Trade-creating Regime-wide Rules of Origin: A Quantitative Analysis[#]

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ABSTRACT

Regime-wide rules of origin (ROO), such as diagonal cumulation, de minimis, and self-certification requirement, can be applied to reduce additional administration and compliance costs for verifying restrictive ROO. However, empirical evidence related to the trade effect of various regime-wide ROOs is very few. We quantitatively investigate the trade effect of regime-wide ROOs by estimating the modified gravity equation with panel data on 48,088 country pairs covering 151 countries for 6 years from 1980 through 2005 at 5 year intervals. From our empirical experiments, we find that implementation of regime-wide ROOs create more trade between FTA members. More specifically, (i) de minimis (diagonal cumulation) creates the least (most, respectively) trade effect among the three policy alternatives; (ii) the positive gains are proven to be much stronger for a free trade area (FTA) between developing countries; (iii) de minimis together with diagonal cumulation is the most trade-creating policy mix, especially, for the FTAs including developing countries.

Keywords: Rules of origin, De Minimis, Certification, Cumulation, Free trade area

JEL Classification: C23, F15

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1. Introduction

Restrictive rules of origin (ROO) can be a serious impediment to the successful utilization of free trade areas (FTAs)[1]. To reduce the trade diversion effect of strict ROOs, regime-wide ROOs, such as de minimis, self-certification requirement, and diagonal cumulation can be applied to complement the restrictive ROO.

However, empirical evidence related to the trade effect of various regime-wide ROOs is very few. Estevadeordal and Suominen (2003) can be an exception. They investigate the trade effect of various regime-wide ROOs by estimating modified gravity equations. However, they apply simple OLS and TOBIT estimation techniques without considering the zero trade issue. Moreover, the cross-section study covering one year in 2001 may not be convincible.

Recognizing the limitations in existing studies, we conduct a quantitative analysis of regime-wide ROOs on trade by using a modified gravity equation. We use panel data on 48,088 country pairs covering 151 countries for 6 years from 1980 through 2005 at 5 year intervals. Following Head et al. (2010), we drop observations that are recorded as zero bilateral trade instead of adopting the Poisson Pseudo-Maximum Likelihood (PPML) estimation technique.[2] Moreover, we consider the time-varying exporter and importer fixed effect to control "multilateral trade resistance" in Anderson and van Wincoop (2003). For policy options, we estimate the trade effect of various combinations of the regime-wide ROOs by specifying interaction terms in the model. In addition, we classify the trade effects into three types of partnership–FTAs between developing countries (SS), between developed countries (NN), and between developed and developing countries (NS).

Section 2 describes the methodology, Section 3 summarizes the empirical findings, and Section 4 concludes the research.

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[1] See Brown et al. (2001), Estevadeordal et al. (2003), Baldwin (2006), Gasiorek et al. (2007), Bombarda and Gamberoni (2008), Harris (2008), Estevadeordal et al. (2008), and Park and Park (2009).

[2] PPML estimation technique introduced by Santos Silva and Tenreyo (2006) has been applied to solve the presence of the zero trade problem. However, Head et al. (2010) and Martin and Pham (2008) criticize the biased estimates by the PPML when there is a large number of zero trade (17.6% in our case). We conducted PPML estimations and found that the results were mostly inconvincible.

2. Methodology

2.1. Model specification and estimation technique

We employ a modified gravity model of bilateral trade flows to estimate the trade effects of FTAs with different ROOs. We classify FTAs by types of regime-wide ROOs as specified in Equation 1.

Equation 1.

$$\ln(Trade_{ijt}) = \alpha_{ij} + \alpha_1 \ln(GDP_{it}) + \alpha_2 \ln(GDP_{jt}) + \alpha_3 \ln(DIST_{ij}) + \beta' X' + \Sigma_k ROO/k + \delta Year_t + \varepsilon_{ijt}$$

where

- *Trade* denotes the value of the bilateral trade between *i* and *j* at time *t*,
- *GDP* is real GDP,
- *DIST* is the distance between *i* and *j*,
- ***X'*** is a set of control variables that includes the *Border*, *Colony*, and *Common Language* dummy,
- *ROO* is a set of regime-wide ROOs: $k \in$ {*Bilateral Cumulation, Diagonal Cumulation*}, {*De Minimis, No De Minimis*} or {*Public Certification, Self Certification*},
  - *Bilateral Cumulation (Diagonal Cumulation)* is a binary variable which is unity if *i* and *j* belong to an FTA formed with bilateral (diagonal, respectively) cumulation,
  - *De Minimis (No De Minimis)* is a binary variable which is unity if *i* and *j* belong to an FTA formed with (without, respectively) De Minimis,
  - *Public Certification (Self Certification)* is a binary variable which is unity if *i* and *j* belong to an FTA formed with public (self, respectively) certification requirement,
- *Year* denotes a set of binary variables which is unity in the specific year *t*.

The country-pair fixed effect (α_{ij}) in Equation 1 controls factors that are specific to the country pair, such as distance, border, common language, and unobserved ties. As country-pair fixed effect controls bilateral resistance, multilateral resistance should be controlled by dealing

with the time-varying exporter and importer fixed effects (α_{it} and α_{jt}) in the following Equation 2.[3] Due to the time-varying dummies included, *DIST*, *GDP*, and *Year* variables are dropped from Equation 1.

Equation 2.

$$\ln(Trade_{ijt}) = \alpha_{ij} + \alpha_{it} + \alpha_{jt} + \beta' X' + \Sigma_k ROO/k + \varepsilon_{ijt}$$

2.2. Data description

We use panel data on 48,088 country pairs covering 151 countries for 6 years from 1980 through 2005 at 5 year intervals. The trade flow data comes from the *Direction of Trade Statistics* provided by the International Monetary Fund. The nominal value of bilateral trade is measured by the sum of the bilateral exports. Data on country pair specific variables, such as distance, colonial ties, common land border, and common languages, are obtained *from Centre d'Etudes Prospectives et d'Informations Internationales (CEPII).* Data for FTAs by different types of ROOs come from Estevadeordal and Suominen (2003). We extend the data by including the FTAs recently in force using the WTO FTA database.

3. Estimation results

We only report results from the dyad fixed effect estimation, which assumes the presence of unobserved country specific factors. We conducted the Hausman test (Hausman, 1978) and found that the null hypothesis, where the individual effects are uncorrelated with the other regressors in the model, has been rejected. However, from the random effect estimation, we found that the conventional gravity variables *(X' in Equations)* representing the transaction costs behave the way the model predicts and the estimated coefficients are statistically significant but not reported.

[3] See Baldwin and Taglioni (2006), Baier and Bergstrand (2007), and Magee (2008).

3.1. Trade Effect of Regime-wide ROOs in General

From column (1) in Table 1, the estimate on the FTA membership formed with the regime-wide ROO of De Minimis implies that a pair of countries that joins an FTA experiences an11.6 percent increase in trade, with other variables being constant.[4] The estimate on the restrictive ROO case (No De Minimis) is statistically insignificant to create bilateral trade. From our estimation in column (2), we find that certification requirement creates a stronger trade effect than that of De Minimis. In particular, self-certification requirement for ROO generates much more but less significant[5] bilateral trade between members (25.9 percent) of an FTA relative to the case with Public Certification (10.5 percent). As figured in the column (3), implementing the Diagonal Cumulation system creates the most trade-creating effect (46.2 percent). As we combine these three lenient ROOs in column (4), we find similar patterns of generating bilateral trade between members, that is, positive and bigger gains (43.3 percent) from an FTA formed with De Minimis/Diagonal Cumulation/Public Certification. The policy combination of De Minimis/Diagonal Cumulation/Self Certification does not create a statistically significant positive trade effect because of the small sample size.

3.2. Trade Effect of Regime-wide ROOs by Membership

The positive gains from a membership of FTA formed with region-wide ROOs are proven to be much stronger for an FTA between developing countries as figured in Table 2. We confirm that combining De Minimis and Diagonal Cumulation is the most trade-creating policy mix for the FTAs including developing countries (NS and SS). For the FTAs between developed countries, we find that regime-wide ROOs do not affect their bilateral trade. We also find that Self Certification alone is a desirable policy for developing countries but not a statistically significant policy combination with the other two alternatives.

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[4] Since $\exp^{0.11}=1.116$, members of an FTA formed with De Minimis trade 11.6% more than others.

[5] It may be caused by the small sample size of the self certification case which shares 4.0 percent of whole sample (97 over 2422).

4. Conclusion

We quantitatively investigate the trade effect of regime-wide ROOs by estimating the modified gravity equation. From our empirical experiments, we find that implementation of regime-wide ROOs–de minimis, self-certification requirement, and diagonal cumulation create more trade between FTA members. More specifically, (i) de minimis (diagonal cumulation) creates the least (most, respectively) trade effect among the three policy alternatives; (ii) the positive gains are proven to be much stronger for an FTA between developing countries; (iii) de minimis together with diagonal cumulation is the most trade-creating policy mix, especially, for the FTAs including developing countries.

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Table 1. Trade Effect of FTA with Region-wide ROOs in General

ROO/k	De Minimis (1)	Certification (2)	Cumulation (3)	Interaction (4)
De Minimis	0.11 (0.03)***			
No De Minimis	0.08 (0.06)			
Self Certification		0.23 (0.12)*		
Public Certification		0.10 (0.03)***		
Bilateral			0.01 (0.03)	
Diagonal			0.38 (0.05)***	
De Minimis/Bilateral/Public				-0.08 (0.03)**
De Minimis/Bilateral/Self				0.19 (0.12)
De Minimis/Diagonal/Public				0.36 (0.05)***
De Minimis/Diagonal/Self				0.02 (0.51)
No De Minimis/Bilateral/Public				0.07 (0.06)
No De Minimis/Bilateral/Self				0.23 (0.46)
Dyad fixed effects	Yes	Yes	Yes	Yes
Time varying exporter and importer fixed effects	Yes	Yes	Yes	Yes
Number of Observations	48,088	48,088	48,088	48,088

Notes:
Standard errors are in parentheses.
Intercept is included but not reported.
*, **, and *** indicate that the estimated coefficients are statistically significant at 10 percent, 5 percent, and 1 percent, respectively.

Table 2. Trade Effect of FTA with Region-wide ROOs by Member-specific Characteristics

ROO/k	De Minimis (5)	Certification (6)	Cumulation (7)	Interaction (8)
De Minimis(NN)	-0.08 (0.12)			
De Minimis(NS)	0.07 (0.04)*			
De Minimis(SS)	0.22 (0.05)***			
No De Minimis(NS)	0.13 (0.38)			
No De Minimis(SS)	0.08 (0.06)			
Self Certification(NN)		-0.17 (0.41)		
Self Certification(NS)		0.09 (0.16)		
Self Certification(SS)		0.48 (0.18)***		
Public Certification(NN)		-0.06 (0.13)		
Public Certification(NS)		0.07 (0.04)*		
Public Certification(SS)		0.14 (0.04)***		
Bilateral(NN)			-0.15 (0.11)	
Bilateral(NS)			0.13 (0.04)***	
Bilateral(SS)			0.12 (0.04)**	
Diagonal(NN)			-0.06 (0.21)	
Diagonal(NS)			0.31 (0.05)***	
Diagonal(SS)			0.58 (0.10)***	
De Minimis/Bilateral/Public(NN)				-0.15 (0.11)
De Minimis/Bilateral/Public(NS)				-0.14 (0.04)***
De Minimis/Bilateral/Public(SS)				0.02 (0.06)
De Minimis/Bilateral/Self(NN)				-0.17 (0.41)
De Minimis/Bilateral/Self(NS)				0.01 (0.18)
De Minimis/Bilateral/Self(SS)				0.43 (0.18)**
De Minimis/Diagonal/Public(NN)				-0.06 (0.21)
De Minimis/Diagonal/Public(NS)				0.31 (0.06)***
De Minimis/Diagonal/Public(SS)				0.58 (0.10)***
De Minimis/Diagonal/Self(NS)				0.01 (0.51)
No De Minimis/Bilateral/Public(NS)				-0.14 (0.64)
No De Minimis/Bilateral/Public(SS)				0.07 (0.06)
No De Minimis/Bilateral/Self(NS)				0.22 (0.56)
Dyad fixed effects	Yes	Yes	Yes	Yes
Time varying exporter and importer fixed effects	Yes	Yes	Yes	Yes
Number of Observations	48,088	48,088	48,088	48,088

Notes:
Standard errors are in parentheses.
Intercept is included but not reported.
*, **, and *** indicate that the estimated coefficients are statistically significant at 10 percent, 5 percent, and 1 percent, respectively.