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**Master's Thesis of Graduate School of International Studies**

# **Impact of NTMs in Service Trade**

**-With the application of developed Gravity Model-**

서비스무역에 대한 비관세조치의 영향 분석: 발달된 중력모델을  
중심으로

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# Abstract

## **Impact of NTMs in Service Trade**

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Non-tariff Measures are gaining attention in the recent decades with the fall of tariffs. As the world is pursuing trade liberalization, one of the most effective protective measures a country can take became NTMs. This is especially true for service trade as there are no tariff measures. Every measure against the service trade is NTMs. Despite the significance, there are only few studies that exhibit the correlations of NTMs and service trade. Also, the subjectivity may have occurred due to the use of one type of gravity model. This study taps into finding the concrete correlation between NTMs and service trade with the application of various developed gravity models from structural gravity model to PPML.

The analysis is divided into two levels: Sectoral and Classifications. The results of all models have shown the strong negative correlations between NTMs and service trade volume. The PPML method have shown the most deep negative correlation, followed by fixed effects model then the structural gravity model.

Keywords: Non-tariff Measures, NTMs, Gravity Model, Service Trade

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## 1. INTRODUCTION

### 1.1 Purpose of the Research

#### **Non-Tariff Measures**

According to business surveys conducted by OCED, regardless of their size, firms face non-tariff barriers as well as tariff barriers when entering foreign markets. With increasing RTAs, trade barriers have significantly been decreasing. However, non-tariff measures seem to replace the traditional roles of trade barriers in a bid to protect importing countries' domestic industry particularly in developing countries.

In fact, Non-tariff measures can be more restrictive for trade than actual tariffs. During the second half of the 20th century, multilateral trade rounds dramatically reduced tariffs. In 1949, the US charged an average tariff of 33.9 percent. Today it is recorded to be only 3.5 percent. The other major economies experience similar patterns that EU positing 5.3 percent, while one of the world's protective country China posits 9.5 percent. (OECD,2019). This pattern shows tariffs are gradually fading.

Non tariff measures on the other hand, are increasing over the years. Although RTAs and FTAs include the restrictions on implementing Non-Tariff measures, often time it is hard to identify and quantify. It is usually integrated in the

domestic regulations and laws and it is not constructed with simplicity. Often times it is accompanied in the process of the manufacturing to the distribution and onto the final consumption. Hence, it is hard to identify or group into neither singular type nor it is viable in measuring the actual impact to trade.

These features are adherently acknowledged by countries that are aiming to implement protectionist measures but are hindering because of the world's trade liberation favoritism. As the recent decade's aim is to liberalize the trade for mutual development, tariffs and other visible protectionist measures are set to drop. In the efforts of WTO and others, such aim has been successfully performed into actions. Countries, that are underdeveloped or where such trade liberalization is detrimental to subjective sectors of industries, therefore seek to find different but sly measures. Hence, Non tariff measures are on the rise.

This is especially true for service trade, as there is no tariff measure. With the absence of tariffs, every measure, in economic perspectives, are considered Non-tariff measures and therefore have more defective power. Hence, this research aims the impacts of the non-tariff measures on export values using STRI provided by OECD.

## **Gravity Model**

The gravity equation has been renowned and frequently used in trade researches, especially measuring the empirical impacts of certain sectors in the international trade. However, gravity model has been developed over time, from considering only distance of the countries to attempts on solving endogeneity and heteroskedasticity. These developed models intrinsically posit different outcomes and interpretations. However, many researches on service trade often times focus on just one type of gravity model. This does not mean they are lack of value but it is ideal to test various models and seek the definite value or outcome.

This study aims to observe the aforementioned Non tariff measure impacts on service trade using various gravity models to examine the differences among models and bring out the concrete measure of impact.

Firstly, using the structural gravity model in two level analysis. This study aims to find out the general impact of Non-Tariff measures on service trade, on sectoral level and STRI classification level: STRI is Service Trade Restrictive Index issued by OECD which is divided into different classes and sectors. STRI will be further analyzed in data section. Then, the impact of Non-Tariff measures will be measured with Fixed Effects Model in three stages: Exporter-time, Importer-time and Exporter-Importer-Time. Lastly, the PPML will be used.

## 1.2 Literature review

There exist numerous researches conducted on the impacts of Non-tariff measures to the trade. Hoda et, al.(2016), used WTO's dataset on Non-Tariff measures using gravity model to empirically testify the correlations of NTM and exports. This valuable research helped exporting companies to improve qualities of their products to meet the standards of destination countries.

Likewise, Hayakawa et, al.(2016), conducted research on similar topic but showed that there were significant trade creations due to reduction of tariffs but not so much of NTMs. However, they displayed that NTB elimination had insightful impacts among low-income countries.

These two researches showed different outcomes despite of their similar aims. This is why more concrete measures of impacts of NTMs with various gravity models. The results could be subjective or incomplete as shown in the two aforementioned researches.

Shopotylo (2016) demonstrated different effects of SPS and TBT measures which are type of NTMs. SPS measure stands for Sanitary and Phytosanitary measures and TBT stands for Technical Barriers to Trade. Due to their different nature and aim, SPS measures is shown to increase the extensive margins of exports and reduce intensive margin while TBT reduce exports at extensive margins and increase exports at intensive margins.



Timini and Conesa(2018) also showed that NTMs had heterogenous effects on Chinese exports both by NTM groups and across product type.

Hence, the impact of NTMs may vary across sector, nature of NTMs and by each country. Aforementioned researches clearly demonstrated that in order to concretely measure the global impacts of NTMs, it is important to consider the heterogeneous variables including sectors, nature of NTMs and more.

There exist comparatively small researches conducted on service trade. Those researches suggested that service trade restrictive measures (Non-tariff measures accustomed to service trade) affects the export values. Using the cross-section data of STRI (Service Trade Restrictiveness Index) provided by OECD, empirical regression on export value had been done (Kim, 2016).

According to Moon in 2016, weight of the STRI is subjective as it reflects the subjective perspectives of the researcher. This means, the results may vary depends on the focus of the research and credibility may also be skewed to the reader. Hence, it is important to include different mechanisms that may reflect possible omitting as well as downsize the subjectivity.

Nordas(2016), unlike Kim(2016), implemented weighted average of 5 classifications of STRI to measure the impacts of NTMs in service exports. This

research has proven negative correlations between the trade liberalization on service industry and the amount of service exports.

### 1.3 Differentiation from previous researches

This research, unlike the previous researches, focuses on isolating the impacts of NTMs in service export by using 2014-2017 STRI panel data. As it is suggested that results of the research may be subjective, it will revise different types of gravity model that is developed throughout the period.

The former researchers focused on the macroscopic impacts of STRI. This will analyze the general impacts of STRI but this type of method is not credible when it comes to policy implications and will not be applicable based on the contexts. Hence, this research will, along with the macroscopic analysis, include STRI Class as suggested by Nordas(2016) but isolated by each Class and will also conduct regression based on sectors rather than whole economy.

## 2. Data

The core data used for analysis includes STRI (OECD), CEPII gravity data and EBOP 2010.

### 1) STRI

OECD provides Service Trade Restrictiveness for 44 countries and 22 sectors through analyzing 16000 laws and regulations over 2014-2018 periods. The general STRI is provided that comprises the overall value of STR along with isolated data in 5 classifications: 1.Category of restrictions, 2.GATS Modes of supply, 3.Market access and national treatment, 4.Firm's establishment versus firm's ongoing operations and 5.Discriminatory versus non-discriminatory.

General STRI data used in this research is divided in sectors and years to clarify the sectoral impacts.

### 2) CEPII gravity data

This research used CEPII gravity data that comprises the data needed for the gravity model analysis: GDP, population, trade and money agreements and bilateral specific data such as common language, for each couple of country, from 1948 to 2015. This research used the data from 2014-2015 in this set and generated transcendent data to 2016 and 2017. The rest is filled through researches from OECD, World bank.

### 3) EBOP 2010

This research utilizes the EBOP 2010 data set provided by OECD to implement bilateral trade value, which is the dependant variable. It has 64040 data comprised with 40 countries and partners, 17 different service sectors for 2014-2017 periods.

### 4) Data Combination

Since the data sets are not completely complementary, it had to be merged. Out of 44 countries from STRI and 40 countries from EBOPS, the corresponding countries were 35 countries. Hence, this research is conducted with using 35 countries that are common to both data sets.

Sectors also differed. STRI had 22 sectors while EBOPS had 17 sectors, following merge had been formulated by referring to 'Correspondence between EBOPS 2010 and the CPC and Choi'(2018).

Table 1. STRI and EBOPS compatibility

STRI sectors	STRI sector codes	EBOPS 2010 sector codes	EBOPS 2010 sectors
Maritime transport	TRMAR	3.1.2	Sea transport, freight
Air transport	TRAIR	3.2	Air transport
Courier	CR	3.4	Post and courier services
Road freight transport	TRROF	3.7.2	Road transport, freight

Rail freight transport	TRRAI	3.6.2	Rail transport, freight
Logistics cargo-handling	LSCAR	3.11	Other supporting and auxiliary services
Logistics storage and warehouse	LSSTG	3.11	Other supporting and auxiliary services
Logistics freight forwarding	LSFGT	3.11	Other supporting and auxiliary services
Logistics customs brokerage	LSCUS	3.11	Other supporting and auxiliary services
Construction	CO	5	Construction
Insurance	FSINS	6	Insurance and pension services
Commercial banking	FSBNK	7.1	Explicitly charged and other financial services
Telecom	TC	9.1	Telecommunications services
Computer	CS	9.2	Computer services
Legal	PSLEG	10.2.1.1	Legal services
Accounting	PSACC	10.2.1.2	Accounting, auditing, bookkeeping, and tax consulting services
Architecture	PSARC	10.3.1.1	Architectural services
Engineering	PSENG	10.3.1.2	Engineering services
Distribution	DS	10.3.4	Trade-related services
Motion pictures	ASMOT	11.1.1	Audiovisual services
Sound recording	ASSOU	11.1.1	Audiovisual services
Broadcasting	ASBRD	11.1.1	Audiovisual services

### 3. Regression Model

#### 3.1 General Model

In general analysis to find out STRI impacts towards service exports, this research uses Anderson and Van Wincoop(2003)'s structural gravity model.

$$1) \ln x_{i,jt} = \text{constant} + \ln(\text{exporteroutput})_{it} + \ln(\text{importerexpenditure})_{jt} \\ - \ln t_{i,jt} - MR_{it} - MR_{jt} + \text{error}_{ijt}$$

STRI is used as bilateral service trade cost variable in sector level. From the equation 1, service export is decided by production of exporting country, expenditure of importing country, bilateral trade cost and Multilateral resistance. In order to translate trade cost from equation1 to reflect Multilateral Resistance, like the equation 2, Taylor series is used (Baier and Bergstrand, 2009).

From the equation 2, First term of the right hand side means exporter's Multilateral Resistance where as the second term stands for importer's Multilateral Resistance.

$$2) MR_{ijt} = \sum_j (-GDP_{wt} / GDP_{jt} * t_{ijt}) + \sum_i (-GDP_{wt} / GDP_{jit} * t_{jit})$$

The research is conducted by combining and simplifying equation 1 and 2 which leads to equation 3. Equation 3 comprises of variables such as STRI, distance, common language, common colony, FTA, etc which are necessary functions of this research's focus variable: service trade cost.

$$3) \ln x_{ijt} = \beta_0 + \beta_1 \ln STRI_{ijk} + \beta_2 \ln distance_{ij} + \beta_3 \ln contig_{ij} + \beta_4 \ln lang_{ij} + \beta_5 \ln comcol_{ij} + \beta_6 \ln col45_{ijt} + \beta_7 \ln FTA_{ijt} + MR_{ijt} + \beta_8 \ln GDP + \beta_9 \ln GDP_{jt} + error_{ijt}$$

The equation 3 directly controls observable variables to estimate the degree and role of Service restrictive measures for service exports. Utilizing this model, this research performs OLS estimates to find out the impacts of STRI on service trade.

From here,  $\ln STRI$  is divided into 5 classes making:

$$4) \ln x_{ijt} = \beta_0 + \beta_1 \ln CLAS1_{ijk} + \beta_2 \ln CLAS2 + \beta_3 \ln CLAS3 + \beta_4 \ln CLAS4 + \beta_5 \ln CLAS5 + \beta_6 \ln distance_{ij} + \beta_7 \ln contig_{ij} + \beta_8 \ln lang_{ij} + \beta_9 \ln comcol_{ij} + \beta_{10} \ln col45_{ijt} + \beta_{11} \ln FTA_{ijt} + MR_{ijt} + \beta_{11} \ln GDP + \beta_{12} \ln GDP_{jt} + error_{ijt}$$

### 3.2 Fixed Effects Regression

In order for robustness, potential endogeneity and mitigation of subjectivity, regression using fixed effects is conducted. The structural fixed effects will also absorb any other time-varying characteristics that may influence bilateral trade flows on the importer and the exporter side (Baier et. al, 2017). Hence, by implementing fixed effects, one can control multilateral resistances and absorb any other country specific factors that may affect bilateral trade flows (Baier et. al, 2017).

In this research, three fixed effects are used separately to compare and contrast the impacts of STRI in exports: Exporter-time fixed effects, Importer-time fixed effects Exporter-importer-time fixed effects.



#### Exporter-time fixed effects

$$5) \ln x_{ijt} = \sum_i \text{fixed effect } i_t + \ln \text{STRI}_{jt} + \ln \text{distance}_{ijt} + \text{contig}_{ijt} + \\ \text{comlang}_{ijt} + \text{comcol}_{ij} + \text{col45}_{ijt} + \text{FTA}_{ijt} + \text{error}_{ijt}$$

#### Importer-time fixed effects

$$6) \ln x_{ijt} = \sum_j \text{fixed effect } j_t + \ln \text{STRI}_{jt} + \ln \text{distance}_{ijt} + \text{contig}_{ijt} + \\ \text{comlang}_{ijt} + \text{comcol}_{ij} + \text{col45}_{ijt} + \text{FTA}_{ijt} + \text{error}_{ijt}$$

#### Exporter-Importer-Time fixed effects

$$7) \ln x_{ijt} = \sum_i \text{fixed effect } i_t + \sum_j \text{fixed effect } j_t + \ln \text{STRI}_{jt} + \ln \text{distance}_{ijt} \\ + \text{contig}_{ijt} + \text{comlang}_{ijt} + \text{comcol}_{ij} + \text{col45}_{ijt} + \text{FTA}_{ijt} + \text{error}_{ijt}$$

### 3.3 Poisson Pseudo-Maximum Likelihood estimation (PPML)

PPML is included to see if the result differs from the OLS regressions. This is because firstly, PPML is consistent with the existence of fixed effects. Secondly, it naturally includes zero trade observations which are set to drop in OLS models. Thirdly, interpretations of the coefficient are straightforward. Unlike the OLS, which the coefficient of independent variables are viewed as semi-elasticities, within PPML, all independent variables recorded in logarithms are able to be accepted as simple elasticities.

The equation used in this method is same as the equation 3 but it is run with PPML.

## 4. Results

### 4.1 General STRI Analysis

This research has firstly aimed in finding the correlations between the general STRI and export values. The macro analysis seeks for the degree of STRI impacting export values and the differences between sectors. The result shows that all the most of the STRI has negative correlation with export values, meaning the increase in STRI results the mitigation of export values. This is relevant to hypothesis 1: 'The higher the NTMs, the lower export value will be'.

The below table shows that STRI variables are shown to be negative, directing that STRI is negatively correlated with export value.

	1.arc	2.acc	3.eng	4.leg	5.sou	6.tel	7.sea
Variables	Inval	Lnval	Inval	Inval	Inval	Inval	Lnval
InSTRI	-0.294***	-0.048***	-0.813***	-0.221***	-1.693***	-0.461***	-
	(1.18)	(0.39)	(5.03)	(1.87)	(3.26)	(3.18)	0.157***
lnDIST	-0.765***	-1.333***	-0.878***	-0.780***	-1.696***	-0.976***	-0.22***
	(5.03)	(17.58)	(10.94)	(8.78)	(6.60)	(13.47)	(1.64)
contig	-0.171***	-0.417***	-0.206***	-0.337***	-0.295***	-0.032***	-
	(0.63)	(-1.98)	(0.85)	(1.46)	(0.67)	(0.15)	0.081***
comlang	0.339***	0.555***	0.259	1.630	0.779	0.703	0.146
	(0.82)	(2.28)	(0.73)	(7.07)	(1.24)	(3.67)	(0.32)
Comcol	0.463***	0.553	1.288	1.480	0.599	1.712	1.444
	(0.90)	(1.20)	(1.61)	(2.18)	(0.72)	(3.64)	(1.83)
Col45	-0.313***	0.395	0.969	0.484	0	0.912	1.122
	(0.32)	(0.53)	(0.63)	(0.60)	.	(1.03)	(0.63)
Fta-wto	-0.992**	-0.384	0.001	0.123	-2.127	0.079	0.638
	(2.62)	(2.13)	(0.01)	(0.58)	(3.73)	(0.48)	(2.00)
Lnhgdp	0.139***	0.770	1.056	0.890	0.886	0.826	0.632
	(2.07)	(19.76)	(19.55)	(21.35)	(8.37)	(25.81)	(10.07)
Lnfgdp	0.325***	0.691	0.776	0.615	0.929	0.601	0.577
	(4.64)	(16.33)	(17.37)	(13.97)	(7.16)	(15.91)	(7.59)
_cons	-0.403**	-7.923	-17.10	-13.55	-12.09	-10.40	-12.60
	(0.23)	(8.25)	(14.80)	(12.01)	(4.20)	(10.97)	(6.84)

## 4.2 STRI with Classification Analysis

The research has identified 5 classes of STRI and utilized those classes to identify individual policy impacts of STRI. The result has shown that STRI, in all classes and sectors, have shown negative correlations with export values. If looked at table below, Row L<sub>inval</sub>(1) displays that all Classes are showing negative correlations. However, the degree of correlation varies between Classes. Class 1 has shown to be the strong defining factor of export mitigation while Class 5, which comprises discriminatory and non-discriminatory measures are shown to be relatively low when compared to Class 1 and 2.

This result is clearly indicating that STRI brings negative impact towards the export value. However, the degree is shown to be relatively small compared to variables. For instance, the distance between exporting-importing countries is shown to be higher than any of the STRI. This implicates that from the general analysis one can figure out that although STRI is shown to be relevant mitigating variable of export value, it is not core depending factor of the mitigation.

Table 2: Impact of 5 classes of STRI on export value

Variables	Lnval(1)	Lnval(2)	Lnval(3)	Lnval(4)
lnCLAS1	-0.684** (0.89)	-0.631** (0.88)	-0.538** (0.68)	-0.783** (1.07)
lnCLAS2	-0.042*** (4.98)	-0.045*** (4.98)	-0.042*** (4.82)	-0.048*** (5.71)
lnCLAS3	-0.017*** (0.02)	-0.780*** (0.11)	-1.685*** (0.21)	-0.054*** (0.07)
lnCLAS4	-0.025*** (2.77)	-0.301*** (3.52)	-0.034*** (2.14)	-0.033*** (2.16)
lnCLAS5	-0.261*** (0.36)	-0.683*** (1.00)	-0.696*** (0.93)	-1.011*** (1.43)
lnDIST	-0.659*** (7.91)	-0.790*** (9.49)	-0.684*** (4.19)	
lnhgdp	0.728*** (14.71)		0.720*** (14.47)	
lnfgdp	0.789*** (7.85)	0.901*** (9.16)		
contig	-0.081*** (0.22)	-0.171*** (0.44)	-0.114*** (0.29)	
comlang	0.701*** (2.66)	0.264*** (0.83)	0.837*** (3.07)	
comcol	1.781*** (3.29)	1.942*** (3.37)	1.915*** (3.48)	
col45	0.313*** (0.32)			
fta-wto	0.733*** (3.43)	0.648*** (3.13)	0.573*** (1.65)	
_cons	-17.42* (2.37)	-8.057* (1.16)	-5.243* (0.72)	-3.381* (0.50)

### 4.3 Regression using fixed effect model

Fixed effect model showed different results than the past models. The overall STRI measures have increased throughout the sectors, becoming one of the defining variables of export mitigation. Row L<sub>val</sub>(2) of the table 2 indicates the exporter-time fixed effect regression which conveys that except Class 1, the overall value or the explanatory power of the classes has increased significantly.

Row L<sub>val</sub>(3) indicates the importer-time fixed effect which shows similar result of L<sub>val</sub>(2) except that Class 2 and 4 has not change much while the value of class 3 has changed dramatically, becoming one of the most influencing factor of the export downturn.

Row L<sub>val</sub>(4) is the result of the exporter-importer-time fixed effect and displays the overall increase in all STRI measures. The notable change is Class 5, which in thie regression shows the highest defining power of the export loss among the classes.

#### 4.4 Regression using PPML

Variables	Lnval(1)
lnCLAS1	-1.684** (0.32)
lnCLAS2	-0.742*** (0.23)
lnCLAS3	-0.437*** (0.56)
lnCLAS4	-1.225*** (0.33)
lnCLAS5	-6.901*** (0.36)
Indist	-0.469*** (0.01)
lnhgdp	0.318*** (0.03)
lnfgdp	0.334*** (0.04)
contig	-0.064*** (0.01)
comlang	0.092*** (0.01)
comcol	1.042*** (0.04)
col45	0.413*** (0.32)
fta-wto	-0.133*** (0.02)
_cons	-7.313* (0.73)



Regression run by PPML also showed different outcomes compared to other models run by OLS. Overall relations with STRI and service trade are shown to have most deep negative correlations. This is, although not definite, because both heteroskedasticity and zero trade observations are corrected.

## 5. Conclusion

This study investigated the impacts of the Non-tariff measures on exports in service trade. The primary question concerned whether the developed gravity model brings different results from the general gravity model.

One of the most important findings from the research is that introducing fixed effects to the gravity model generally increased the explanatory power of the STRI. At some cases, the core depending variable of the export value has been changed.

Another significant finding is the differing results gathered from general STRI and STRI divided in sectors. When regressed with general STRI, the value is relatively weak compared to STRI in divided classes. This represents that certain policy of the STRI posits major influences on service trade while other classes are relatively minor. According to the research, Class 4 had relatively lower correlations while Class 1 and 5 had higher correlations. Interesting fact is that Class 1 had low correlation when regressed without fixed effects but high correlations with the fixed effects.

## 5.1 Implications

The study suggests that impact of STRI varies between sectors and classifications. This means that when formulating policy or export planning, one must consider the sector and classification. It would be risky to perceive that because certain sector poses low general STRI, export is viable. One must consider the subjectivity of certain service product and its dependence of STRI Classes. If the product is not highly correlated with high STRI class, export is likely to be viable. In other words, even with low general STRI, if the service product is highly correlated with STRI class that has high correlations with export value, exporting won't be efficient.

## 5.2 Limitations

There exists some limitation to this research that needs to be addressed. Firstly, the data that are correspondent to year is relatively small. The research was conducted with 2014-2017 data, which is insufficient for accurate research. For instance, FTA could have been implemented before 2014, and the inability to compare the FTA prior to 2014 displays limitation. If able to access data before 2014 and after 2017, future study can analyze the variable impacts more thoroughly

Second, further development of STRI is needed to accurately measure the STRI impact. Although STRI is thorough enough to measure the impact of service trade restrictions, there is no data that compels STRI. This can cause a problem as it might cause biased result. This research aimed to create variety through utilizing classified STRI along with general STRI but is not enough since it is within the same background.

Lastly, this research could not tap into policy or export decisions which are based on the implications and results of regression produced in this study. Future research should accommodate the formulation and simulation of optimal policy or export decisions on service trade.

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# 국문초록

## 서비스무역에 대한 비관세조치의 영향 분석: 발달된 중력모델을 중심으로

한동호

비관세장벽은 관세가 급격하게 떨어지고 있는 최근 10년간 많은 주목을 받고 있다. 세계가 무역자유화에 눈길을 돌리고 있는 지금, 국가가 자국의 이익을 보호할 수 있는 방법으로 비관세장벽을 선택하고 있다. 특히, 관세가 적용되지 않는 서비스무역은 그 정도가 더 심하다. 그러나 중요성은 인지하면서도 아직까지 많은 서비스무역과 비관세장벽의 연관성에 대한 연구가 부족한 실정이다. 또한, 대부분의 중력모델을 중심으로 연구를 진행하였기에 객관성이 부족할 수 있다. 본 연구는 비관세장벽과 서비스무역의 관계를 다양한 중력모델과 PPML 등을 사용하여 입증하려 노력했다.

본 연구는 산업별과 STRI의 분류로 나누어 진행하였다. 결과적으로 모든 모델들이 비관세장벽과 서비스무역에 대해 강한 역 상관관계를 나타내었다. PPML이 가장 강하게, 고정효과를 적용한 모델이 두 번째로 그리고 구조적인 중력모델 순으로 나타났다.

주제어: 비관세장벽, NTMs, 중력모델, 서비스무역