The Influence of Origin Regulations on the FTA Utilization and Export Performance of Automobile Parts Companies

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Abstract

Purpose – This study examined the Rules of Origin (RoO) as a factor affecting free trade agreements' (FTA) utilization and analyzed the causal relationship and the effects of these factors on the export performance of automobile parts companies.

Design/methodology – We analyzed and verified the impact of FTA utilization and the export performance of automobile parts companies by dividing the characteristics of the RoO into complexity and uncertainty. Following which, various statistical analyses were conducted on the interrelationships among these variables.

Findings – This research analyzed the effect of the RoO factors of complexity and uncertainty on the use of FTA and the export performance of automobile parts companies. We found that these characteristics of RoO were generally related to and affected the FTA use and export performance of these companies. Based on this, this study's investigation into the characteristics of the RoO would then help companies in better utilizing the FTA, as well as providing suggestions on how to effectively respond to the application of the FTA in the future.

Originality/value – Companies that want to utilize FTAs in international trade must follow the RoO. In the Regional Trade Agreement (RTA), the country-of-origin is a key factor, with the RoO being an important requirement for the application of preferential tariffs. These regulations are a requirement for receiving FTA preferential treatment; however, they also cause difficulties to companies in using the FTA.

Keywords: Preferential Tariffs, Free Trade Agreement, Rules of Origin, Export Performance
JEL Classifications: D12, F14, O53

1. Introduction

1.1. Research Purpose and Background

To receive preferential tariff benefits through the FTA, certain Rules of Origin (RoO) must be satisfied. However, RoO have complex and uncertain characteristics, which can occasionally cause disputes in international trade. Herein, efforts have been made to establish internationally unified regulations to solve this problem; however, countries tend to tighten procedures in signing free trade agreements (FTA) in order to protect their own industries, which can then incur other types of costs (Cho Sung-Jang and Cho Chan-Hyuk, 2016).

The application of the FTA preferential tax rate generally applies a lower tax rate than does the standard tariff rate, which provides benefits to all parties within the agreement (Choi Jae-soon, 2008); however, there are certain requirements that must be met by trading companies

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to receive these benefits that are often difficult to meet.

Korean companies with several FTAs have difficulties in using preferential tariffs due to the uncertain and complex characteristics of RoO. Unlike the purpose of the FTA, which aims to ease tariff barriers, RoO are often another barrier in international trade, which can then also be a factor that makes it difficult for companies to utilize FTAs. The application of preferential tax rates through FTAs is nullified if the RoO are not satisfied, meaning that RoO can be regarded as a limitation to market access in international trade (Estevadeordal et al., 2009). Although this may cause difficulties for companies to use the FTA, domestic companies also tend to lack any preparation for RoO. Various studies have been conducted on the positive effects and advantages of FTAs, with there only being a few on the effects of the uncertain and complex characteristics of RoO on corporate FTA utilization and performance.

Therefore, by analyzing the impact of RoO's uncertain and complex characteristics on FTA utilization and the relationship between export performances— specifically among auto parts companies that have high FTA competitiveness and are closely related to FTA utilization— this study's findings would allow us to derive and suggest countermeasures to address this issue.

1.2. Research Scope and Methods

In this study, several hypotheses were established based on a literature review of previous research, with the results then being derived through an empirical analysis. Based on previous studies, the characteristics of RoO were analyzed by dividing it into two factors: uncertainty and complexity. In addition, based on this, a research model and hypotheses were established, with the latter being verified through empirical analyses using statistical techniques.

The survey data collected in this study were converted into a dataset for analysis using micro-soft EXCEL after coding and error review. In this analysis, IBM SPSS program version 25.0 was used, with a statistical significance level of 0.05. In order to analyze the variables affecting the utilization of FTA and export performance, a factor analysis was conducted, and a linear regression analysis was then performed. In addition, to verify the mediating effect of FTA use in the relationship between uncertainty and complexity in export performance, this was analyzed using PROCESS macro model 4 as proposed by Hayes (2013).

2. Theoretical Background

2.1. RoO of the FTA

FTAs between countries contain various components, with chapters on the RoO having a particularly strong influence on the trade of goods among all the content of the agreement. Ongoing research on the FTA is being actively conducted; however, research on the characteristics of RoO for the application of preferential tariffs is relatively insufficient.

Korean scholar Choi Jang-woo (2007) derived certain differences by comparing and analyzing PRoO (Preferential Rules of Origin) and the system between Korea and FTA signatories in various aspects. Further, Lee Yong-geun and Ahn Chang-dal (2011) analyzed the effect of an index that quantitatively measures the characteristics of the FTA RoO signed by Korea on trade volume between countries, focusing on major product groups. Additionally, Cho Mi-jin and Ahn Kyung-ae (2011) analyzed the characteristics of RoO as an important factor in the process of implementing the FTA and presented their importance.

Foreign scholars Estevadeordal et al. (2009) stated that, in the application of preferential tax rates that can be received through FTAs, one may lose their eligibility to apply FTA preferential tax rates and that RoOs can be considered a limitation in accessing the market in international trade. In particular, the characteristics of RoO were classified, with these then being determined by the unique factors of the FTA. Further, Harris (2007) presented and analyzed the mechanisms for the measurement method and factors of RoO in the Preferential Trade Agreement.

Further, RoO determines preferential and non-preferential tax applications depending on whether or not the country-of-origin requirement is satisfied. These RoOs are in the form of general agreements, international agreements, and regulations between the parties of the contract in question and consist of verification procedures by customs authorities. The country-of-origin can be said to be the nationality of the goods and is typically the area wherein the goods are produced, processed, and manufactured. Park (2021)

Due to the complexity of the standards set for each country-of-origin, considering the global trade environment and the uncertainty of its interpretation, it is then practically difficult to unify the RoO. Therefore, in the fairly expanded FTA environment, the influence of the country-of-origin and the characteristics of its regulations are noteworthy.

Additionally, Harris and Staples (2009) suggested a mechanism to mitigate trade barriers by RoO through effective trade facilitation.

Studies on the degree of the features of RoO that have constructed certain barriers have found that the uncertainty and complexity factors herein add to these barriers, resulting in a divergence problem.

Table 1. Divergence
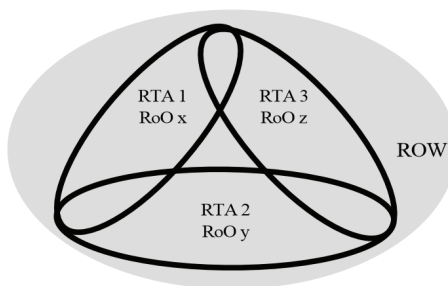
Note: Rest of the World (ROW).
Source: Estevadeordal et al. (2009).

2.2. Requirements for the Application of FTA

RoO can be classified into non-preferential Rules of Origin (non-PRoO) for purposes other than preferential tariffs and Preferential Rules of Origins (PRoO) depending on the method and purpose of the application. In particular, PRoO for the application of preferential agreements, such as FTAs, consists of the country-of-origin determination criteria, as well as the country-of-origin labeling standards, submission of country-of-origin documentation, and their customs procedures.

The detail of RoO varies slightly for each FTA, but the basic framework is similar. The process for applying the FTA must always be followed, including the general standards,

sufficient processing principles, regional production principles, direct transportation principles, and product specific rules (such as party requirements, procedural requirements, item requirements, and country-of-origin requirements).

3. Hypotheses Development

3.1. Analysis of the Characteristics and Types of RoO and Determination of Study Variables

3.1.1. Determination of the Variables: Utilization of FTA & Trade Performance

The country-of-origin can be divided into a preferential origin where the preferential tax rate can be applied and a non-preferential origin that is not subject to the preferential tax rate but is used for other purposes. The country-of-origin covered in this study includes the preferential country-of-origin that is the basis for the application of the FTA.

The characteristics of the RoO are classified into uncertainty and complexity and, in particular, the effects of Korean auto parts companies on FTA utilization and export performance were then analyzed.

This study aims to analyze the causal relationship between the rules of origin and the use of FTAs, targeting automobile parts companies that account for a large part of trade volume and industrial importance and have high FTA utilization.

In particular, based on several previous studies, variables were constructed centering on two factors that could affect FTA utilization and export performance among the characteristics of the Rules of origin.

3.1.2. Determination of Variables: Complexity

First, the complexity of the RoO, which include the requirements for the application of the FTA, such as meeting the country-of-origin rules and the procedure for certifying the country-of-origin that are both complicated because, in particular, RoO varies from party to party within the FTA agreement. Nam Phung-Woo and Choi Jun-Ho (2007) stated that, because the standards and procedures for receiving tariff benefits using the FTA are complicated, a lack of familiarity with the related content can cause losses to companies.

Estevadeordal et al. (2009) also stated that various types of RoOs are mixed in various FTAs signed by numerous countries, which can increase the costs of trading companies. In addition, in RoO, it is said that special attention is needed because the inherent complexity may make it more difficult for an entity to manage regulations for various agreements. The institutional regulations of the RoO may vary depending on the complexity of import and export transactions or on the trade patterns between the FTA contracting countries.

Kim Moo-Han (2010) conducted an analysis and found that Korean SMEs generally lack an understanding of the FTA and that the complex characteristics of RoO also affect their FTA utilization rate.

3.1.3. Determination of Variables: Uncertainty

Second, the use of FTAs involves the fact that uncertainty around the RoO may arise due to inconsistencies in procedures and methods for processing the country-of-origin verification (investigation) that may occur in the future. The requirements recognized by each

country that has signed FTAs as part of their regulations, such as the cumulative standards in FTAs described in previous studies, may be different, which may increase other costs and uncertainties.

In expanding the meaning of uncertainty, Robbins (1984) explained that the external environment can be a factor that is difficult for companies to control. In the context of FTAs, this external environment is then influenced by RoO and FTA regulations.

Krueger (1999) carefully examined the function of barriers inherent in RoOs that cause trade diversion effects and presented examples of protecting the industry due to the use of intermediate goods among various regulations on the country-of-origin to meet the RoO of NAFTA (USMCA).

On the contrary, Kaleka (2002) divided various resources held by a company into the size of the company, its trade experience assets, and other financial assets. These resources may also include experience in responding to FTAs. The expression "uncertainty" can have various meanings and in this study, after reviewing previous research related to the RoO of the FTA and the FTA environment, we defined the different regulations, interpretations, and procedural differences of each FTA agreement as the overall uncertainty.

3.2. Determination of Hypotheses

H1: The complexity of the RoO has a negative (-) effect on the use of FTAs by automobile parts companies.

RoO often involve different regulations and standards for each contracting state, with this complexity potentially acting as another trade barrier to the free trade.

Bhagwati et al., (1998) described the characteristics and concerns inherent in the complex and challenging nature of the RoO, along with the Spaghetti Bowl Effect, when outlining the possible inefficiencies in FTAs. Further, Estevadeordal et al. (2009) analyzed the occurrence of various costs and the impact of FTAs on the parties involved in foreign exchange trade transactions due to the complex characteristics that make it difficult to apply the preferential tax rate in the use of FTAs.

From the perspective of companies that apply preferential treatment using FTAs, there are differences in RoO for each partner country, with it being difficult to prove their exact origin. Therefore, we established a hypothesis to verify how the complexity of RoO affects the actual use of the FTA by automobile companies.

H2: Uncertainty in the RoO has a negative (-) effect on the use of FTAs by automobile parts companies.

Matters concerning uncertainties that may arise during the process of utilizing the FTAs include differences in the process of verifying the country-of-origin, procedural differences, and varying interpretations of the results, which can be a significant burden on companies in this context.

The Commission of the European Communities (2003) stated that there is much room for dispute in applying RoO due to differences in domestic laws and characteristics between the parties involved in a given contract in the verification procedure for the application of origin. Estevadeordal et al. (2009) stated that the characteristics of uncertainty in RoO increase costs and uncertainty for both customs authorities and trading parties. Cantin and Lowenfeld

(1993) further stated that there may be potential differences in the interpretation and conclusion processes of RoO between parties in terms of exports and imports. Izam (2003) also stated that problems may arise in the verification procedures of RoOs between contracting states when viewed in terms of the occurrence of disputes and the relevant resolution process. In addition, there is a risk that the cost and effectiveness of the RoO are not guaranteed depending on the method of direct and indirect verification used at the time of verification, with the uncertain nature of the RoO then meaning that we cannot guarantee the certainty of the responsibility of the company using the FTA, which can then lead to disputes. It can also be a cause of reductions in the utilization of FTAs.

Therefore, a third hypothesis was established to verify how this uncertainty in RoO affects the actual use of the FTA by automobile parts companies.

H3: The use of the FTA has a positive (+) effect on the export performance of automobile parts companies.

Additionally, there will be a variety of factors affecting trading companies. In particular, the use of the FTA, which is ever expanding in order to ease trade barriers in products trade, has a significant impact on the countries and companies concerned.

Na Do-Sung and Young-Ho Yoon (2011) analyzed the factors that affect the export performance of companies in a given environment and their utilization of the FTA among domestic export companies. Cho et al. (2016) further identified the factors affecting the establishment of the RoO regulations of the FTA and examined this based on the Korean industry.

Furthermore, Mee-Jin Cho and Kyoung-Ae An (2011) explained, in their study on the use of FTAs in major countries such as Europe and the United States, that the characteristics of RoO, the degree of practical benefit of applying preferential tax rates, and the procedures and methods of the country-of-origin verification all affect the use of FTAs.

Yi (2016) extended the theory established in prior research on the characteristics of complex and limited legal regulations in international trade using FTAs in PRoO and derived several policy improvements and theoretical implications. Cho Jung-ran (2008) further analyzed the impact of RoO on the economic effect of FTA use and, specifically, estimated and analyzed the relationship between RoO and FTA utilization in NAFTA (USMCA) and the issues surrounding the origin criteria.

Based on these previous studies, we established a hypothesis focusing on this relationship to verify how the application of preferential tariffs due to the use of FTAs affects the export performance of exporters, specifically among automobile parts companies.

H4: The complexity and uncertainty of the RoO have a mediating effect on the use of the FTA in relation to the export performance of automobile parts companies.

This hypothesis was established to confirm whether there is a difference in the degree to which the complexity and uncertainty characteristics of RoO affect the use of FTAs and the application of preferential tariffs, as well as whether the use of FTAs has a mediating effect within the relationship between export performances.

Based on previous studies, this study classified its measurement items into the complexity and uncertainty factors of the RoO through the definition of the FTA use variable. Research

models and hypotheses were established based on variables derived from previous studies and literature reviews, as explained above, and questionnaire surveys were then constructed through the operationalization of the definitions of this study's variables.

3.3. Composition of Survey Questions

For this study's empirical analysis, a survey was conducted from 2019 to 2020, focusing on insiders from 86 automobile parts companies in Korea. The survey method consisted of a direct collection of questionnaires conducted on-site among FTA education of officials, as well as an indirect collection through e-mail. A total of 86 responses were collected and used in this study except for some that were difficult to use in our analysis.

Table 2. Variable Definitions and Survey Design

| Variable	Criteria	Operant Definition and Survey
Complexity of RoO	5-point Likert scale	- Effects of the complexity of RoO on FTA utilization - Degree of the complexity of RoO between contracting parties - Relationship and impact of RoO complexity and cost generation - The degree of burden of preparing documents to satisfy the complexity of RoO - Effects of RoO complexity on FTA utilization
Uncertainty of RoO	5-point Likert scale	- The effect of RoO uncertainty on the application of preferential tariffs and the satisfaction of RoO in the use of FTA - The impact of increased costs and uncertainty on the public and private sectors - Effect of RoO on the post-verification procedures of location of origin - Cost limitation, inefficiency, and responsibility during verification - Effects of RoO uncertainty on FTA utilization
Use of RoO and FTA	5-point Likert scale	- Effects of RoO characteristics on FTA utilization - Effects of RoO complexity and uncertainty on the execution of preferential tariffs and the satisfaction of location of origin - Degree of negative impact of RoO characteristics
Export Performance of Automotive Parts Companies	5-point Likert scale	- The degree of performance of a company's export growth - Reduction of costs due to FTA utilization - The degree of exportability and influence of RoO characteristics - Degree of export performance based on preferential tariffs and utilization of country-of-origin

According to the collected questionnaires, 96% of the respondents were using the FTA and the countries that were subject to export transactions were diverse, including the Americas, Europe, China, and Southeast Asia.

4. Research Methodology

4.1. Research Model

This study defined its independent variables by dividing RoO's characteristics into complexity and uncertainty, which are at the core of FTA utilization and the preferential tax rate application. The key purpose here was to conduct an analysis on the impact of RoO and its two characteristics on FTA utilization and export performance while specifically focusing on automobile parts companies. As reviewed in previous studies, the complexity and uncertainty characteristics of RoO have a strong influence on companies and trading parties using FTAs. Therefore, research was conducted using a model that divides the characteristics of RoO into complexity and uncertainty.

Fig. 1. Research Model
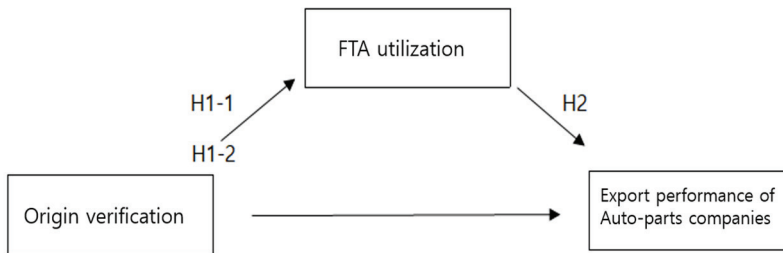
4.2. Evaluation of Research Model

4.2.1. Normality Test and General Characteristics of Variables

A normality test was performed to examine the distribution of the continuous variable. After that, we then divided the testing into a parameter analysis and a nonparametric test according to the normality judgment. We then judged the data as non-regular if the probability of significance was found to be lower than 0.05.

The general characteristics of the variables are shown in Table 3. Complexity_1 was 29.14±4.98, complexity_2 was 3.51±0.86, while complexity as a whole was 32.65±5.16. Further, uncertainty_1 was 40.01±6.98 and uncertainty_2 was 43.70±7.45. Additionally, FTA utilization_1 was 10.85±2.24, FTA utilization_2 was 11.44±1.76, and FTA utilization as a whole was 22.29±3.27. Finally, export_1 and export_2 were 19.99±3.94 and 7.20±1.51, respectively, while export as a whole was 27.19±4.62.

4.2.2. Correlation analyses

The results of the correlation tests between the study variables are shown in Table 4.

4.2.3. Factor analysis

The results of the suitability tests of all items reveals that the Cornbach's α of complexity was 0.883 and was 0.864 for uncertainty, 0.752 for FTA utilization, and was 0.856 for export performance. All of these results were higher than 0.600.

Table 3. Descriptive statistics of the study variables

	N	Min	Max	Avg	Standard deviation
Complexity_1	86	17.00	40.00	29.14	4.98
Complexity_2	86	1.00	5.00	3.51	0.86
Complexity	86	20.00	45.00	32.65	5.16
Uncertainty_1	86	22.00	55.00	40.01	6.98
Uncertainty_2	86	1.00	22.00	3.69	2.17
Uncertainty	86	25.00	60.00	43.70	7.45
FTA Utilization_1	86	6.00	15.00	10.85	2.24
FTA Utilization_2	86	8.00	15.00	11.44	1.76
FTA Utilization	86	16.00	30.00	22.29	3.27
Export performance_1	86	10.00	30.00	19.99	3.94
Export performance_2	86	4.00	10.00	7.20	1.51
Export performance	86	15.00	40.00	27.19	4.62

Table 4. Correlations between the study variables

	Complexity_1	Complexity_2	Complexity	Uncertainty_1	Uncertainty_2	Uncertainty	FTA Utilization_1	FTA Utilization_2	FTA Utilization	Export performance_1	Export performance_2	Export performance
Complexity_1	1											
Complexity_2	0.117	1										
Complexity	.986**	.281**	1									
Uncertainty_1	.706**	0.174	.712**	1								
Uncertainty_2	0.107	0.055	0.112	0.070	1							
Uncertainty	.692**	0.180	.699**	.957**	.356**	1						
FTA Utilization_1	.752**	.235*	.766**	.714**	0.157	.714**	1					
FTA Utilization_2	.292**	.445**	.357**	.216*	0.185	.256*	.327**	1				
FTA Utilization	.672**	.400**	.717**	.605**	0.207	.627**	.861**	.762**	1			
Export performance_1	0.170	.243*	0.205	0.199	0.022	0.193	0.168	.265*	.258*	1		
Export performance_2	.613**	0.120	.612**	.606**	0.001	.568**	.642**	.312**	.608**	.299**	1	
Export performance	.345**	.247*	.375**	.368**	0.019	.350**	.352**	.328**	.418**	.950**	.581**	1

** The correlation is significant at the 0.01 level (both sides).
* The correlation is significant at level the 0.05 (both sides).

a) Analysis of the Complexity Factors

The Varimax rotation method was used as an extraction method for the factor analysis, with the Kaiser-Meyer-Olkin measure of sample adequacy being 0.868 and the Bartlett's sphericity test being 464.964 (p<0.001), which means that our sample is adequate. As a result of the factor analysis, items 3 and 6 in the questionnaire that had communality values lower than 0.5, which represents the description of each variable, were deleted. As a result of the total variance described, two factors were extracted, with factor 3 having a value of 0.914 using the eigenvalue of 1. Two factors were found to explain 59.36% of the total variance. Complexity_1 was classified into 10, 5, 11, 4, 8, 7, 2, while complexity_2 was classified into 1.

Table 5. Rotated Component Matrix a

	Component		Cronbach's a
	1	2	
10. There are differences in the RoO around the world and these complex characteristics make it difficult to recognize the country-of-origin	.901	-.035	
05. It is difficult and complicated to prepare documents to meet the RoO, meaning that it is a burdensome process	.796	-.047	
11. The complex nature of the RoO affects the use of FTAs	.794	.106	
04. The complexity of the RoO has increased, with it being difficult to utilize the FTA due to the complex trade patterns between the parties of each FTA contracting country	.767	.113	Complexity_1 (0.896)
08. The complex RoO increase the difficulty of management	.714	.191	
07. Complex RoO increase costs for both the private sector (importers and producers: costs of satisfying and certification of origin) and the public sector (customs and customs authorities: verification and administrative processing)	.709	.011	
02. The complexity of the RoO is a burden in the use of FTAs	.687	.189	
09. The complex system of RoO is an obstacle in terms of export diversification	.668	-.264	
01. I understand the complexity of the RoO	.074	.961	Complexity_2
Kaiser-Meyer-Olkin (KMO) and Bartlett's Test Results			
KMO measure of sample adequacy			.868
Bartlett's Sphericity Test	Approximate chi-square		464.964
	Degrees of freedom		55
	Probability of significance		.000

- Extraction method: Analysis of principal components
- Rotation Method: Varimax with Kaiser Normalization
a. 3 Factor rotation convergence in iterative calculations.

b) Analysis of the Uncertainty Factors

A factor analysis of the uncertainty variable was extracted using the Varimax method, with the Kaiser-Meyer-Olkin measure of sample adequacy coming to 0.912 and the Bartlett's sphericity test coming to 717.140, (p<0.001), which suggests that the sample is adequate. As

a result of our factor analysis, there were no items with a communality value of 0.5 or less that represents the description of each variable by the extracted factors. As a result of the total variance described, two factors were extracted, with factor 3 of 0.759 using the eigenvalue 1. Furthermore, two factors were found to explain 68.54% of the total variance. Uncertainty_1 was classified into 2,3,4,5,6,7,8,9,10,11,12, while complexity_2 was classified into 1.

Table 6. Rotated Component Matrix a

	Component		Cronbach's a
	1	2	
10. The uncertainty of the country-of-origin verification procedure increases the operating cost of the FTA and makes it difficult for companies to utilize preferential tariffs	.853	-.071	
02. Uncertainty in the RoO is a burden on the use of FTAs	.842	.150	
09. Depending on the circumstances of the customs and tariff authorities, if the administrative work is insufficient or uncertain, there may be an imbalance in the work of customs officials, which may then cause losses	.839	-.032	
11. Due to the uncertain nature of the RoO and interpretation, it is difficult to receive acknowledgement of the country-of-origin	.830	.055	
04. Customs and customs authorities of both parties are involved in the verification process and, in this case, if the interpretation of the origin of one party's work is inconsistent with that of the other party, it will negatively affect the implementation of FTA preferential tariffs	.815	.012	
05. If uncertain and inconsistent origin information is provided from the exporting country (exporter, producer), the importing country will then experience difficulties in using the FTA due to the burden of tariffs and liability for negligence	.806	.158	Uncertainty_1 (0.945)
06. Errors or minor inconsistencies in administrative documents, such as documentation of origin, increase uncertainty for the parties involved in the transaction	.801	-.003	
12. The uncertain nature of the RoO affects the use of FTAs	.796	-.118	
03. Complex and uncertain RoO increase costs and uncertainty in both the private sector (import companies and producers) and the public sector (customs and customs authorities)	.796	.154	
08. Due to discrepancies in verification procedures, as well as interpretations or differences in evidential documents, there are difficulties in post-verification of origin	.792	-.031	
07. The above characteristics have a more negative effect on the balance of rights and obligations between exporters, producers, and importers in the case of non-main office transactions	.673	.249	
01. I understand the uncertainty of the RoO	.014	.968	Uncertainty_2
Kaiser-Meyer-Olkin (KMO) and Bartlett's Test			
KMO measure of sample adequacy			.912
	Approximate chi-square		717.140
Bartlett's Sphericity Test	Degrees of freedom		66
	Probability of significance		.000

- Extraction method: Analysis of principal components
- Rotation Method: Varimax with Kaiser Normalization
a. 3 Factor rotation convergence in iterative calculations.

c) Analysis of FTA Utilization Factors

The factor analysis of the FTA utilization variable was extracted using the Varimax method, with the Kaiser-Meyer-Olkin measure of sample adequacy coming to 0.694 and the Bartlett's sphericity test coming to 159.060 (p<0.001), suggesting that the sample is adequate. As a result of the factor analysis, there were no items with a communality value of 0.5 or lower that represents the description of each variable by the extracted factors. As a result of the total variance described, two factors were extracted, with factor 3 coming to 0.687 using the eigenvalue 1. Two factors were found to explain 68.24% of the total variance. Further, FTA_utilization 1 was divided into 4, 5, and 6, while FTA_utilization 2 was divided into 1, 2, and 3.

Table 7. Rotated Component Matrix a

	Component		Cronbach's a
	1	**2**	
05. The nature (uncertainty) of the RoO negatively affects the use of FTAs	.916	.061	FTA Utilization_1 (0.818)
04. The nature (complexity) of the RoO negatively affects the use of FTAs	.890	.084	
06. There is a burden and risk involved in using FTA due to the post-verification of origin	.709	.287	
01. We are making good use of the FTA that was signed by Korea	-.014	.826	FTA Utilization_2 (0.669)
02. The proportion of FTA use in exports is increasing	.153	.810	
03. The proportion of FTA use in imports is increasing	.262	.661	
Kaiser-Meyer-Olkin (KMO) and Bartlett's Test			
KMO measure of sample adequacy			.694
Bartlett's Sphericity Test	Approximate chi-square		159.060
	Degrees of freedom		15
	Probability of significance		.000

- Extraction method: Analysis of principal components
- Rotation Method: Varimax with Kaiser Normalization

a. 3 Factor rotation convergence in iterative calculations.

d) Analysis of Export Performance Factors

The factor analysis of the export performance indices was done using the Varimax method, with the Kaiser-Meyer-Olkin measure of sample adequacy coming 0.815 and Bartlett's sphericity test coming to 346.973 (p<0.001), suggesting that the sample is adequate. As a result of the factor analysis, all of the communality values representing the description of each variable by the extracted factors was 0.4 or greater and, as such, there were no questions that were omitted. As a result of the total variance described, two factors were extracted with factor 3 of 0.638 using the eigenvalue 1. Further, two factors were found to explain 70.36% of the total variance.

Table 8. Rotated Component Matrix a

	Component		Cronbach's a
	1	2	
02. The use of the FTA has increased exports	.856	-.001	Export performance_1 (0.897)
04. The use of FTA preferential tariffs has increased the market share of exported goods	.840	.014	
05. The use of the FTA has increased price competitiveness and brought in new trading parties	.824	.148	
03. The use of FTA preferential tariffs has increased exports to FTA signatories compared to other countries	.778	.130	
06. The successful implementation of the FTA generally helps increase exports	.775	.363	
01. The export profit margin (margin/sales) increased due to the use of FTA preferential tariffs	.728	.187	
07. Difficulties due to the nature of the RoO (complexity, uncertainty) negatively affect the trade transactions and performance of a company	.052	.879	Export performance_2 (0.732)
08. If the difficulties caused by the characteristics of the RoO (complexity and uncertainty) are mitigated, it will have a more positive effect on corporate performance	.188	.872	

Kaiser-Meyer-Olkin (KMO) and Bartlett's Test		
KMO measure of sample adequacy		0.815
Bartlett's Sphericity Test	Approximate chi-square	346.973
	Degrees of freedom	28
	Probability of significance	0.000

- Extraction method: Analysis of principal components
- Rotation Method: Varimax with Kaiser Normalization

a. 3 Factor rotation convergence in iterative calculations.

4.2.4. Regression analyses

a) A Regression Analysis of the Influence of Complexity on FTA Utilization

As a result of predicting FTA utilization as a dependent variable, the explanatory power R^2 of the regression was 0.557, with the explanatory power of the revised R^2 after correction coming to 0.546. As for the regression equation, F was 52.146 with $p<0.001$, which was suitable.

As a result of predicting the use of the dependent variable of FTA utilization, complexity_1 B=0.416 ($p<0.001$) and complexity_2 B=1.234 ($p<0.001$) both showcased a significant effect. Further, after determining multicollinearity, we found that the tolerance was greater than 0.1 and the VIF was less than 10, indicating that there was no problem with collinearity.

Table 9. Regression Analysis of the Complexity of FTA Utilization

Model		Unstandardized coefficient		Standardized coefficient	t	p-value	95% confidence interval for B		Collinearity statistics	
		B	Standardi-zation error	β			Min	Max	Toler-ance	VIF
1	(Constant)	5.824	1.635		3.563	0.001	2.573	9.076		
	Complexity_1	0.416	0.048	0.634	8.618	0.000	0.320	0.512	0.986	1.014
	Complexity_2	1.234	0.279	0.326	4.432	0.000	0.680	1.788	0.986	1.014

$R^2 = 0.557$, R^2 adj $= 0.546$, F=52.146 (p<0.001)

a. Dependent variable: FTA utilization

b) Regression Analysis of the Influence of Uncertainty on FTA Utilization

As a result of predicting FTA utilization as a dependent variable, the explanatory power R2 of the regression was 0.393, while the explanatory power of revised R2 that corrected the independent variable was 0.379. The regression equation was found to be suitable with an F of 26.917 and p<0.001.

As a result of predicting the dependent variable, FTA utilization, uncertainty_1 B=0.278 (p<0.001) showed a significant effect, while uncertainty_2 showed an insignificant effect. As a result of determining multicollinearity, the tolerance was greater than 0.1 and the VIF was less than 10, indicating that there was no problem with collinearity.

Table 10. Regression Analysis of the influence of Uncertainty on FTA Utilization

Model		Unstandardized coefficient		Standardized coefficient	t	p-value	95% Confidence interval for B		Collinearity statistics	
		B	Standardi-zation error	β			Min	Max	Toler-ance	VIF
1	(Constant)	10.242	1.667		6.143	0.000	6.926	13.557		
	Uncertainty_1	0.278	0.040	0.593	6.925	0.000	0.198	0.358	0.995	1.005
	Uncertainty_2	0.250	0.129	0.166	1.933	0.057	-0.007	0.508	0.995	1.005

$R^2 = 0.393$, R^2 adj $= 0.379$, F=26.917 (p<0.001)

a. Dependent variable: FTA utilization

c) A Regression Analysis of the Effect of FTA Utilization on Export Performance

As a result of predicting export performance as a dependent variable, the explanatory power R2 of the regression was 0.175, while the explanatory power of revised R2 with the independent variable corrected was 0.155. The regression equation was found to be suitable with an F of 8.797 and p<0.001.

As a result of predicting the export performance of the dependent variable, FTA utilization_1 B=0.566 (p=0.011) and FTA utilization_2 B=0.626 (p=0.027) showed significant effects. As a result of determining multicollinearity, the tolerance was found to be greater than 0.1 and the VIF was less than 10, indicating that there was no problem with collinearity.

Table 11. Regression Analysis of the Effect of FTA Utilization on Export Performance

Model	Unstandardized coefficient		Standardized coefficient	t	p-value	95% confidence interval for B		Collinearity statistics	
	B	Standardization error	β			Min	Max	Tolerance	VIF
(Constant)	13.881	3.308		4.196	0.000	7.301	20.461		
1 FTA Utilization_1	0.566	0.218	0.274	2.600	0.011	0.133	0.999	0.893	1.120
FTA Utilization _2	0.626	0.277	0.238	2.259	0.027	0.075	1.178	0.893	1.120

$R^2 = 0.175$, R^2 adj = 0.155, F=8.797 (p<0.001)

a. Dependent variable: Export performance

d) Regression Analysis of the effects of Complexity and Uncertainty on Export Performance

As a result of our predictions using export performance as a dependent variable, the explanatory power R^2 of regression was 0.185, while the explanatory power of revised R^2 with the independent variable corrected was 0.145. Further, the regression equation showcased that F was suitable at 4.602 with p=0.002.

As a result of predicting export performance as the dependent variable, there were no variables that appeared significant. Additionally, as a result of determining multicollinearity, the tolerance was greater than 0.1 and the VIF was less than 10, indicating that there was no problem with collinearity.

Table 12. Regression Analysis of the effects of Complexity and Uncertainty on Export Performance

Model	Unstandardized coefficient		Standardized coefficient	t	p-value	95% confidence interval for B		Collinearity statistics	
	B	Standardization error	β			Min	Max	Tolerance	VIF
(Constant)	13.433	3.313		4.054	0.000	6.841	20.026		
Complexity_1	0.163	0.132	0.176	1.236	0.220	-0.099	0.425	0.498	2.008
1 Complexity_2	1.020	0.545	0.191	1.869	0.065	-0.066	2.105	0.968	1.034
Uncertainty_1	0.141	0.095	0.212	1.485	0.141	-0.048	0.329	0.493	2.029
Uncertainty_2	-0.054	0.216	-0.025	-0.251	0.802	-0.483	0.375	0.987	1.014

$R^2 = 0.185$, R^2 adj = 0.145, F=4.602 (p=0.002)

a. Dependent variable: Export performance

4.2.5. Mediation effect analysis

a) The Mediating Effect of FTA Utilization in the relationship between Uncertainty and Export Performance

To verify the mediating effect of FTA utilization in the relationship between uncertainty

and export performance, the PROCESS macro model 4, as proposed by Hayes (2013), was used, with 5,000 bootstrap samples being designated and the confidence interval set to 95%. As a result of the analysis, we found that uncertainty has a significant effect on the use of the FTA (B=.2752, p<.0001). Further, when the FTA utilization parameter was introduced, the uncertainty factor (B=.0898, p=0.2579) was insignificant, with the FTA utilization (B=.4624, p=0.0118) being significant, although there was no mediating effect identified.

Table 13. The mediating effect of FTA utilization in the relationship between uncertainty on export performance

Variable	B	se	t	p	LLCI	ULCI
Parameter model (Dependent variable: FTA utilization)						
Constant	10.2649	1.6535	6.2079	.0000	6.9766	13.5531
Uncertainty	.2752	.0373	7.3767	.0000	.2010	.3494
Dependent Variable Model (Dependent Variable: Export Performance)						
Constant	12.9555	3.2857	3.9430	.0002	6.4204	19.4906
Uncertainty	.0898	.0788	1.1393	.2579	-.0669	.2465
FTA Utilization	.4624	.1795	2.5762	.0118	.1054	.8195

The total effect between uncertainty and export performance was significant as B=0.2170 (p=0.0010); however, the direct effect of the route through which FTA use was used as the input was meaningless as B=.0898 (p=0.2579). As a result of our verifying uncertainty and export performance using bootstrapping, we found that there was no 0 between the minimum and maximum values of the bootstrapping, meaning that there was an indirect effect.

Table 14. Total, Direct, and Indirect Effects between Uncertainty and Export Performance

Effect	B	se	LLCI	ULCI
Total effect	.2170	.0634	.0909	.3431
Direct effect	.0898	.0788	-.0669	.2465
Indirect effect	.1273	.0562	.0214	.2422

b) The mediating effect of FTA utilization in the relationship between complexity and export performance

PROCESS macro model 4 was used to verify the mediating effect of FTA utilization in the relationship between complexity and export performance, with 5,000 bootstrap samples being designated and the confidence interval set to 95%. As a result of the analysis, we found that complexity has a significant effect on FTA utilization (B=.4548, p<.0001). Further, when FTA utilization parameters were introduced, complexity (B=.1389, p=0.2787) was insignificant, while FTA utilization (B=.4338, p=0.0335) was significant, although there was no mediating effect found.

Table 15. The mediating effect of FTA utilization in the relationship between complexity and export performance

Variables	B	se	t	p	LLCI	ULCI
Parameter model (Dependent variable: FTA utilization)						
Constant	7.4397	1.5955	4.6630	.0000	4.2670	10.6125
Complexity	.4548	.0483	9.4222	.0000	.3588	.5508
Dependent Variable Model (Dependent Variable: Export Performance)						
Constant	12.9825	3.2925	3.9430	.0002	6.4338	19.5312
Complexity	.1389	.1273	1.0905	.2787	-.1144	.3921
FTA Utilization	.4338	.2007	2.1616	.0335	.0346	.8330

The total effect between complexity and export performance was significant as B=.3362 (p=0.0004); however, the direct effect of the route through which FTA utilization was included was insignificant as B=.1389 (p=0.2787). As a result of verifying the roles of complexity and export performance using bootstrapping, we found that there was no 0 between the upper and lower limits of the bootstrapping, meaning that there was an indirect effect.

Table 16. Total, Direct, and Indirect Effects between Complexity and Export Performance

Effect	B	se	LLCI	ULCI
Total effect	.3362	.0907	.1558	.5166
Direct effect	.1389	.1273	-.1144	.3921
Indirect effect	.1973	.0925	.0060	.3713

5. Results

This study aimed to derive implications for ensuring a more efficient origin of products management and FTA utilization by analyzing the impact of complexity and uncertainty of the RoO on FTA utilization and their relationship between export performances. The study survey was conducted both offline and online among our chosen sample, with the significance being analyzed through a mediating effect analysis using PROCESS macro model 4, which is effective in analyzing models with a mixture of moderating and mediating effects.

In sum, we found that, after predicting the FTA utilization as the dependent variable, complexity_1 B=0.416 (p<0.001) and complexity_2 B=1.234 (p<0.001) showed significant effects. Further, uncertainty_1 B=0.278 (p<0.001) showed a significant effect, while uncertainty_2 only showed an insignificant one.

In addition, as a result of predicting the export performance of the dependent variable, FTA utilization_1 B=0.566 (p=0.011) and FTA utilization_2 B=0.626 (p=0.027) both showed significant effects. As a result of predicting export performance as the dependent variable, there were no variables that had any significant effects.

In the analysis of the mediating effect, uncertainty had a significant effect on FTA utilization (B=.2752, p<.0001); further, when the FTA utilization parameter was introduced, the effect of uncertainty (B=.0898, p=0.2579) was insignificant, with the FTA utilization (B=.4624, p=0.0118) then being significant, while there was no mediating effect. In addition, the total effect between uncertainty and export performance was significant as B=.2170

(p=0.0010), but the direct effect of the FTA was meaningless as B=.0898 (p=0.2579). Additionally, the verification of uncertainty and export performance using the bootstrapping method revealed that there was no 0 between the upper and lower limits of the bootstrap.

As a result of the analysis, complexity was found to have a significant effect on FTA utilization in the relationship between complexity and export performance (B=.4548, p<.0001); herein, when FTA utilization while were introduced, complexity (B=.1389, p=0.2787) was insignificant, and FTA utilization (B=.4338, p=0.0335) was significant, with there being no mediating effect. In addition, the total effect between complexity and export performance was significant as B=.3362 (p=0.0004), but the direct effect of FTA utilization was insignificant as B=.1389 (p=0.2787). Further, the test of complexity and export performance using bootstrapping revealed that there was no 0 between the upper and lower limits of the bootstrap that then suggests there is an indirect effect.

Complexity and uncertainty were found to have a significant effect on export performance without any impact from other variables; however, when the FTA utilization variable was inserted, the direct impact of complexity and uncertainty was insignificant. Furthermore, our results showed that the impact is significant when FTA was used, which then implies that the export performance of companies is affected through the FTA while it is used to control for complexity and uncertainty due to preferential benefit.

Although the complexity and uncertainty of RoO may be a risk factor for companies using FTAs, there are limitations in increasing their performance in the current trade environment without using FTAs. In addition, although there are limitations in not being able to compare and analyze the purpose of this study by degree of preparation, capability of the companies studied, and the industries involved, similar studies to this one will be helpful for exporters in assisting them in improving the impact of FTA utilization and risk management amid the global trade environment wherein the FTA is inevitable.

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