



university of
 groningen

faculty of arts

CEASG

CEASG Working Paper Series

2022004-PE

Trade Restrictive Measures and Trade Deflection: Case of Korea-European Union Trade

February 2022

Hea-Jung Hyun

The **C**enter for **E**ast **A**sian **S**tudies **G**roningen
(**CEASG**) is an inter-faculty research institute
initiating and supporting interdisciplinary
teaching and research on contemporary China,
Japan, Korea and Mongolia. These working
Paper Series covers:

- Political economy
- International relations
- Regional political issues

CEASG
Faculty of Arts
University of Groningen

Visiting address:
Oude Kijk in 't Jatstraat 26
9712 EK Groningen
The Netherlands

Postal address:
P.O. Box 800
9700 AV Groningen
The Netherlands

T +31 50 363 7150

www.rug.nl/ceasg

KOREA **KF**
FOUNDATION

한국국제교류재단

Trade Restrictive Measures and Trade Deflection: Case of Korea-European Union Trade

*Hea-Jung Hyun*¹

Abstract

Facing stringent trade policies imposed by importing countries, exporters have an incentive to deflect trade towards a third market with less stringent trade-restrictive measures. Using product-destination level panel data, we empirically examine whether Korean exports, being subjected to a more restrictive trade policy by the importing country than the EU's, are deflected to the EU or the other way around. We find that an increase in the frequency of antidumping measures or technical regulations imposed by an importing country leads to a trade deflection effect. The magnitude of this effect, however, can be heterogeneous across exporting or imposing countries

Keywords

Trade policy, trade deflection, exporter productivity

JEL Classification:

F13, F14

¹ College of International Studies, Kyung Hee University, Korea; E-mail: hjhyun@khu.ac.kr Tel: 82-31-201-2376.

1. Introduction

“The 25 March 2002 EU press release announcing its steel safeguard response to the US steel safeguard of 5 March noted that ‘[w]hilst US imports of steel have fallen by 33% since 1998, EU imports have risen by 18%. Given that worldwide there are 2 major steel markets (EU with 26.6 m tonnes of imports in 2001 and US with 27.6 m tonnes), this additional protection of the US steel market will inevitably result in gravitation of steel from the rest of the world to the EU. This diversion is estimated to be as much as 15 m tonnes per year (56% of current import levels).’” (European Union, 2002) re-quoted from Bown and Crowley (2007).

Recent trends of trade policy have two folds: trade liberalization through reduction of tariffs on the one hand and a surge in protectionism through increase in trade-restrictive measures on the other. Especially for Free Trade Agreement (FTA) members, tariffs may not be an effective tool for protective trade policy, as trading parties need to renege on or renegotiate FTAs to raise tariffs again, which incurs high costs. To avoid this process and to raise protectionist measures after the global financial crisis in 2008, member countries began to increase trade barriers using trade remedies and adopting non-tariff measures (Hyun and Jang, 2019).

Trade remedies consist of three measures: antidumping, countervailing duties, and safeguard measures (GATT Articles 6 and 19). Since the majority of trade remedies take the form of antidumping measures, we consider in our paper antidumping as one of two import restrictive measures. Another type of protective measures used in this paper is the Technical Barrier to Trade (TBT). Documents on TBT in each country lay down product characteristics or their related processes and production, which include product certification requirements, performance mandates, conformity assessment procedures, labeling, and others. TBTs can increase the cost of exporting into the country adopting such measures. The imposition of TBTs by the importing country can raise the costs of producing the exported goods as technical standards require upgrading or at least adaptation of products or packaging, and varying standards across destinations reduce opportunities for economies of scale (Fontagné and Orefice, 2018).

Given multiple trading parties at product-level, the effect of trade-restrictive measures on trade flows can be complex. When an importing country imposes restrictive trade policies such as antidumping measures or TBTs, the affected exporting country may deflect trade by reducing exports to the imposing country and increasing the export volume to the third country. This process is called trade deflection, first named so by Bown and Crowley (2007). When an importing country uses import restrictions such as antidumping duties or TBTs to protect domestic producers from imports, does this lead to a substantial deflection of exports to third country markets? If so, can we find evidence in a specific case of trading parties such as Korea and the European Union (EU), with Korean exports diverting to the EU or the other way around? Does this effect differ across importing regions? In the present paper we address these issues and test the heterogeneous response of exporters to trade restrictive policy concerns, controlling for the potential fixed effect by country, product and year.

There are only few publications on the impact of trade restrictive measures on trade deflection. Using French customs data, Fontagné and Orefice (2018) show that the presence of TBTs reduces the probability of exporting to the destination imposing the measure on the corresponding HS4 product category, and this effect is exacerbated for multi-destination firms, because they can easily divert their shipment to TBT-free destinations. Bown and Crowley (2007) provide evidence that US restrictions between 1992 and 2001 have both deflected and depressed Japanese export flows to third countries.

Most related literature uses the data from the WTO I-TIP (Integrated Trade Intelligence Portal) to count the number of notifications for trade remedies and technical measures. However, only 43 percent of all the notifications are recorded as Harmonized System (HS) code in the WTO I-TIP dataset (Ghodsi et al., 2017), which can generate a sample selection bias due to missing information.

To fill this gap, this paper attempts to consider both antidumping and TBTs and empirically examines how new trade-restrictive measures affect trade deflection effects, particularly in trade between Korea and the EU between 1996 and 2014 using a new product-level dataset. Unlike previous literature, we use the recently constructed wiiw (Vienna Institute for International Economic Studies) NTM Database for trade remedies and technical

measures. The wiiw NTM dataset substantially reduces the percentage of missing HS codes from 57% to 25%. To our knowledge, this is the first study that uses the wiiw NTM dataset for the case of Korea-EU trade flows to resolve the problem of bias from missing information in the WTO I-TIP dataset. In addition, to determine the average trade deflection effect of trade restrictive measures imposed by various trading partners, we include 48 countries in the importing country list.

The remainder of this paper is as follows. In section 2 we investigate the trends of trade, antidumping and TBTs imposed on Korea and the EU. Section 3 provides a theoretical background and econometric specifications based on the literature review. Section 4 shows the empirical results. Finally, section 5 draws conclusions and addresses policy implications.

2. Korea-EU Trade and Empirical Strategy

2.1. Trade policy and Korea-EU trade

The trade volume between Korea and the EU has grown substantially during the past decades despite temporary downturns due to the global financial crisis and a surge in protectionist measures stemming from an increase in non-tariff measures. Figure 1 shows that even before the Korea-EU FTA was signed in 2011, Korean exports to the EU have increased while they have slightly fallen in 2013 and 2014. A similar trend is found in exports from the EU to Korea. The increasing rate of EU exports to Korea is higher in the late 2000s than in the early 2000s. An interpretation of trade flows between Korea and the EU could be a gradual reduction of bilateral tariffs between Korea and the EU over time as pictured in Figure 2. Another potential explanation can be a trade deflection effect from trade-restrictive measures taken by imposing countries.

Figure 1 To Be Inserted Here

Figure 2 To Be Inserted Here

2.2. Empirical strategy

This section presents an empirical strategy for testing our prediction by estimating the effects

of Non-tariff Measures (NTMs) on trade deflection for Korean (or EU) product level exports to third countries during the period 1996-2014. First, it examines whether there exists evidence that the use of trade restrictive policies such as antidumping or TBT has any impact on export patterns to third markets. We investigate whether on average country k 's exports to the third country j will increase when country m takes antidumping measures or TBT against country k more than country j does against country k in product s . Second, we attempt to find evidence in the specific case of two trading parties: Korea and European Union. Both cases - Korea diverting exports to the EU in response to trade-restrictive measures imposed by country m and EU diverting exports to Korea - are explored. Third, as robustness check, we investigate whether there is any variation in the magnitude of across importing countries or regions.

To examine above research hypotheses, we build the following empirical specification for the value of country k 's exports of product s to country j in year t .

$$\ln V_{kfst} = \beta_0 + \beta_1 \ln \text{Tariff}_{kfst} + \beta_2 \ln T_{kmst} + G_{kjt} + \delta_{mst} + \varepsilon_{kfst} \quad (1)$$

where s denotes the product at SITC 4-digit level and t denotes the year. k , m and j are exporting country, imposing country and third country respectively. The variable V_{kfst} denotes the value of exporting country k 's exports of product s to country j in year t . Tariff_{kfst} is a tariff imposed by country j on product s exported by country k , while T_{kmst} are trade-restrictive measures such as antidumping or TBT imposed by country m against country k . G_{kjt} are gravity variables²: distance between trading parties, and a regional trade agreement (RTA). δ_{mst} is country m -SITC4-year t triplet fixed effects to control for unobserved country-product-year specific attributes. ε_{kfst} is an error term.

An important empirical issue in analyzing the effect of trade policy is that there can be an endogeneity problem if it is correlated with unobservable cross-sectional trade costs (Piermartini and Yotov, 2016); the trade-restrictive measure is more likely to be imposed by destination countries on products with large volumes of imports which can lead to underestimation of trade-impeding effects if the endogeneity problem is not properly

² Other conventional gravity variables such as the dummy variable for common official language, a common border, and colonial ties are excluded because most of the observations are zeros for Korea.

explained in the regression. To resolve potential endogeneity problems, we further use the three-way fixed effect of third country j -SITC3-year to control for varying factors such as business cycles, import-demand shocks and multilateral trade resistance (as highlighted by Head and Mayer, 2014) which might affect trade. These triplets also control measures imposed by a country in response to a negative domestic shock in a given sector (Fontagné and Orefice, 2018). In this process, country-year specific gravity variables such as distance and RTA dummies in the baseline model are all subsumed under country j -SITC3-year fixed effects. Country pair fixed effects are not considered as Korea is the only exporting country in our baseline model.

2.3. Measurement of trade restrictive measures

To construct a product-level technical regulation or antidumping (i. e., T_{smt} or T_{sjt}), we use the frequency index as in Fugazza (2013). It is measured as the ratio of products, the share in total tariff lines containing one or more NTMs within an industry as follows: $FI_{sm} = \left[\frac{\sum D_{hkm} N_{hkm}}{\sum N_{hkm}} \right] \times 100$, where D_{hkm} is 1 if the importing country m imposes a technical regulation measure on product h exported by country k more than once, or 0 otherwise. Product h is classified using the Standard International Trade Classification (SITC) five-digit code within the more aggregated product s at the SITC four-digit code. N_{hkm} takes 1 if country m imports product h from country k . Since TBT is a Most Favored Nation (MFN) Treatment based on a non-discriminatory trade policy which is unilaterally imposed against all trading partners, these variables are exporter- and/or importer-specific, respectively. To transform unilateral TBTs to a bilateral one, we take the difference in technical regulations between importer m and exporter k at s in t denoted by TBT_Diff, which is by nature, a bilateral trade policy variable.

Table 1 reports the summary statistics for the frequency index of TBTs and antidumping measures. On average, more stringent TBTs and antidumping measures at SITC 4-digit level are taken against Korea compared to the EU.

Table 1 To Be Inserted Here

Table A1 shows the frequency index of TBTs. Since TBTs are unilaterally imposed to meet the requirement of the MFN clause, the affected member country is not identified. TBTs are most frequently imposed on scientific and control instruments, while they are hardly imposed on travel goods, handbags and similar goods. Table A2 reports the mean of antidumping dummies, and the frequency index of antidumping measures imposed on EU exported products. Organic chemicals and iron and steel are top exported products in which antidumping is applied most frequently. Table A3 displays dummies and the frequency index of antidumping measures taken by country m against Korean exports by sector. The largest number of antidumping is imposed on power-generating machinery and equipment followed by chemical materials and products.

2.4. Data

The data employed in this paper consist of a time-series panel of bilateral country-product level trade flows, trade policy, and gravity variables for the exporting country (either Korea or EU), 53 imposing countries and a third country (either EU or Korea) for the period 1996–2014. Bilateral trade data, disaggregated at the product level, are collected from UN COMTRADE (United Nations Commodity Trade Statistics Database). The source of TBT data is the wiiw (Vienna Institute for International Economic Studies) NTM Database. Most previous literature used data from the WTO Integrated Trade Intelligence Portal (I-TIP) to count the number of notifications for technical measures. However, only 43 percent of all notifications are recorded as a harmonized system (HS) code in the WTO I-TIP dataset (Ghodsi et al., 2017). This substantial amount of missing information can generate sample selection bias of sectoral investigation. The wiiw NTM dataset compiled by Ghodsi et al. (2017) as the research project PRONTO (Productivity, Nontariff Measures and Openness) substantially reduces the percentage of missing HS codes from 57% to 25%. To construct the TBT frequency index, we convert HS six-digit data to five-digit SITC level and aggregate sectors at the four-digit SITC level.

The source of MFN (or preferential tariffs if available) ad valorem tariff rate is World Integrated Trade Solution (WITS). The distances, measured as a great circle distance between trading partners are from the Centre d'Etudes Prospectives et d'Informations Internationales

(CEPII). The Regional Trade Agreement (RTA) dummy taking 1 if two trading parties have RTA is collected from WTO RTA database.

3. Empirical Results

3.1. Baseline results

Table 2 reports the trade deflection effects of Korean exports in response to antidumping imposed by importing countries. Columns (1) and (2) show the empirical results when the dummy variable is used as a proxy of the antidumping measure. ADP Columns (3) and (4) report results when the frequency index is employed as an antidumping measure. In column (1), Korean exporters significantly increase export volumes destined to third country j with no antidumping measure if the antidumping measure is taken by imposing country m . Gravity variables such as distance and RTAs show the expected sign: the trade volume is reduced for distant destination countries, while it is positively correlated when both Korea and trading partner country j are in the same RTA. The trade volume is negatively affected by import tariffs imposed by country j . This result is confirmed when third country j -SITC3-Year fixed effects are included in column (2). When ADP FI is taken as antidumping measure, we can find that Korean exports to the third country j with no antidumping measure at product s are positively affected by ADP taken by country m . This result is robust for specification with third country j -SITC3-Year fixed effects in column (4).

Table 2 To Be Inserted Here

Table 3 shows trade deflection from Korea to the EU from antidumping measures taken by imposing country m on product s . Column (1) shows that if the antidumping measure is imposed by country m on Korean exports of product s , the export volume to EU member countries increases. In column (2) antidumping measured as frequency index also has statistically significant positive impact on trade deflection from Korea to the EU. Column (4) and (5) report the product-level response by EU exports to antidumping measures. The estimates of coefficients of the impact of the antidumping dummy and frequency index show that the EU export volume in product s to Korea will increase when antidumping is imposed

by importing country m and there is no antidumping by Korea.

Table 3 To Be Inserted Here

Table 4 displays the trade deflection effect of TBTs. In column (2) a more stringent TBT imposed by country m than by Korea leads to an increase in export volume from Korea to the EU when the EU imposes no TBT on product s . This result holds for the case where the TBT is measured as TBT_Diff in column (3). When the EU becomes exporter, trade deflection to Korea can be positively affected by TBTs imposed by country m rather than by the EU (in column (5)). However, when the TBT is measured as the maximum TBT frequency index between the difference in TBT and zero, the export volume from the EU to Korea increases in response to the TBT imposed by country m , but is statistically insignificant. This suggests that, due to a relatively smaller portion of export volume to Korea compared to Korean exports to the EU, the size of trade deflection from the EU to Korea may be less clear than the other way around.

Table 4 To Be Inserted Here

3.2. Robustness check

Columns (1) to (6) in Table 5 report the effects of antidumping measures on trade deflection of Korean exports to the EU member countries by the imposing countries (or region). All six columns show that Korean exports to the EU increases in response to an increase in ADP_FI, but there exists heterogeneity in the magnitude of the impact across the imposing region. When Japan increases antidumping measures against Korean exports in product s by 1% in terms of frequency index, Korea increases the export volume to the EU by 13.78%, while the size is only 0.905% for other Asian countries. This implies that demands for product s in Japan and EU are highly substitutable for Korean exporters. Columns (7) to (12) report the trade deflection of EU exports to Korea by imposing countries or regions. While the export volume in product s from the EU to Korea increases in response to an increase in ADP_FI by 0.999~2.101% for most regions, it substantially decreases by 9.759% when antidumping is imposed by Japan. This may be happening because the EU can increase sales to EU member countries instead of resorting to trade deflection to a third country like Korea; the so-called

trade depression effect. Another interpretation could be that trade from the EU can be diverted from Japan to large economies such as the United States rather than Korea.

Table 5 To Be Inserted Here

Table 6 reports the effects of stringent TBTs on trade deflection. Columns (1) to (6) show the results of Korean exports to EU member countries by TBT imposing countries (or region). All six columns show that Korean exports to the EU increase in response to an increase of gap in TBT between the imposing country and Korea with little differences in the magnitude of the impact across the imposing region ranging between 0.474~0.791%. Columns (7) to (12) report the trade deflection of EU exports to Korea by imposing regions. EU exports to Korea do not significantly increase for more stringent TBTs imposed by China (or the Middle East and Africa) vis-à-vis the EU. As in column (8) of Table 5, the trade deflection effect of TBTs on EU exports to Korea may differ according to the imposing region.

Table 6 To Be Inserted Here

4. Conclusion

If compliance costs to meet the requirements of new technical regulations or antidumping measures taken by the imposing country are higher than the costs of an increasing export volume to a third country, exporters can opt to reorient their sales to the third country. This paper attempts to examine whether trade is diverted from Korea to the EU or from the EU to Korea in response to an increase in trade-restrictive measures. Using product level panel data, we find significant positive impact of antidumping measures more frequently imposed by the importing country vis-à-vis the EU (or Korea) on trade deflection of Korean (or EU) exports. This result holds for most of the imposing regions with few exceptions. For trade deflection resulting from an increase in imposition of TBTs, Korean exports divert to the EU on products when no TBTs are imposed by the EU. Trade deflection effects in EU exports to Korea vary across imposing regions and countries. Due to the limitation on information on new markets at product-level data, we could not distinguish the trade deflection effects between extensive margin and intensive margin, which is left for future research upon availability of information on entry and exit of products by destination.

Bibliography

- Bown, C.P., and M.A. Crowley (2007), “Trade deflection and trade depression,” *Journal of International Economics*, vol. 72, pp. 176–201
- European Union (2002), “Proposed EU steel safeguard measures,” Press release MEMO/02/67, 25 March
- Fontagné, L., and G. Orefice (2018), “Let’s try next door: Technical Barriers to Trade and multi-destination firms,” *European Economic Review*, vol. 101, pp. 643–663
- Fugazza, M. (2008), “The Economic behind Non-Tariff Measures: Theoretical Insights and Empirical Evidence,” Policy Issues in International Trade and Commodities Study Series 57, Geneva: United Nations Conference on Trade and Development (UNCTAD)
- Ghodsi, M., J. Grubler, O. Reiter, and R. Stehrer (2017), “The Evolution of Non-Tariff Measures and Their Diverse Effects on Trade,” Research Report 419, Vienna: The Vienna Institute for International Economic Studies
- Head, K., and T. Mayer (2014), “Gravity equations: workhorse, toolkit, and cookbook,” in: G. Gopinath, E. Helpman, and K. Rogoff (Eds.), *Handbook of International Economics*, chapter 4, vol. 4, Amsterdam: North Holland
- Hyun, H-J., and Y-J. Jang (2019), “New Trade Restrictive Measures and Exports: Evidence from South Korea,” *Seoul Journal of Economics*, vol. 32, no. 2, pp. 137-162
- Piermartini, R. and Y. Yotov (2016), “Estimating Trade Policy Effects with Structural Gravity”, School of Economics Working Paper Series 2016-10, LeBow College of Business, Drexel University

Figure 1: Trade flows between Korea and EU (1996-2014)

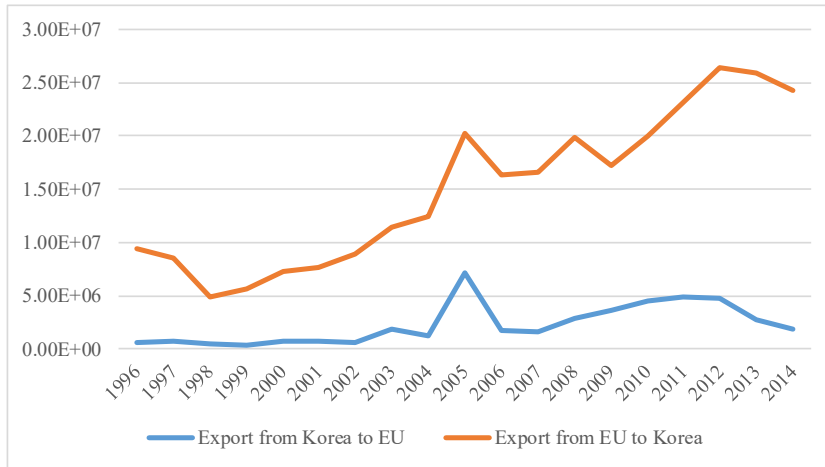


Figure 2: Bilateral tariff between Korea and EU (1996-2014)

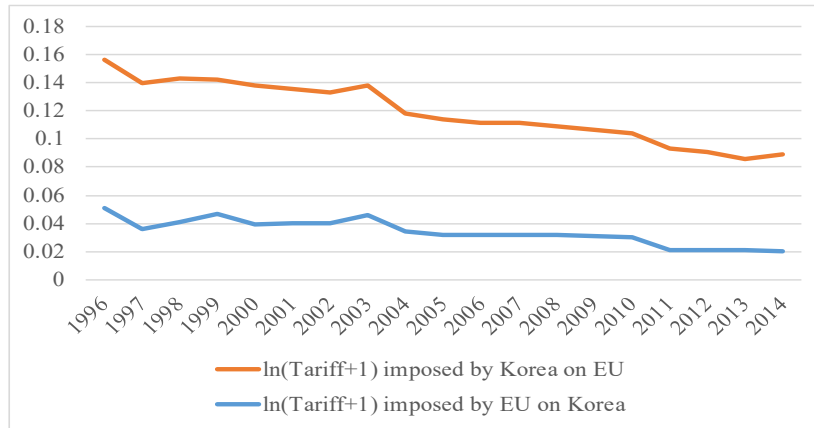


Table 1: Summary statistics of trade restrictive measures imposed by trading partner (SITC 4-digit)

Variable	Mean	Std. Dev.	Min	Max
TBT dummy	0.536	0.499	0	1
TBT FI (Korea)	0.513	0.491	0	1
TBT FI (EU)	0.254	0.430	0	1
TBT Diff (Korea)	-0.047	0.557	-1	1
TBT Diff (EU)	-0.224	0.568	-1	1
ADP imposed on Korea				
ADP (case)	0.129	1.672	0	62
ADP dummy	0.012	0.111	0	1
ADP FI	0.010	0.092	0	1
ADP imposed on EU				
ADP (case)	0.001	0.086	0	22
ADP dummy	0.001	0.023	0	1
ADP FI	0.000	0.012	0	1

Notes: TBT FI (Korea) is a frequency index of TBT imposed by country m excluding EU. TBT FI (EU) is a frequency index of TBT imposed by country m excluding Korea. TBT Diff (Korea) is the difference between TBT FI imposed by country m excluding EU and TBT FI imposed by Korea. TBT Diff (EU) is the difference between TBT FI imposed by country m excluding Korea and TBT FI imposed by EU.

Table 2: Antidumping and trade deflection of Korea

	ADP dummy		ADP FI	
	(1)	(2)	(3)	(4)
lnDistance	-0.316*** (0.00516)		-0.316*** (0.00516)	
RTA	0.248*** (0.00672)		0.249*** (0.00672)	
ln(Tariff+1)	-3.246*** (0.0283)	-7.527*** (0.0801)	-3.246*** (0.0283)	-7.555*** (0.0801)
ADP	0.521*** (0.0199)	0.908*** (0.0174)	0.314*** (0.0205)	0.893*** (0.0155)
Imposing country-SITC3-Year FE	Yes	Yes	Yes	Yes
Third country-SITC3-Year FE	No	Yes	No	Yes
Observations	16,665,337	12,645,850	16,665,337	12,645,850
R-Squared	0.450	0.725	0.450	0.725
Log Likelihood	-1.270e+12	-5.830e+11	-1.270e+12	-5.840e+11

Notes: The dependent variable is a natural logarithm of the value of Korean exports of product s to the third country j in year t .

Table 3: Antidumping and trade deflection

	Korea-EU		EU-Korea	
	ADP dummy	ADP FI	ADP dummy	ADP FI
	(1)	(2)	(4)	(5)
ln(Tariff+1)	-9.774*** (0.0998)	-9.785*** (0.0998)	1.034*** (0.0201)	1.041*** (0.0200)
ADP	1.154*** (0.0203)	0.835*** (0.0277)	1.314*** (0.0693)	1.205*** (0.0911)
Imposing country-SITC3-Year FE	Yes	Yes	Yes	Yes
Third country-SITC3-Year FE	Yes	Yes	Yes	Yes
Observations	4,689,311	4,689,311	6,244,896	6,244,896
R-Squared	0.676	0.675	0.334	0.334
Log Likelihood	-4.18e+11	-4.19e+11	-4.5e+10	-4.5e+10

Notes: The dependent variable is a natural logarithm of the value of Korean (or EU) exports of product s to EU (or Korea) in year t .

Table 4: TBT and trade deflection

	Korea-EU			EU-Korea		
	TBT Diff		TBT FI	TBT Diff		TBT FI
	(1)	(2)	(3)	(4)	(5)	(6)
ln(Tariff+1)	-15.46*** (0.230)	-30.00*** (0.184)	-30.42*** (0.187)	2.854*** (0.158)	-0.0623 (0.0809)	-0.0232 (0.0800)
TBT		0.637*** (0.0176)	0.460*** (0.0492)		0.250*** (0.0244)	0.0370 (0.152)
Imposing country-SITC3-Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Third country-SITC3-Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,201,979	1,381,684	1,381,684	314,374	452,594	452,594
R-Squared	0.831	0.871	0.869	0.484	0.421	0.420
Log Likelihood	-2.74e+10	-3.41e+10	-3.48e+10	-1.15e+09	-3.76e+09	-3.77e+09

Notes: The dependent variable is a natural logarithm of the value of Korean (or EU) exports of product s to EU (or Korea) in year t .

Table 5: Robustness check: Antidumping and trade deflection by imposing regions

	Korea-EU						EU-Korea					
	USA	Japan	China	Asia	Latin America	Middle east & Africa	USA	Japan	China	Asia	Latin	Middle east & Africa
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
ln(Tariff+1)	-7.344*** (0.613)	-5.740*** (0.589)	-6.192*** (0.610)	-7.929*** (0.185)	-9.206*** (0.220)	-6.077*** (0.195)	1.028*** (0.138)	1.041*** (0.139)	1.003*** (0.141)	1.043*** (0.0384)	1.039*** (0.0385)	1.041*** (0.0371)
ADP FI	1.982*** (0.0532)	13.78*** (0.546)	3.038*** (0.215)	0.905*** (0.0440)	1.457*** (0.207)	5.915*** (0.293)	1.849*** (0.198)	-9.759*** (1.010)	1.463*** (0.235)	0.999*** (0.0944)	2.028*** (0.411)	2.101*** (0.458)
Imposing country-SITC3-Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Third country-SITC3-Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	229,160	232,832	228,968	2,654,547	1,908,210	1,652,918	130,102	130,102	130,102	1,691,326	1,691,326	1,821,428
R-Squared	0.712	0.696	0.689	0.723	0.755	0.734	0.334	0.333	0.334	0.334	0.334	0.333
Log Likelihood	-1.02e+10	-1.12e+10	-1.07e+10	-1.12e+11	-7.89e+10	-8.16e+10	-9.38e+08	-9.38e+08	-9.37e+08	-1.22e+10	-1.22e+10	-1.31e+10

Notes: The dependent variable is a natural logarithm of the value of Korean (or EU) exports of product s to EU (or Korea) in year t .

Table 6: Robustness check: TBT and trade deflection by imposing region

	Korea-EU						EU-Korea					
	USA	Japan	China	Asia	Latin America	Middle East & Africa	USA	Japan	China	Asia	Latin America	Middle East & Africa
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
ln(Tariff+1)	-34.74*** (0.795)	-41.24*** (0.918)	-39.44*** (1.121)	-43.29*** (0.349)	-46.60*** (0.331)	-45.76*** (0.463)	1.996*** (0.385)	-0.0503 (0.260)	0.303 (0.331)	0.173 (0.147)	-0.133 (0.144)	-0.342** (0.147)
TBT Diff	0.791*** (0.0722)	0.554*** (0.0707)	0.474*** (0.0909)	0.624*** (0.0306)	0.579*** (0.0307)	0.642*** (0.0511)	0.449*** (0.126)	0.263*** (0.100)	0.0497 (0.104)	0.316*** (0.0427)	0.309*** (0.0430)	-0.0507 (0.0584)
Imposing country-SITC3-Year FE	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No	Yes	Yes	Yes
Third country-SITC3-Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	28,716	28,720	22,064	132,440	153,867	70,650	28,716	28,720	22,064	132,440	153,867	70,650
R-Squared	0.446	0.373	0.350	0.414	0.435	0.406	0.446	0.373	0.350	0.414	0.435	0.406
Log Likelihood	-1.56e+08	-2.36e+08	-1.95e+08	-1.08e+09	-1.30e+09	-7.12e+08	-1.56e+08	-2.36e+08	-1.95e+08	-1.08e+09	-1.30e+09	-7.12e+08

Notes: The dependent variable is a natural logarithm of the value of Korean (or EU) exports at product s to EU (or Korea) in year t .

Table A1: TBT measures imposed by importing countries by sector (1996-2014)

SITC 2-digit	Description	TBT dummy	TBT FI
11	Beverages	0.955	0.955
24	Cork and wood	0.376	0.362
26	Textile fibres (other than wool tops and other combed wool) and their wastes (not manufactured into yarn or fabric)	0.692	0.676
43	Animal or vegetable fats and oils, processed; waxes of animal or vegetable origin; inedible mixtures or preparations of animal or vegetable fats or oils, n.e.s.	0.948	0.948
51	Organic chemicals	0.796	0.759
53	Dyeing, tanning and colouring materials	0.286	0.258
54	Medicinal and pharmaceutical products	0.737	0.698
57	Plastics in primary forms	0.751	0.751
58	Plastics in non-primary forms	0.644	0.644
59	Chemical materials and products, n.e.s.	0.795	0.482
63	Cork and wood manufactures (excluding furniture)	0.458	0.435
64	Paper, paperboard and articles of paper pulp, of paper or of paperboard	0.344	0.339
65	Textile yarn, fabrics, made-up articles, n.e.s., and related products	0.610	0.603
66	Non-metallic mineral manufactures, n.e.s.	0.702	0.698
67	Iron and steel	0.616	0.616
68	Non-ferrous metals	0.346	0.346
69	Manufactures of metals, n.e.s.	0.613	0.567
71	Power-generating machinery and equipment	0.768	0.710
72	Machinery specialized for particular industries	0.744	0.663
73	Metalworking machinery	0.624	0.615
81	Prefabricated buildings; sanitary, plumbing, heating and lighting fixtures and fittings, n.e.s.	0.749	0.734
82	Furniture and parts thereof; bedding, mattresses, mattress supports, cushions and similar stuffed furnishings	0.984	0.818
83	Travel goods, handbags and similar containers	0.023	0.023
84	Articles of apparel and clothing accessories	0.550	0.548
86	Scientif & control instrument, photography, clocks	0.799	0.778
89	Miscellaneous manufactured articles, n.e.s.	0.533	0.465

Table A2: Antidumping Measures imposed by importing countries on EU by sector
(1996-2014)

SITC 2-digit	Description	ADP dummy	ADP FI
11	Beverages	0.002	0.001
24	Cork and wood	0.001	0.000
26	Textile fibres (other than wool tops and other combed wool) and their wastes (not manufactured into yarn or fabric)	0.002	0.002
43	Animal or vegetable fats and oils, processed; waxes of animal or vegetable origin; inedible mixtures or preparations of animal or vegetable fats or oils, n.e.s.	0.000	0.000
51	Organic chemicals	0.013	0.006
53	Dyeing, tanning and colouring materials	0.000	0.000
54	Medicinal and pharmaceutical products	0.000	0.000
58	Plastics in non-primary forms	0.000	0.000
59	Chemical materials and products, n.e.s.	0.010	0.003
63	Cork and wood manufactures (excluding furniture)	0.001	0.001
64	Paper, paperboard and articles of paper pulp, of paper or of paperboard	0.011	0.005
65	Textile yarn, fabrics, made-up articles, n.e.s., and related products	0.000	0.000
66	Non-metallic mineral manufactures, n.e.s.	0.000	0.000
67	Iron and steel	0.016	0.010
68	Non-ferrous metals	0.000	0.000
69	Manufactures of metals, n.e.s.	0.001	0.000
71	Power-generating machinery and equipment	0.000	0.000
72	Machinery specialized for particular industries	0.001	0.000
84	Articles of apparel and clothing accessories	0.000	0.000
86	Scientif & control instrument, photography, clocks	0.002	0.001
89	Miscellaneous manufactured articles, n.e.s.	0.000	0.000

Notes: Number of cases of antidumping measures are cumulative numbers aggregated over SITC 2-digit level. ADP dummy and ADP FI are mean value of ADP dummy variables and ADP frequency ratio between 1996 and 2014 respectively. Korea is excluded from trading partner countries in the table above as Korea is taken as the third importing country in an analysis of the trade deflection effect of trade policy imposed by trading partners on the EU.

Table A3: Antidumping measures imposed by importing countries on Korea by sector (SITC two-digit)

SITC 2-digit	Description	ADP dummy	ADP FI
26	Textile fibres (other than wool tops and other combed wool) and their wastes (not manufactured into yarn or fabric)	0.042	0.036
33	Petroleum, petroleum products and related materials	0.089	0.089
51	Organic chemicals	0.022	0.011
57	Plastics in primary forms	0.004	0.004
59	Chemical materials and products, n.e.s.	0.097	0.060
65	Textile yarn, fabrics, made-up articles, n.e.s., and related products	0.034	0.018
67	Iron and steel	0.013	0.008
69	Manufactures of metals, n.e.s.	0.013	0.013
71	Power-generating machinery and equipment	0.157	0.157
72	Machinery specialized for particular industries	0.063	0.023
86	Scientif & control instrument, photography, clocks	0.029	0.018

Notes: Number of cases of antidumping measures are cumulative numbers aggregated over SITC 2-digit level. ADP dummy and ADP FI are mean value of ADP dummy variables and ADP frequency ratio between 1996 and 2014 respectively. The EU is excluded from trading partner regions in the table above as the EU is taken as the third importing region in an analysis of the trade deflection effect of trade policy imposed by trading partners on Korea.