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Trade Facilitation Provisions in Regional Trade Agreements: Discriminatory or Non-discriminatory?*

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The RTAs with trade facilitation provisions have been expected to generate a larger net trade-creating effect and complement the discriminatory feature of RTAs but have yet to be empirically proven. Recognizing the limitations of existing studies, we conducted a quantitative analysis on the effects of RTAs with and without trade facilitation provisions on both intra- and extra-bloc trade by using a modified gravity equation. We applied the Poisson Pseudo-Maximum Likelihood (PPML) estimation with time varying exporter and importer fixed effect method to panel data consisting of 45,770 country pairs covering 170 countries for 2000-2010. We found that the trade facilitation provisions in existing RTAs are non-discriminatory by generating more intra- and extra-bloc trade in general. In particular, we found that the trade effects of RTAs in the APEC region are much stronger than the general case covering all RTAs in the world. In addition, as we control the trade effect of a country's trade facilitation, which is ranked by the World Bank's logistic performance index, RTAs consisting of trade facilitation provisions are discriminatory for trade in final goods and non-discriminatory for trade in intermediate goods. Overall, we endeavor to "explain," instead of "hypothesizing," why most of the recent RTAs contain trade facilitation provisions, especially in light of the deepening regional interdependence through trade in parts and components under global value chains and support the necessity of multilateralizing RTAs by implementing non-discriminatory trade facilitation provisions.

Keywords: Regional Trade Agreements, Trade Facilitation Provisions, Trade Effect, Gravity Equation, APEC
JEL classification: C23, F15, O53

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I. INTRODUCTION

With countries expecting gains from freer trade, discriminatory regional trade agreements (RTAs) have proliferated since the late 1980s. However, the shallow integration through discriminatory tariff reforms alone has been insufficient to generate significant gains. Multilateralizing regionalism, through deepening regional trade negotiations, has taken center stage among recent trade issues, as shown in the comprehensive investigation of Baldwin and Low (2009). More specifically, Baldwin (2014) and Lejárraga (2014) elaborate about the importance of deeper integration that is complemented with a reduction of non-tariff barriers to tariff reforms. Deeper integration is expected to not only enhance the gains from RTAs but also reduce discrimination and lead regional trade blocs to a more desirable global free trade environment.

Enhancing trade facilitation is a desirable option for promoting a global free trade environment that complements discriminatory RTAs, as reported by leading multilateral organizations such as the OECD (2002), Maur (2008) of the World Bank, Hamanaka, Tafgar, and Lazaro (2010) of the Asian Development Bank, UNCTAD (2011), UNESCAP (2011), Neufeld (2014) of the World Trade Organization, and Yasui (2014) of the World Customs Organization. Accordingly, most of recent RTAs equipped with trade facilitation provisions are expected to produce larger trade-creating and smaller trade-diverting effects.[1] On the other hand, Hamanaka, Tafgar, and Lazaro (2010) worry about discriminatory features of the trade facilitation provisions by reviewing characteristics of existing RTAs with trade facilitation provisions in the Asia Pacific region.[2] However, the trade-

[1] According to Chart 2 in Neufeld (2014), 95% of RTAs formed between 2000 and mid-2013 contain trade facilitation provisions, in contrast to 14%, 50%, and 92% of RTAs with trade facilitation provisions formed during the 1970s, 1980s, and 1990s, respectively.

[2] Only members can exclusively take the benefit of trade facilitation measures under the RTA and different trade facilitation treatment is applied to non-members. For example, documentation requirement for customs clearance against members of an RTA is much simpler than that against non-member trading partners. Hamanaka, Tafgar, and Lazaro (2010) list some member-specific trade facilitation measures under RTAs in the Asia Pacific region. As a case, the ASEAN-Japan CEPA provides express shipment in Article 22 of Chapter 2 for trade in goods but the express customs procedure is applicable to goods traded between members only.

creating and diverting effects of RTAs consisting of trade facilitation provisions have yet to be empirically tested. Dennis (2006) and Kim et al. (2013) quantitatively measure the additional gains derived from enhanced trade facilitation in the cases of the Middle East and North Africa region (MENA) and the Asia Pacific Economic Cooperation region (APEC), respectively, by comparing those gains with the ones derived from tariff reduction alone. However, their findings apply to a specific RTA and their quantitative analyses measure the general effect of enhanced trade facilitation, independent of tariff reforms of RTAs and are in line with existing empirical studies, as surveyed in Dennis (2010). They do not investigate the interacting effects of RTAs with trade facilitation provisions.

Recognizing the limitations of existing studies, this paper investigates the interacting effects of RTAs with and without trade facilitation provisions on intra- and extra-bloc trade by using a modified gravity equation. From this quantitative analysis, we examine whether trade facilitation provisions generate more gains from easier trade and reduce discriminatory feature of RTAs in general and in the APEC region.[3] More specifically, for each RTA dummy, we construct two binary variables: one for intra-bloc membership (*Insiders*: member-member country pairs) and the other for extra-bloc membership (*Outsiders*: member-non-member country pairs). By doing so, we are able to decompose the trade effects into trade-creating and trade-diverting effects. Thus, it could be examined whether RTAs containing trade facilitation provisions are discriminatory or non-discriminatory. Moreover, we consider deepening global value chains and the resulting increase in the trade of parts and components by classifying total tradable goods into *final* and *intermediate* goods. The effects of trade facilitation provisions are expected to differ according to the commodity type.[4]

For the quantitative analysis, we use panel data consisting of 45,770 country-pairs covering 170 countries for three years, 2000, 2005, and 2010. In order to address the zero trade issue and the presence of heteroskedasticity, we adopt the Poisson Pseudo-Maximum Likelihood (PPML) estimation method introduced by Santos Silva and Tenreyo (2006). Moreover, we control bilateral linkages by

[3] In order to investigate whether the APEC's principle of open regionalism works for multilateralizing RTAs, we estimate the trade effects of RTAs with and without trade facilitation provisions covering the APEC region separated from RTAs around the world.

[4] See Felipe and Kumar (2010) and Yadav (2014).

applying multilateral trade resistance, introduced by Anderson and van Wincoop (2003), through the use of the time varying exporter and importer fixed effect. As in Baier and Bergstrand (2007), the time varying exporter and importer fixed effects also control endogeneity problem of RTAs and properly estimate the average treatment effect of entering an RTA. In order to control the general effect of trade facilitation, we introduce the World Bank's logistic performance index (LPI) as an independent variable measuring a country's level of trade facilitation. Results covering an alternative sample period, 2007, and those from an alternative specification will be compared in order to check the robustness of the PPML estimation.

Section II briefly reviews the trade creation and diversion effects of RTAs with a consideration of trade facilitation and raises research questions to be empirically investigated. Section III describes the model, estimation method, and data for the quantitative analysis. Section IV reports empirical findings and Section V concludes this research.

II. TRADE FACILITATION, TRADE, AND REGIONAL TRADE AGREEMENTS

Trade facilitation is an effort to pursue greater "convenience" in international trade by easing economic activities across borders. The reduction in trade costs, resulting from better trade facilitation, has an identical effect as lowering tariff or non-tariff barriers, both resulting in an increase in social welfare through the gains from freer and easier trade.[5] More specifically, trade facilitation improves importing countries' welfare by narrowing the gap between the world market price and domestic price of the imported goods, which leads to an increase in the trade volume. According to UNESCAP (2007), estimated trade costs in industrialized countries are decomposed into transport costs, border-related trade barriers, and retail and wholesale distribution costs. Each share 21% (freight costs of 11% and transit costs of 9%), 44% (tariffs and non-tariffs of 8%, language barriers of 7%, currency barrier of 14%, information costs barrier of 6%, and security barrier of 3%) and 55% of total trade costs, respectively. This indicates that the trade costs incurred by inefficient trade facilitation cause more than half of the transaction costs across borders.

[5] See Deardorff (2001).

The effects of trade facilitation on bilateral trade vary according to commodity type as investigated in Felipe and Kumar (2010). More specifically, Yadav (2014) empirically examines the impact of trade facilitation on parts and components and final goods trade for the machinery and transport equipment sector. He finds that the "border efficiency" is more important for the parts and components trade than final goods trade. In particular, considering deepening production networks by vertical specialization of supply chains in recent years, production networks may significantly affect RTA-related benefits over time. Arndt (2001) theoretically proves that the output expansion effect of production networks overwhelms negative trade diversion effect of discriminatory preference given to members of RTAs.

Quite a few empirical experiments about analyzing the positive effect of trade facilitation on trade and welfare have been conducted by using survey, gravity model, partial equilibrium model, and computable general equilibrium model (CGE) analysis, as surveyed in the APEC (2002), OECD (2003), Kim and Park (2005), Felipe and Kumar (2010), and Otsuki (2011). As aforementioned, many "qualitative" studies have emphasized the important role of trade facilitation provisions for a more desirable formation of RTAs, such as the OECD (2002), Maur (2008), Hamanaka, Tafgar, and Lazaro (2010), UNCTAD (2011), UNESCAP (2011), Neufeld (2014), and Yasui (2014). However, there is no "quantitative" analysis of the trade creation and diversion effect of RTA with trade facilitation provisions. Thus, it is still not clear that the trade facilitation provisions in existing RTAs can generate significant enough additional gains from freer and easier trade by increasing the trade creation effect and decreasing the trade diversion effect.

In this empirical experiment, we attempt to quantitatively investigate changes in intra- and extra-bloc trade volume by applying a gravity regression model analysis. By conducting this experiment, we can answer whether the trade facilitation provisions in existing RTAs can be a way to multilateralize regionalism and lead to a more desirable global free trade environment. More specifically, we attempt to investigate the following research questions.

Q1: Does the trade-creating effect of eliminating tariff by forming RTAs become significantly stronger if the RTAs are equipped with trade facilitation provisions? If yes, deeper integration through enhancing trade facilitation is a desirable policy option to complement the limited gains from tariff reform alone.

Q2: Are the trade facilitation provisions in existing RTAs discriminatory or non-discriminatory? If the answer is non-discriminatory, the RTAs with trade facilitation provisions do not divert trade from efficient non-members to inefficient members and mitigate the discriminatory feature of RTAs. Then, currently proliferating RTAs can be regarded as stepping stones for a global free trade.

Q3: Do the afore-mentioned trade effects of trade facilitation provisions differ according to the commodity type?

III. METHODOLOGY

1. Model Specification and Estimation Method

We employ a modified gravity model of bilateral trade flows to estimate the trade-creating and trade-diverting effects of RTAs with trade facilitation provisions, as specified in Equation 1.

Equation 1.

$$ln(Trade^{z}_{ijt}) = \alpha_0 + \alpha_1 ln(Y_{it}) + \alpha_2 ln(Y_{jt}) + \alpha_3 ln(DIST_{ij}) + \beta' X' + \gamma_1 RTA^{k}/Insider_{ijt} + \gamma_2 RTA^{k}/Outsider_{ijt} + \varepsilon_{ijt}$$

where *i* and *j* denote particular countries and *t* denotes time.

- $Trade^{z}_{ijt}$ denotes the value of bilateral trade between *i* and *j* by commodity type, where $z \in \{Total, Final, and Intermediate goods\}$,
- Y_{it} *and* Y_{jt} are real GDP,
- $DIST_{ij}$ is the bilateral distance between *i* and *j*,
- *X'* is a set of control variables that includes the *Colony*, *Contiguity*, and *Common Language* dummies,

In order to examine whether RTAs with trade facilitation provisions generate more gains from easier trade and reduce discriminatory feature of RTAs, we construct two binary variables: one for intra-bloc membership (*Insiders*: member-member

country pairs) and the other for extra-bloc membership (*Outsiders*: member-non-member country pairs) as follows:

- $RTA^k/Insider_{itj}$ is a binary variable which is unity if *i* and *j* belong to the same type of RTA (*k*) by inclusion of trade facilitation provisions, *where* $k \in$ *{TF: RTA with trade facilitation provisions, NTF: RTA without trade facilitation provisions}*
- $RTA^k/Outsider_{ijt}$ is a binary variable that is unity if *i* belongs to an RTA and *j* does not, or vice versa, by inclusion of trade facilitation provisions, *where* $k \in$ *{TF: RTA with trade facilitation provisions, NTF: RTA without trade facilitation provisions}*

Table 1 clarifies the assigned RTA dummies by type of RTAs and by membership in the upper panel, either 1 or 0. As shown in the lower panel of Table 1, the expected positive signs of γ_1 measure trade-creating effects of RTAs with or without trade facilitation provisions. On the other hand, the possible negative estimates, γ_2, imply that RTAs divert trade from nonmembers to members. Accordingly, the lower panel of Table 1 indicates the discriminatory or non-discriminatory features of RTAs with trade facilitation provisions.

Table 1. Clarification of RTA Dummies and Coefficients

RTA Dummies					
Country *i* / Country *j*		Member		Non-Member	
	Type of RTAs (*k*)	TF (RTA with Trade Facilitation Provisions)	NTF (RTA without Trade Facilitation Provisions)	TF (RTA with Trade Facilitation Provisions)	NTF (RTA without Trade Facilitation Provisions)
Member	TF	RTA/Insider = 1	RTA/Insider = 0	RTA/Outsider = 1	RTA/Outsider = 0
	NTF	RTA/Insider = 0	RTA/Insider = 1	RTA/Outsider = 0	RTA/Outsider = 1
Non-Member	TF	RTA/Outsider = 1	RTA/Outsider = 0	RTA/Outsider = 0	RTA/Outsider = 0
	NTF	RTA/Outsider = 0	RTA/Outsider = 1	RTA/Outsider = 0	RTA/Outsider = 0

Table 1. Continued

Estimated Coefficients					
Country *i* / Country *j*		Member		Non-Member	
	Type of RTAs (*k*)	TF (RTA with Trade Facilitation Provisions)	NTF (RTA without Trade Facilitation Provisions)	TF (RTA with Trade Facilitation Provisions)	NTF (RTA without Trade Facilitation Provisions)
Member	TF	Trade-creating RTA ***(γ1>0)***		Trade-diverting RTA ***(γ2<0)*** Discriminatory Trade Facilitation Provisions & vice versa	
	NTF		Trade-creating RTA ***(γ1>0)***		Trade-diverting RTA ***(γ2<0)***
Non-Member	TF	Trade-diverting RTA ***(γ2<0)*** Discriminatory Trade Facilitation Provisions & vice versa			
	NTF		Trade-diverting RTA ***(γ2<0)***		

In order to solve the zero trade issue and the presence of heteroskedasticity, the PPML estimation is applied to Equation 1. Then, Equation 1 is estimated in its multiplicative form, as in Equation 2.

Equation 2.

$$Trade^{z}_{ijt} = exp(\alpha_0 + \alpha_1 \ln(Y_{it}) + \alpha_2 \ln(Y_{jt}) + \alpha_3 \ln(DIST_{ij}) + \beta' X' + \gamma_1 RTA^{k}/Insider_{ijt} + \gamma_2 RTA^{k}/Outsider_{ijt}) u_{ijt,} \; where \; u_{ijt} = exp(\varepsilon_{ijt}).$$

In order to control endogeneity problem of RTAs[6] and problem of multilateral resistance terms[7], we address the time varying exporter and importer fixed effects

[6] To take endogeneity problem of RTAs into account, Baier and Bergstrand (2002) and Magee (2003) employ an instrumental variables (IV) regression approach. However, Baier and Bergstrand (2004) show that IV regressions of the average treatment effects of RTAs are unstable and the exogeneity of the instruments is often rejected. Alternatively, Baier and Bergstrand (2007) propose using panel data with country and year fixed effects to properly estimate the average treatment effect of entering an RTA.

[7] As introduced in Anderson and van Wincoop (2003).

(α_{it} and α_{jt}), as in Equation 3. Owing to the time varying exporter and importer fixed effects included in the country-specific variables, Y_{it} and Y_{jt} are dropped from Equation 2, as follow.

Equation 3.

$$Trade^{z}_{ijt} = exp(\alpha_0 + \alpha_{it} + \alpha_{jt} + \alpha_1 \ln(DIST_{ij}) + \beta' X' + \gamma_1 RTA^{k}/Insider_{ijt} + \gamma_2 RTA^{k}/Outsider_{ijt}) u_{ijt,} \text{ where } u_{ijt} = exp(\varepsilon_{ijt})$$

or

$$\ln(Trade^{z}_{ijt}) = \alpha_0 + \alpha_{it} + \alpha_{jt} + \alpha_1 \ln(DIST_{ij}) + \beta' X' + \gamma_1 RTA^{k}/Insider_{ijt} + \gamma_2 RTA^{k}/Outsider_{ijt} + \varepsilon_{ijt}.$$

2. Data

We use annual data consisting of 45,770 country-pairs in total. The dataset features a panel structure that covers 170 countries in 2000, 2005, and 2010, respectively. The nominal value of bilateral trade is measured by the sum of the bilateral imports. The data for bilateral imports at the three-digit Broad Economic Categories (BEC) level are obtained from the UN Comtrade database, wherein "intermediate goods" include BEC codes 111, 121, 21, 22, 31, 322, 42, and 53. Data for country-pair specific variables (e.g., distance, contiguity, colony, and common language) are obtained from the Centre d'Études Prospectives et d'Informations Internationales (CEPII). We classify RTAs into RTAs with and without trade facilitation provisions using the WTO Regional Trade Agreements Database.

Summary statistics, for the data used in the estimations, are presented in Table 2. Of 45,770 observations, 4,300 country-pairs (9.4 percent) belong to the intra-bloc membership of existing RTAs in a given year; among them 2,191 country-pairs (51.0 percent) are the member of RTAs with trade facilitation provisions and 2,109 country-pairs (49.0 percent) are members of RTAs without trade facilitation provisions; 41,470 country-pairs (90.6 percent) are linked through the extra-bloc membership.

Table 2. Summary Statistics

	Total (obs. = 45,770)		RTA with Trade Facilitation Provisions (obs. = 2,191)		RTA without Trade Facilitation Provisions (obs. =2,109)		No RTA (obs.=41,470)	
	Mean	Standard Deviation (SD)	Mean	SD	Mean	SD	Mean	SD
Total Trade	5.8	71.0	44.7	248	18.7	735	3.5	48.4
Trade in final goods	2.6	35.1	20.7	111	83.1	351	1.5	26.9
Trade in intermediate goods	3.2	37.3	23.8	139	10.3	401	2.0	23.0
ln(Distance)	8.77	0.77	7.58	0.92	7.51	1.00	8.89	0.64
Colony	0.01	0.09	0.02	0.12	0.01	0.08	0.01	0.09
Common language	0.15	0.36	0.14	0.35	0.22	0.41	0.15	0.36
Contiguity	0.02	0.13	0.12	0.32	0.11	0.31	0.01	0.08

In Table 2, we present some notable findings. First, the RTA members trade more and the overall trade-creating effect of RTAs is stronger with trade facilitation provisions. In particular, the RTA members, with trade facilitation provisions, trade intermediate goods more than those without trade facilitation provisions and vice versa in the final goods trade. Second, the logarithmic mean of the geographical distance between members of existing RTAs is shorter than those of the whole sample or those between countries excluded from existing RTAs, regardless of trade facilitation provisions. This finding is supported by the higher mean of geographical location sharing (Contiguity) in existing RTAs. Third, there is no significant difference in cultural similarity between intra-bloc and extra-bloc membership, as indicated in the mean of colonial linkage and use of common language.

IV. RESULTS

1. Trade Creation and Diversion Effects: Panel Data Analysis

We apply the PPML estimation to Equation 3. As summarized in Table 3, the gravity model fits the data well, and it explains a major part of the variations in bilateral trade flows. The conventional variables behave much in the same way as the model predicts, and the estimated coefficients are statistically significant,

except for the common language dummy. The estimated coefficient for bilateral distance is significantly negative. The estimated coefficients for colonial linkage and contiguity are significantly positive.

From the significantly positive coefficients for *RTA/TF/Insider* and *RTA/NTF/Insider* dummy variables in Model (1) focusing on trade-creating effect only, we find that intra-bloc membership increases bilateral trade in both final and intermediate goods. Furthermore, the trade-creating effects of RTAs vary according to the commodity type. That is, the intra-bloc trade-creating effect is stronger on final goods than on intermediate goods, regardless of the existence of trade facilitation provisions. However, as we include both intra-bloc and extra-bloc membership in Model (2) which is our preferred regression model, the RTAs consisting of trade facilitation provisions (estimated coefficients for *RTA/TF/Insider*) create 1.5 times more trade in intermediate goods than in final goods ($e^{1.352}$=3.87 relative to $e^{0.925}$=2.52).[8] Furthermore, the trade-creating effects generated by RTAs with trade facilitation provisions are 3.0, 2.0, and 3.9 times stronger for total, final, and intermediate goods trade, respectively, than those generated by RTAs without trade facilitation provisions (estimated coefficients for *RTA/NTF/Insider*).

We also find that in general the RTAs do not divert trade from non-members to members, as estimated in both the significantly positive coefficients for *RTA/TF/Outsider* and statistically insignificant coefficients for *RTA/NTF/Outsider*. Overall, the RTAs with trade facilitation provisions increase not only intra-bloc trade but also extra-bloc trade. This finding is supported by the estimations shown in Model (3) covering RTAs with trade facilitation provisions only. Lastly, we find that the RTAs without trade facilitation provisions are non-trade-creating and divert both final and intermediate goods trade, as shown in Model (4). From the estimation results, we conclude that trade facilitation provisions in existing RTAs are non-discriminatory and complement the discriminatory feature of RTAs without trade facilitation provisions.

[8] Similar to Yadav (2014).

Table 3. Trade-creating and Trade-diverting Effects of RTAs with and without Trade Facilitation Provisions: PPML Estimation with Panel Data of 2000, 2005, and 2010

Dependent Variable: Bilateral Trade	Model (1) All RTAs considering Intra-bloc Membership only			Model (2) All RTAs considering both Intra-bloc and Extra-bloc Membership			Model (3) RTAs with Trade Facilitation Provisions considering both Intra-bloc and Extra-bloc Membership			Model (4) RTAs without Trade Facilitation Provisions considering both Intra-bloc and Extra-bloc Membership		
	Total	Final Goods	Intermediate Goods	Total	Final Goods	Intermediate Goods	Total	Final Goods	Intermediate Goods	Total	Final Goods	Intermediate Goods
Ln (Dist)	-0.701 (0.030)***	-0.615 (0.037)***	-0.764 (0.030)***	-0.709 (0.030)***	-0.619 (0.036)***	-0.774 (0.029)***	-0.767 (0.024)***	-0.696 (0.030)***	-0.820 (0.024)***	-0.802 (0.028)***	-0.732 (0.033)***	-0.858 (0.027)***
Colony	0.416 (0.143)***	0.527 (0.144)***	0.322 (0.156)**	0.432 (0.139)***	0.536 (0.142)***	0.340 (0.150)**	0.468 (0.141)***	0.582 (0.143)***	0.375 (0.152)**	0.555 (0.150)***	0.673 (0.151)**	0.465 (0.162)***
Common Language	-0.025 (0.068)	-0.038 (0.080)	-0.004 (0.070)	-0.029 (0.067)	-0.042 (0.075)	-0.006 (0.068)	-0.010 (0.068)	-0.020 (0.076)	0.010 (0.070)	0.016 (0.068)	0.001 (0.076)	0.039 (0.070)
Contiguity	0.368 (0.070)***	0.398 (0.080)***	0.339 (0.070)***	0.381 (0.069)***	0.402 (0.079)***	0.361 (0.067)***	0.389 (0.070)***	0.404 (0.080)***	0.373 (0.068)***	0.417 (0.072)***	0.436 (0.081)***	0.399 (0.071)***
RTA/TF/Insider	0.472 (0.061)***	0.512 (0.068)***	0.467 (0.063)***	1.150 (0.204)***	0.925 (0.241)***	1.352 (0.195)***	0.958 (0.143)**	0.778 (0.174)***	1.121 (0.136)***			
RTA/NTF/Insider	0.339 (0.088)***	0.451 (0.100)***	0.264 (0.097)***	0.387 (0.091)***	0.464 (0.104)***	0.347 (0.098)***				0.044 (0.084)	0.134 (0.094)	-0.030 (0.094)
RTA/TF/Outsider				0.652 (0.187)***	0.400 (0.221)*	0.843 (0.179)***	0.582 (0.123)***	0.410 (0.155)***	0.715 (0.116)***			
RTA/NTF/Outsider				0.066 (0.160)	-0.080 (0.191)	0.162 (0.165)				-0.342 (0.086)***	-0.290 (0.101)***	-0.393 (0.094)***
No. of Observations	45,139	45,139	45,770	45,139	45,139	45,770	45,139	45,139	45,770	45,139	45,139	45,770
R^2	0.92	0.86	0.89	0.88	0.86	0.89	0.88	0.86	0.89	0.88	0.86	0.88
Time Varying Exporter and Importer Fixed Effects	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes

2. Trade Creation and Diversion Effects: Cross-Sectional Data Analysis with Controlling Nation's Overall Level of Trade Facilitation

In order to distinguish the interacting trade effects of RTAs with member-specific trade facilitation provisions from the effects of nation's overall trade facilitation, we include the World Bank's *logistic performance index* (LPI) as an independent control variable measuring a country's average level of trade facilitation. Accordingly, the gravity equation in the Equation 3 is modified to Equation 4, as follows.

Equation 4.

$$ln(Trade^{z}_{itj}) = \alpha_0 + \alpha_{it} + \alpha_{jt} + \alpha_1 \ln(DIST_{ij}) + \beta' X' + \delta ln(LPI_{it} \cdot LPI_{jt}) + \gamma_1 RTA^{k}/Insider_{ijt} + \gamma_2 RTA^{k}/Outsider_{ijt} + \varepsilon_{ijt}$$

where LPI is the logistic performance index. The logistic performance index is obtained from the World Bank. For this experiment, we use cross-sectional data for 9,705 country pairs that include 154 countries for 2010 because of the limited availability of LPI data reported by the World Bank.[9] In line with the studies surveyed by Dennis (2010), we expect that better trade facilitation, as measured by logistic performance index in country-pairs, increases trade.

As reported in Table 4, there is no significant difference in the results, compared with the panel data analysis, without controlling the general effect of trade facilitation (see Table 3). The trade-creating effect of trade facilitation, measured by LPI, is significantly strong[10] but the trade effects of RTA are weaker as we control the overall effect of trade facilitation. Moreover, in contrast with the case without controlling the overall effect of trade facilitation, we find that the intra-bloc trade-creating effect (estimated coefficient for *RTA/TF/Insider* in Model 5) is stronger on intermediate goods than on final goods when trade facilitation provisions exist, whereas the opposite is true when trade facilitation provisions do not exist (estimated coefficient for *RTA/NTF/Insider* in Model 5). This finding is supported by the estimations shown in Model (7).

[9] The sample size should be 11,751 country pairs, but there are some missing data for intermediate goods trade.

[10] Similar to Felipe and Kumar (2010).

Table 4. Trade-creating and Trade-diverting Effects of RTAs with and without Trade Facilitation Provisions: PPML Estimation with Cross-sectional Data for 2010

Dependent Variable: Bilateral Trade	Model (5) All RTAs considering Intra-bloc Membership only			Model (6) All RTAs considering both Intra -bloc and Extra-bloc Membership			Model (7) RTAs with Trade Facilitation Provisions considering both Intra -bloc and Extra-bloc Membership			Model (8) RTAs without Trade Facilitation Provisions considering both Intra -bloc and Extra-bloc Membership		
	Total	Final Goods	Intermediate Goods	Total	Final Goods	Intermediate Goods	Total	Final Goods	Intermediate Goods	Total	Final Goods	Intermediate Goods
Ln(Dist)	-0.692 (0.036)**	-0.594 (0.038)***	-0.762 (0.041)***	-0.690 (0.035)***	-0.595 (0.038)***	-0.758 (0.040)***	-0.735 (0.031)***	-0.638 (0.035)***	-0.805 (0.035)***	-0.764 (0.031)***	-0.671 (0.035)***	-0.835 (0.033)***
Colony	0.446 (0.222)**	0.527 (0.233)**	0.354 (0.239)	0.455 (0.220)**	0.535 (0.234)**	0.367 (0.233)	0.471 (0.224)**	0.546 (0.236)**	0.391 (0.241)	0.534 (0.228)**	0.608 (0.240)**	0.457 (0.242)*
Common Language	-0.012 (0.084)	-0.027 (0.091)	0.021 (0.093)	-0.008 (0.084)	-0.030 (0.091)	0.028 (0.091)	0.012 (0.085)	-0.012 (0.092)	0.053 (0.096)	0.022 (0.084)	0.000 (0.091)	0.063 (0.093)
Contiguity	0.313 (0.090)***	0.362 (0.101)***	0.267 (0.095)***	0.321 (0.092)***	0.345 (0.101)***	0.308 (0.095)***	0.334 (0.093)***	0.363 (0.102)***	0.316 (0.097)***	0.337 (0.092)***	0.379 (0.102)***	0.301 (0.098)***
Ln(LPI*LPI)	25.975 (1.312)***	26.309 (1.296)***	25.693 (1.496)***	25.990 (1.310)***	26.283 (1.296)***	25.736 (1.455)***	26.073 (1.307)***	26.372 (1.298)***	25.818 (1.456)***	25.673 (1.403)***	25.985 (1.378)***	25.383 (1.560)***
RTA/TF/Insider	0.293 (0.072)***	0.294 (0.072)***	0.315 (0.086)***	0.688 (0.303)**	0.508 (0.255)**	1.521 (0.364)***	0.678 (0.174)***	0.064 (0.166)	1.177 (0.206)***			
RTA/NTF/Insider	0.283 (0.100)***	0.307 (0.104)***	0.260 (0.129)**	0.304 (0.100)***	0.245 (0.105)**	0.365 (0.123)***				0.098 (0.092)	0.133 (0.098)	0.055 (0.120)
RTA/TF/Outsider				0.378 (0.290)	-0.797 (0.243)***	1.166 (0.353)***	0.461 (0.154)***	-0.266 (0.153)*	0.925 (0.185)***			
RTA/NTF/Outsider				-0.274 (0.292)	-1.004 (0.261)***	0.239 (0.358)				-0.570 (0.144)***	-0.225 (0.164)	-0.785 (0.169)***
No. of Observations	9,694	9,694	9,705	9,694	9,694	9,705	9,694	9,694	9,705	9,694	9,694	9,705
R^2	0.92	0.91	0.92	0.92	0.91	0.92	0.92	0.91	0.92	0.92	0.91	0.92
Exporter and Importer Fixed Effects	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes

Furthermore, as we include both intra-bloc and extra-bloc membership in Model (6), the significantly negative coefficients for *RTA/TF/Outsider* and *RTA/NTF/Outsider* are estimated for trade in final goods. It indicates that the RTAs with trade facilitation provisions divert trade in final goods from non-members to members. Unlike the decrease in final goods imports from non-members, the RTAs with trade facilitation provisions create more intermediate goods trade and RTAs without trade facilitation provisions do not divert, as shown by the estimated coefficient for the *RTA/TF/Outsider* and *RTA/NTF/Outsider*. It indicates that trade facilitation provisions are discriminatory for final goods trade but not for intermediate goods trade. This finding is supported by the estimations shown in Model (7). We also find that RTAs without trade facilitation provisions are non-trade-creating for both final and intermediate goods trade. In particular, unlike the RTAs with trade facilitation provisions, the RTAs without trade facilitation provisions significantly divert intermediate goods trade (Model (8)). These findings confirm that the discriminatory feature of RTAs differs according to commodity type. From the estimation results, we conclude that trade facilitation provisions in existing RTAs are non-discriminatory for intermediate goods trade but discriminatory for final goods trade.

3. Robustness Check

To check the robustness of the PPML estimation, we compare the estimation results covering a different sample period, 2007 (Model (9) as equivalent to Model (6)) and those from an alternative specification for marginal effects of the RTAs with trade facilitation provisions (Model (10) as comparable to Model (7)), as shown in Table 5. Compared with the results in Table 4, the similar patterns found in Table 4 strongly support the robustness of the PPML estimation.

Table 5. Robustness Check

Dependent Variable: Bilateral Trade	Model (9) Alternative Sample Period[1]			Model (10) Alternative Specification		
	RTAs with Intra-bloc and Extra-bloc Membership[2]			Marginal Effect of RTAs with Trade Facilitation Provisions[3]		
	Total	Final Goods	Intermediate Goods	Total	Final Goods	Intermediate Goods
Ln(Dist)	-0.663 (0.035)***	-0.578 (0.040)***	-0.731 (0.035)***	-0.689 (0.035)***	-0.595 (0.038)***	-0.757 (0.040)***

Table 5. Continued

Dependent Variable: Bilateral Trade	Model (9) Alternative Sample Period[1]			Model (10) Alternative Specification		
	RTAs with Intra-bloc and Extra-bloc Membership[2]			Marginal Effect of RTAs with Trade Facilitation Provisions[3]		
	Total	Final Goods	Intermediate Goods	Total	Final Goods	Intermediate Goods
Colony	0.378 (0.224)*	0.435 (0.222)**	0.418 (0.240)*	0.452 (0.220)**	0.524 (0.233)**	0.370 (0.233)
Common Language	-0.017 (0.089)	-0.029 (0.094)	0.005 (0.094)	-0.008 (0.084)	-0.029 (0.091)	0.029 (0.092)
Contiguity	0.362 (0.090)***	0.364 (0.098)***	0.360 (0.091)***	0.327 (0.091)***	0.359 (0.101)***	0.304 (0.095)***
Ln(LPI∗LPI)	13.176 (0.593)***	13.608 (0.588)***	12.884 (0.662)***	25.994 (1.306)***	26.303 (1.293)***	25.732 (1.461)***
RTA/Insider				0.428 (0.274)	-0.181 (0.328)	0.826 (0.288)***
RTA/TF/Insider	0.547 (0.349)	-0.305 (0.277)	1.205 (0.407)***	0.526 (0.190)***	-0.222 (0.178)	1.026 (0.230)***
RTA/NTF/Insider	0.436 (0.108)***	0.417 (0.117)***	0.495 (0.121)***			
RTA/Outsider				0.108 (0.255)	-0.479 (0.312)	0.476 (0.258)*
RTA/TF/Outsider	0.155 (0.337)	-0.694 (0.262)***	0.774 (0.395)**	0.536 (0.168)***	-0.213 (0.153)	1.022 (0.198)***
RTA/NTF/Outsider	-0.393 (0.339)	-0.867 (0.277)***	-0.015 (0.397)			
No. of Observations	6,917	6,917	9,200	9,694	9,694	9,705
R^2	0.93	0.91	0.94	0.92	0.91	0.92
Exporter and Importer Fixed Effects	yes	yes	yes	yes	yes	yes

Notes: 1. Cross-sectional analysis for 2007.
2. Equivalent to Model (6) in Table 5.
3. Comparable to Model (7) in Table 5.

4. An Application to the APEC Region

One of the distinguishing features of the APEC's efforts for trade and investment liberalization is non-exclusive. Non-discriminatory application of trade facilitation can be an example and has been recognized as one of the most important objectives among the APEC's cooperation programs. The APEC's Bogor declaration in 1994 stated that trade facilitation was needed to complement trade liberalization. More specifically, the APEC's Shanghai declaration in 2003 stated the objective of reducing transaction costs by 5 percent by focusing on the four areas of trade facilitation, customs procedures, standards and conformity, business mobility, and e-commerce. Compared to tariff reducing reform policies among only trade bloc members, trade facilitation makes cross-border transactions easier for members to open up toward nonmembers thereby satisfying the APEC's commitment to "open regionalism."

In order to investigate whether the APEC's efforts for enhancing trade facilitation, we estimate the trade effects of RTAs with and without trade facilitation provisions covering the APEC region separated from RTAs around the world. For this experiment, we rerun Equation 3, estimate the trade effects of RTAs in the APEC region (hereafter APEC-RTAs) separated from the sample covering all RTAs in the world, and report in Table 6.

As we compare estimation results in Table 6 with results in Model (2) of Table 3, we find that (i) both intra-bloc and extra-bloc trade-creating effects of APEC-RTAs are significantly positive with trade facilitation provisions (*APEC_RTA/TF/Insider* and *APEC_RTA/TF/Outsider*) but statistically insignificant without trade facilitation provisions *(APEC_RTA/NTF/Insider* and *APEC_RTA/NTF/Outsider*); (ii) no matter what the APEC-RTAs are equipped with or without trade facilitation provisions, the APEC-RTAs are not diverting trade indicating the non-discriminatory feature of APEC-RTAs (*APEC_RTA/TF/Outsider* and *APEC_RTA/ NTF/Outsider*); (iii) for NON-APEC-RTAs, both intra-bloc and extra-bloc trade-creating effects are weaker with trade facilitation provisions and stronger without trade facilitation provisions than those of the APEC-RTAs; and (iv) the NON-APEC-RTAs without trade facilitation provisions are trade-diverting particularly for trade in final goods (negative coefficient of *NONAPEC_RTA/NTF/Outsider*).

Table 6. Trade-creating and Trade-diverting Effects of APEC-RTAs with and without Trade Facilitation Provisions: PPML Estimation with Panel Data of 2000, 2005, and 2010

	Total	Final Goods	Intermediate Goods
Ln (Dist)	-0.655 (0.030)***	-0.559 (0.036)***	-0.726 (0.029)***
Colony	0.363 (0.138)***	0.428 (0.137)***	0.303 (0.152)**
Common Language	-0.050 (0.067)	-0.059 (0.067)	-0.027 (0.066)
Contiguity	0.385 (0.071)***	0.421 (0.080)***	0.358 (0.069)***
APEC_RTA/TF/Insider	1.371 (0.188)***	1.099 (0.205)***	1.598 (0.190)***
APEC_RTA/NTF/Insider	0.040 (0.113)	-0.072 (0.145)	0.125 (0.122)
APEC_RTA/TF/Outsider	1.088 (0.164)***	0.947 (0.181)***	1.190 (0.168)***
APEC_RTA/NTF/Outsider	0.279 (0.229)	0.099 (0.267)	0.411 (0.222)*
NONAPEC_RTA/TF/Insider	0.695 (0.195)***	0.300 (0.214)	0.974 (0.201)***
NONAPEC_RTA/NTF/Insider	0.393 (0.106)***	0.446 (0.111)***	0.353 (0.122)***
NONAPEC_RTA/TF/Outsider	0.305 (0.172)*	-0.071 (0.187)	0.573 (0.178)***
NONAPEC_RTA/NTF/Outsider	-0.183 (0.154)	-0.387 (0.165)**	-0.047 (0.165)
No. of Observations	45,139	45,139	45,770
R^2	0.91	0.92	0.91
Time Varying Exporter and Importer Fixed Effects	yes	yes	yes

V. CONCLUDING REMARKS

In this quantitative analysis, we attempted to "explain," instead of "hypothesizing" why most of the recent RTAs contain trade facilitation provisions, especially in light of the deepening regional interdependence under global value chains, and thus support the necessity of multilateralizing RTAs through the deeper integration of non-discriminatory trade facilitation provisions.

As we evaluate empirical findings in Section IV, we can answer the research questions raised in Section II. Both eliminating tariff by forming RTAs and enhancing trade facilitation are trade-creating and the positive effect is much stronger if the RTA is equipped with trade facilitation provisions. It means that the existing RTAs possessing trade facilitation provisions are trade-creating, whereas the RTAs without trade facilitation provisions do not create but rather divert trade, thereby indicating the non-discriminatory features of trade facilitation provisions in existing RTAs. Thus, deeper integration through implementing non-discriminatory trade facilitation provisions is a desirable policy option to complement the discriminatory feature of RTAs and a powerful policy option to propel domestic reform as well.[11]

In particular, as we control the general impact of trade facilitation indicated by the World Bank's LPI, we find that the intra-bloc trade-creating effect is stronger on intermediate goods than on final goods when trade facilitation provisions exist, whereas the opposite is true when trade facilitation provisions do not exist. We also find that the preferential treatment in trade, created by forming RTAs consisting of trade facilitation provisions, is discriminatory for trade in final goods and non-discriminatory for trade in intermediate goods.

As a case study applied to RTAs in the APEC region, we find that trade facilitation provisions matter more significantly to RTAs covering the APEC economies compared to other regions and have not been discriminatory supporting the APEC's principle of open regionalism. Accordingly, we positively support the APEC's unilateral liberalization effort for reducing trade costs across borders through the enhancement of trade facilitation measures. In addition, we strongly suggest that the proposed region-wide FTAAP (free trade areas of the Asia-Pacific) should contain non-discriminatory trade facilitation provisions.

Before closing, as a referee suggested for the estimation technique, if we use a "two-way fixed-effect model estimation for this panel analysis instead of using time varying exporter and importer fixed effect model, we may more efficiently control the macroeconomic environment which might affect the dependent variable with year dummies." Regarding another referee's suggestion on the RTA database,

[11] Many governments use RTAs as a pushing factor for domestic reform including transparent customs procedures, regulatory reforms, and information technology. According to Wilson, Mann, and Otsuki (2005), domestic reform efforts by both importing and exporting countries remarkably increase global trade and economic well-being.

our "database does not delve into details about whether the trade facilitation provisions cover TBT (technical barriers to trade), SPS (sanitary and phytosanitary measures), service trade, or difference in obligation." These issues should be covered but we will leave them for our future research.

REFERENCES

Anderson, J. E. and E. van Wincoop. 2003. "Gravity with Gravitas: A Solution to the Border Puzzle," *American Economic Review*, vol. 93, no 1, pp. 170-192.

Asia-Pacific Economic Cooperation (APEC). 2002. "Measuring the Impact of APEC Trade Facilitation on APEC Economies: A CGE Analysis," Chapter 2 in *Benefits of Trade and Investment Liberalization and Facilitation*. APEC Economic Committee.

Arndt, S. W. 2001. "Production Networks in an Economically Integrated Region," *ASEAN Economic Bulletin*, vol. 18, no. 1, pp. 24-34.

Baier, S. L. and J. H. Bergstrand. 2002. On the Endogeneity of International Trade Flows and Free Trade Agreements. Unpublished manuscript.

_____. 2004. "Economic Determinants of Free Trade Agreements," *Journal of International Economics*, vol. 64, no. 1, pp. 29-63.

_____. 2007. "Do Free Trade Agreements Actually Increase Members' International Trade?," *Journal of International Economics*, vol. 71, no. 1, pp. 72-95.

Baldwin, R. 2014. "Multilateralising 21st Century Regionalism," *Global Forum on Trade Reconciling Regionalism and Multilateralism in a Post-Bali World*. Paris: OECD Conference Centre.

Baldwin, R. and P. Low. (eds.) 2009. *Multilateralizing Regionalism: Challenges for the Global Trade System*. Cambridge: Cambridge University Press.

Deardorff, A. V. 2001. "International Provision of Trade Services, Trade, and Fragmentation," *Review of International Economics*, vol. 9, no. 2, pp. 233-248.

Dennis, A. 2006. The Impact of Regional Trade Agreements and Trade Facilitation in the Middle East and North Africa Region. World Bank Policy Research Paper, no. 3837.

_____. 2010. "Global Economic Crisis and Trade: The Role of Trade Facilitation," *Applied Economics Letters*, vol. 17, no. 18, pp. 1753-1757.

Felipe, J. and U. Kumar. 2010. The Role of Trade Facilitation in Central Asia: A Gravity Model. Working Paper, no. 628. New York: Levy Economics Institute of Bard College.

Hamanaka, S., Tafgar., A. and D. Lazaro. 2010. Trade Facilitation Measures Under Free Trade Agreements: Are They Discriminatory Against Non-Members? ADB Working Paper Series on Regional Economic Integration, no. 55.

Kim, S. and I. Park. 2005. "Trade Facilitation and A Northeast Asian Free Trade Arrangement," *International Area Studies Review*, vol. 8, no. 1, pp. 45-63.

Kim, S., Park I. and S. Park. 2013. "A Free Trade Area of the Asia Pacific (FTAAP): Is It Desirable?" *Journal of East Asian Economic Integration*, vol. 17, no. 1, pp. 3-25.

Lejárraga, I. 2014. Deep Provisions in Regional Trade Agreements: How Multilateral-friendly? An Overview of OECD Findings. OECD Trade Policy Papers, no. 168.

Magee, C. 2003. "Endogenous Preferential Trade Agreements: An Empirical Analysis," *B.E. Economic Analysis and Policy*, vol. 2, no. 1, pp. 1-19.

Maur, J. C. 2008. Regionalism and Trade Facilitation: A Primer. World Bank Policy Research Working Paper 4464.

Neufeld, N. 2014. Trade Facilitation Provisions in Regional Trade Agreements: Traits and Trends. Staff Working Paper ERSD-2014-01. Geneva: Economic Research and Statistics Division, World Trade Organization.

Organization for Economic Cooperation and Development (OECD). 2002. The Relationship between Regional Trade Agreements and Multilateral Trading System: Trade Facilitation. TD/TC/WP(2002)17/FINAL, Working Party of the Trade Committee, OECD.

_____. 2003. Quantitative Assessment of the Benefits of Trade Facilitation. TD/TC/WP (2003)31/FINAL, Working Party of the Trade Committee, OECD.

Otsuki, T. 2011. Quantifying the Benefits of Trade Facilitation in ASEAN. OSIPP Discussion Paper: DP-2011-E-006. Osaka: The Osaka School of International Public Policy, Osaka University.

Santos Silva, J. M. C. and S. Tenreyo. 2006. "The Log of Gravity," *Review of Economics and Statistics*, vol. 88, no. 4, pp. 641-658.

United Nations Conference on Trade and Development (UNCTAD). 2011. *Trade Facilitation in Regional Trade Agreements*. New York and Geneva: United Nations.

United Nations Economic and Social Commission for Asia and the Pacific (UNESCAP). 2007. "Trade Facilitation Beyond the Multilateral Trade Negotiations: Regional Practices, Customs Valuation and Other Emerging Issues," A study by the Asia-Pacific Research and Training Network on Trade.

_____. 2011. Trade Facilitation in Regional Trade Agreements: Recent Trends in Asia and the Pacific. Staff Working Paper, 02/11, Trade and Investment Division, UNESCAP.

Wilson, J. S., Mann, C. L. and T. Otsuki. 2004. Assessing the Potential Benefit of Trade Facilitation: A Global Perspective. World Bank Policy Research Working Paper, WPS 3224.

Yadav, N. 2014. "Impact of Trade Facilitation on Parts and Components Trade," *International Trade Journal*, vol. 28, no. 4, pp. 287-310.

Yasui, T. 2014. Trade Facilitation in Regional Trade Agreements. WCO Research Paper, no. 30. World Customs Organization.

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