

Rauch, J. E., 1999, Networks versus Markets in International Trade, *Journal of International Economics*, **48**(1): 7–35.

Soloaga, I. and Winters, L., 2001, Regionalism in the Nineties: What Effect on Trade?, *The North American Journal of Economics and Finance*, **12**(1): 1–29.

Viner, J., 1950, *The Customs Union Issues*, Carnegie Endowment for International Peace, New York.

Winters, A. and Chang, W., 2000, Regional Integration and Import Prices: An Empirical Investigation, *Journal of International Economics*, **51**(2): 363–377.

Wylie, P., 1995, Partial Equilibrium Estimates of Manufacturing Trade Creation and Diversion due to NAFTA, *The North American Journal of Economics & Finance*, **6**(1): 65–84.

Yang, S. and Martinez-Zarzoso, I., 2014, A Panel Data Analysis of Trade Creation and Trade Diversion Effects: The Case of ASEAN–China Free Trade Area, *China Economic Review*, **29**, 138-151.

Table 1. Performance of the Demand Function Estimation

Number of Markets					
Total number of markets					779
Estimates with stat. sig negative price coefficient					295
of which have stat. sig nest share coefficient					129
of which the overidentification tests are not rejected					61
Basic Statistics					
	Obs	Mean	Std. Dev.	Min	Max
Price coef.	61	0.00	0.00	-0.01	0.00
ln (nests) coef.	61	0.59	0.17	0.31	0.98
Adj. R-sq	61	0.74	0.12	0.49	1.00
Sargan p-val.	61	0.39	0.30	0.05	0.98

Source: Authors' estimation.

Table 2. Average Unit Value and Quality

	Unit Value		Quality	
	Insiders	Outsiders	Insiders	Outsiders
MFN	5.933	6.414	1.020	0.491
Others	5.735	5.854	1.141	0.724
AANZFTA	5.043		1.179	
ACFTA	5.054		1.557	
AFTA	5.126		1.873	
AIFTA	5.960		1.378	
AJCEP	5.896		1.676	
AKFTA	6.128		1.290	
JTEPA	6.288		1.454	
TAUFTA	5.081		1.187	
TINFTA	8.968		1.801	
TNZCEP	5.255		1.835	

Source: Authors' computation

Notes: The abbreviations are defined as follows: AFTA (ASEAN Free Trade Area), TIFTA (Thailand–India FTA), TAFTA (Thailand–Australia FTA), ACFTA (ASEAN–China FTA), TNZCEPA (Thailand–New Zealand Closer Economic Partnership Agreement), JTEPA (Japan–Thailand Economic Partnership Agreement), AJCEP (ASEAN–Japan Comprehensive Economic Partnership Agreement), AKFTA (ASEAN–Republic of Korea FTA), AANZFTA (ASEAN–Australia–New Zealand FTA), and AIFTA (ASEAN–India FTA).

Table 3. Simple Regression on Quality

	(I)	(II)	(III)	(IV)
AANZFTA	0.204	-0.315		
	(0.439)	(0.265)		
ACFTA	0.552***	0.803***		
	(0.0995)	(0.0765)		
AFTA	0.896***	0.468***		
	(0.121)	(0.0935)		
AIFTA	0.398**	0.188		
	(0.181)	(0.184)		
AJCEP	0.697***	0.296*		
	(0.241)	(0.170)		
AKFTA	0.304	0.0921		
	(0.202)	(0.165)		
JTEPA	0.439***	0.328***		
	(0.104)	(0.0903)		
Others	0.117***	-0.0705**		
	(0.0394)	(0.0319)		
TAUFTA	0.171	0.00277		
	(0.142)	(0.121)		
TINFTA	0.781***	0.574**		
	(0.150)	(0.247)		
TNZCEP	0.816***	0.224		
	(0.302)	(0.471)		
Insiders			0.529***	0.680***
			(0.0292)	(0.0240)
Year fixed effect	Yes	Yes	Yes	Yes
Product (hs8) fixed effect	No	Yes	No	Yes
Number of Observations	15,836	15,836	23,983	23,983
R-squared	0.006	0.401	0.015	0.381

Notes: The dependent variable represents our estimates of quality. ***, **, and * indicate 1%, 5%, and 10% significance, respectively. The robust standard error appears in parenthesis. The base tariff scheme in columns (I) and (II) is the MFN scheme.

Table 4. Margin Change versus Trade Diversion Measure

	Margin Change				Diversion			
	2008	2009	2010	2011	2008	2009	2010	2011
Vegetable products	0	0	0	0	0	0.00	0.06	0
Animal/vegetable fats and oils	0.35	1.07	1	0	0	0.00	0.00	0
Food products	1.25	0	0.19	0	0.00	0.00	0.01	0
Mineral products	1.33	0	0	0	0	0	0	0
Chemical products	0	0	0.09	0	0.00	0.00	0.00	0
Plastics and rubber	0	0	1.78	0	0	0.00	0.13	0.03
Wood products	4.72	0	0.28	0	0	0	0.00	0
Paper products	0	0	2.65	0	0	0.00	0.00	0
Textiles	0	0	0	0	0	0.01	0.00	0.00
Footwear	0	1.58	3.42	0	0	0	0	0.00
Plastic or glass products	0	0	0	0	0	0.03	0.05	0
Base Metal	0	0.40	2.67	0	0	0.00	0.01	0
Machinery	0.25	0	0.08	0	0	0	0	0
Transport equipment	0	0	0	0	0	1.36	0.63	0
Precision machinery	2.02	0	0	0	0	0.00	0.00	0
Others	3.39	0	0	0	0	0.00	0.00	0
Total	0.31	0.09	0.78	0	0.00	0.02	0.02	0.00

Source: Authors' computation

Table 5. Basic Statistics

	Mean	SD	p10	p90
Quality	0.027	1.146	-1.225	1.248
Unit Value	0.036	1.253	-1.227	1.304
Quality Frontier	0.214	0.282	0.003	0.695
Diversion	0.012	0.133	0	0.000
Quality Frontier * Diversion	0.003	0.036	0	0.000
Margin Change	0.293	1.171	0	0

Source: Authors' computation

Table 6. Regression Results

Dependent Variable	(I) Quality	(II) Quality	(III) Quality	(IV) Unit Value	(V) Unit Value	(VI) Unit Value
Quality Frontier			-0.486***			0.178***
			(0.0465)			(0.0477)
Diversion	0.251***		-0.0436	0.115		0.0877
	(0.0584)		(0.202)	(0.0925)		(0.128)
Quality Frontier * Diversion			1.487**			0.0905
			(0.685)			(0.510)
Margin Change		0.00810			-0.0159	
		(0.0105)			(0.0137)	
Country-year fixed effect	Yes	Yes	Yes	Yes	Yes	Yes
Number of Observations	8,289	8,289	8,289	8,289	8,289	8,289
R-squared	0.040	0.039	0.053	0.046	0.046	0.047

Notes: ***, **, and * indicate 1%, 5%, and 10% significance, respectively. The robust standard error appears in parenthesis.

Appendix: RTAs by Thailand during Our Sample Period

FTAs	Members	Implementation
ASEAN Free Trade Area (AFTA)	Brunei, Cambodia, Indonesia, Laos, Malaysia, Myanmar, Philippines, Singapore, Viet Nam, and Thailand	1993
Thailand-India FTA (TINFTA): Early harvest	India and Thailand	2004
Thailand-Australia FTA (TAUFTA)	Australia and Thailand	2005
ASEAN-China FTA (ACFTA)	Brunei, Cambodia, China Indonesia, Laos, Malaysia, Myanmar, Philippines, Singapore, Viet Nam, and Thailand	2005
Thailand-New Zealand Closer Economic Partnership Agreement (TNZCEP)	New Zealand and Thailand	2005
Japan-Thailand Economic Partnership Agreement (JTEPA)	Japan and Thailand	2007
ASEAN-Japan Economic Partnership Agreement (AJCEP)	Brunei, Cambodia, Indonesia, Japan, Laos, Malaysia, Myanmar, Philippines, Singapore, Viet Nam, and Thailand	2009
ASEAN-Republic of Korea FTA (AKFTA)	Brunei, Cambodia, Indonesia, Laos, Malaysia, Myanmar, Philippines, Korea, Singapore, Viet Nam, and Thailand	2010
ASEAN-Australia-New Zealand FTA (AANZFTA)	Australia, Brunei, Cambodia, Indonesia, Laos, Malaysia, Myanmar, New Zealand, Philippines, Singapore, Viet Nam, and Thailand	2010
ASEAN-India FTA (AIFTA)	Brunei, Cambodia, India, Indonesia, Laos, Malaysia, Myanmar, Philippines, Singapore, Viet Nam, and Thailand	2010

Source: Legal texts of RTAs