Journal of Korea Trade Vol. 24, No. 6, October 2020, 157-172
https://doi.org/10.35611/jkt.2020.24.6.157
ISSN 1229-828X

The Impact of Export Insurance on Exports to ASEAN and India: The Experience of Korea

JKT 24(6)

Received 20 August 2020
Revised 16 September 2020
Accepted 7 October 2020

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Abstract

Purpose – This research empirically proves the extent to which export insurance promotes Korean exports to research object countries among New Southern countries. The outcome of this research will present implications for the operations of export insurance for exports to these countries.

Design/methodology – For the empirical analysis, the export equation was composed using a basic gravity model. Based on this, the determinants of Korea's exports to research object countries were analyzed. In this study, a panel unit root test and panel cointegration test were conducted. As a result of the panel unit root test, it was confirmed that the variables of the panel data are not belonging to I(0), but to I(1). As a result of the panel cointegration test, it was established that there are long-term stable relationships among all variables. Accordingly, the gravity model was estimated using original data in order to reduce the information loss caused by the first difference, in spite of individual data belonging to I(1).

Findings – For the estimated results of panel OLS, the estimated coefficient of short-term export insurance was 0.56-0.64, with statistically significant results at the significance level of 1%. In addition, for the analysis results of the random effect model, the estimated coefficient of short-term export insurance was 0.59-0.64%, with a statistically significant result at the 1% significance level. This could indicate that Korean export insurance has positive influences on export promotion to New Southern countries.

Originality/value – The research implies that export insurance has a 4.1 to 4.7 multiplier effect in expanding exports to the New Southern countries for Korea. This research has intensively analyzed the effects of export insurance on the promotion of exports to a selected area by a government foreign economic policy, which is the originality and value of this paper.

Keywords: Export Credit, Export Promotion, Gravity Model, New Southern Countries, Short-term Export Insurance
JEL Classifications: F13, F32, F40

1. Introduction

The New Southern countries, which include the 10 member nations of the Association of Southeast Asian Nations (ASEAN) and India, are evaluated as having high strategic value as a new growth engine of the global economy. New Southern countries are rapidly emerging as a new "big consumer market" due to rapid economic growth and improved income levels. In particular, the New Southern countries have established themselves as a large market with trade and investment of $181.2 billion (share of 15.9% out of total trade) and $7.2 billion

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(14.4% out of total outbound investments), respectively. In this regard, one policy that has recently attracted much attention in Korea is the New Southern Policy, which is said to be a new paradigm for foreign economic policy in Korea.

The recent protectionism between the United States and China is not a fragmentary or temporary phenomenon, but is likely to be prolonged in connection with the domestic political situations in both nations. Accordingly, Korea, which is highly dependent on the US and Chinese markets, needs to diversify its export markets in order to reduce external risks and establish a stable economic infrastructure. In this situation, Korea should exercise an active export expansion policy to the New Southern countries. In addition, the Korean government should provide various export promotion measures that can effectively support and revitalize exports to this region amid the rapidly changing trade environment. One of these export support measures is export insurance.

The Korean government needs to actively support exports to the New Southern countries by using the export insurance system. Funatus (1986) presented the results of a study in which most OECD member countries actively used an export insurance system to protect exporters and promote exports. In addition, studies on the impact of export insurance on exports have been conducted steadily since the late 1990s to the present. Export insurance was proven a part of trade policy for export promotion by many researchers, such as Baltensperger and Herger (2009), Kim Sae-Young and Lee Seo-Young (2004), Lee Yune and Kim Hee-Kook and Polat and Yesilyaprak (2017).

A common feature of the previous studies is that the effect of export insurance was analyzed for exports to all countries. However, these findings can be said to be insufficient in analyzing the export promotion effect of export insurance. In other words, export insurance is widely used for high risk exports; that is, exports to countries with a high risk of non-payment. Considering these points, it is possible to derive accurate and reliable results by restricting the research on export insurance to specific regions, and conducting research with strictly refined data about the concerned exports and the insured amounts. It is necessary to present improvement measures appropriate to the characteristics of the region through studies of specific regions rather than through studies at the overall level in consideration of the fact that export insurance is a policy-operated system for exports to risky areas.

Under this background, in order to overcome the limitations of the existing studies, this study aims to conduct empirical research by limiting the subject of research to New Southern countries that have recently attracted attention in Korea. In other words, the purpose of this study is to analyze how Korea's export insurance system affects exports to New Southern countries. To this end, this study attempts to conduct an empirical analysis using a gravity model. The gravity model is recognized as the most suitable research model for analyzing the flow of regional and international trade (Helpman, 2008).

Through the results of this empirical research, it is possible to examine the significance and specific size of the impact of export insurance on exports to New Southern countries. Therefore, it can be determined whether export insurance makes a significant contribution to expanding the export market in New Southern countries. This paper is expected to provide policy implications in terms of the importance of export insurance in increasing exports to a strategic overseas market. In other words, this research examines the effectiveness of export insurance in the promotion of exports to a strategic area for Korea, whose development strategy is characterized as export-led growth. This research attentively studies the effects of export insurance on an area of overseas market selected by the foreign economic policy of Korea.

The structure of this paper is as follows. Chapter II analyzes the theory and preceding studies on export insurance systems. Chapter III designs the research model based on

previous research and explains the research methodology. Chapter IV conducts an empirical analysis on how Korea's export insurance system affects exports to New Southern countries. Chapter V summarizes the research results and suggests implications.

2. Theoretical Background

2.1. The Export Insurance Scheme in Korea

Export insurance is a risk-cover scheme that helps exporters develop and expand overseas markets by hedging risks arising from commercial or political events. Commercial risks refer to events in which overseas buyers fail to pay for goods or services supplied on credit terms due to financial difficulties, such as insolvencies, business closures, cash flow problems, and so on. Commercial risks include a buyer's refusal to or delay in taking delivery of supplies without cause. The political risks are inclusive of all events, other than commercial risks that prevent payments for international contracts. Examples of political risks include war, civil unrest, expropriation, rebellion, riot, and strikes (K-SURE, 2019). Force majeure events are included in political risks.

Export insurance provides risk-cover policies either for exporters that deliver supplies on credit terms, or for financial institutions that extend financing to buyers based on the underlying international transactions. The policies for the former appear in the way of supplier's credit, and policies for the latter are mostly provided in the way of buyer's credit.

The cover comes in different forms according to the period of credit in the underlying individual transactions. Short-term insurance covers those transactions which have credit terms up to two years. Medium and long-term insurance covers a period over two years. By and large, medium and long-term insurance is provided for transactions of capital goods that are mostly large and heavy tangible assets requiring two to three years to complete. Because transactions of capital goods require large sums of money during the completion period, financing from a financial institution is necessary for buyers in order to pay for the goods, mostly in an installment plan during construction. Exporters are paid until the time of delivery of the capital goods directly through the financing from the financial institution. Medium and long-term insurance makes financings easy by securing the repayments of the borrowers, who are the buyers, of the capital goods.

Short-term insurance is for goods such as consumer products, light industry products, and intermediate goods that are transacted with the payment terms of the Document against Payment, Document against Acceptance, and Telegraph Transfer. Of course, transactions with a Letter of Credit are covered by the short-term insurance program in case the issuing banks of the Letters of Credit have a low net worth or are located in countries where political risks are high. Short-term insurance also functions as a way to finance overseas receivables by assigning the rights for the sums payable under the insurance policy to financial institutions (Lavelle, 1994).

The export insurance regime is based on the Trade Insurance Act, which mandates the Korea Trade Insurance Corporation (hereinafter reffered to 'K-SURE') to operate the trade insurance system in Korea (Trade Insurance Act, Article 37). K-SURE is an official export credit agency backed by the Korean government. The purpose of the insurance system is to cover risks airing in connection with trade or other foreign transactions (Trade Insurance Act, Article 1).

K-SURE provides the widest range of insurance programs, including Short-Term Export Credit Insurance, Medium and Long-Term Export Credit Insurance, Export Credit

Guarantee, and Foreign Exchange Risk Insurance. An Export Credit Guarantee is provided to Korean exporters to finance the working capital for impending export transactions. Foreign Exchange Risk Insurance covers losses on foreign currency transactions arising from the underlying exports.

Short-Term Export Credit Insurance is a program which is applicable to three types of transactions with a maximum payment term of two years: i) exports of goods that are produced, processed, or collected in Korea; ii) exports of goods produced or processed by an overseas subsidiary of a domestic company, or goods processed overseas by a third party assigned by Korean companies; or iii) exports of goods imported for the purpose of export to a third country (K-SURE, 2019). Most of the total insured amount comes from the exports of the first, which are called 'direct exports'. The other two transactions are occasionally insured by Korean exporters.

Individual shipments of direct exports are insured either by the comprehensive policy or by a single Short-Term Export Credit Insurance program. The comprehensive policy is issued as an open policy in which K-SURE and the exporter agree that the exporter should notify K-SURE of all shipments that match the listed transaction types in the open policy, and that K-SURE covers the notified shipments without further underwriting processes. A larger credit limit and a lowered insurance premium are allowed per each overseas buyer to the insured under the comprehensive policies. Via the comprehensive policy, the insurer can spread the risks by realization of the law of large numbers, and the insured can expand into the overseas market without worrying about non-payment events. A single policy is issued upon application from an exporter for each overseas buyer after being underwritten by K-SURE, which considers the creditworthiness of the buyer, the payment term, the history of transactions between counterparties, and so on.

The coverage ratio of Short-Term Export Credit Insurance is usually 95% for each shipment of underlying transactions. The average insured term falls around 120 days. Short-Term Export Credit Insurance seems to be provided with premium rates that are adequate to cover the long-term operating costs and losses of the program, according to the loss ratio of the program being less than 100% over the recent five years (K-SURE, 2019). The loss ratio less than 100% confirms that Short-term Export Insurance is operating within the regime of the WTO's subsidy regulations (Lee Koung-Rae, 2019). Short-Term Export Credit Insurance for 'direct exports' is the flagship program, with a two thirds share of the total underwriting volume of K-SURE.

2.2. Literature Review

Two methodologies have been used in the empirical research on export insurance: the export function model and gravity model. Lee Seo-Young (2014) and Mah (2006/2010) conducted empirical analyses by applying the export supply function. Research by Lee Yune and Kim Hee-Kook (2016) and Polat and Yesilyaprak (2017) conducted empirical analyses by applying the gravity model. Each analysis method has advantages and disadvantages, but the gravity model has been used more frequently in recent years.

Mah (2006) examined whether or not export insurance provided by the Japanese government promoted exports. The export supply function model was applied to the empirical analysis, and the period of investigation (POI) for research was 1961 to 1999. Prior to the empirical analysis, data stability tests were conducted. The unit root tests showed that all concerned variables were integrated at order one, and they were not cointegrated. Empirical evidence using the first differenced data showed that export insurance did not have a significant effect on the exports of Japan. Mah (2010) conducted an empirical analysis of the

impact of the British export insurance system on exports. The analysis method was the same as that of Mah (2006), and the POI for the analysis was from 1980 to 2006. Empirical evidence using the first differenced data showed that export insurance did not have a significant effect on increasing the exports of Britain.

Lee Seo-Young (2014) conducted an empirical analysis on the impact of Korea's export insurance system on export promotion to all countries. This study divided the export insurance programs provided by K-SURE into two groups: short-term insurance types and medium and long-term insurance types. He conducted two analyses on each group. The model applied to the empirical analysis was the export supply function model, and the POI for the research was from 1992 to 2013. The empirical research evidenced that both the short-term and the medium and long-term export insurance had no contribution to promoting exports.

Lee Yune and Kim Hee-Kook (2016) estimated the effect of Korea's short-term export insurance on exports using a panel gravity model. The model by Head and Mayer (2014) was assumed and extended to include the performance of short-term export insurance coverage in Korea for a period of interest of 20 years from 1995 to 2014. The estimation results showed that there was strong evidence of the positive effect of short-term export insurance on export promotion. The research proved that if Korea's short-term export insurance increased by 1%, exports would increase by about 0.08%. They argued that Korea's export insurance system was effective as a trade support tool.

Polat and Yesilyaprak (2017) analyzed the effects of Turkey's export credit insurance on export performance. The empirical analysis was conducted by setting a trade gravity equation for the years of 2000 to 2015 as the POI. Empirical evidence using a different panel gravity model, log-log OLS and a fixed effect model, showed that the provision of export insurance by the government had a significant effect on increasing exports in Turkey. According to the results of the study, if the supply of export insurance increase by 1%, exports can be expected to rise by 0.03-0.17% in Turkey.

This study conducts an empirical analysis with the gravity model used in research by Lee Yune and Kim Hee-Kook (2016), Polat and Yesilyaprak (2017). In order to analyze the impact of export insurance on exports, it is vital to accurately define data related to insured transactions and the concerned exports. In most studies, the total insured amount was used as empirical analysis data, along with the total amount of exports. However, in order to use the underwritten volume for analysis, it is important to process and refine the data according to the purpose of the study. That is, because the insured volume of export insurance is inclusive of foreign transactions which are not directly related to exports, the insured volume should be processed to exclude the amount that is not deeply related to domestic economic activities, such as resale, intermediary trade, consignment sales, and others. Likewise, exports should be matched with the respective insured transactions. Only after refining the data can the promotion effect of export insurance be analyzed. However, in a study by Lee Yune and Kim Hee-Kook (2016), the data seemed not to be processed or refined in consideration to the raw data on the insured amount and the concerned exports. If an empirical analysis were to be conducted without accurately defining and processing the data, there may be errors in the analysis results entailing incorrect implications for export insurance.

Since panel data used in the gravity model includes time series data, empirical analysis should be conducted after confirming the stability of the panel data. In a study by Polat and Yesilyaprak (2017), an empirical analysis was conducted without a stability test for the time series data used in the estimation model. If the stability of time series data is not secured, the reliability of the estimation results may be lower. Accordingly, this study fixes the problems of the stability of the panel data to contribute to academic development.

In consideration of the nature of export credit insurance covering high-risk transactions, the effects of export insurance should be studied on specific areas regarded as a high risk, or as a strategic area for expansion into an overseas market. Otherwise, the results of research on the effects may be averaged to a low level by combining both the insured amounts for exports to a risky area, and for exports to marketable risk countries. All previous studies on the effects of export insurance have been done on export promotion to all countries. In this sense, it could be said the previous literature has a lack of explanation of the effects of export insurance.

3. The Model and Data

3.1. Research Model

3.1.1. Basic Theory for Model Setting

A gravity model is most generally used to analyze determinants of exports at the national level. That is, the gravity model is the main economic model used for empirical studies on trade among nations. The gravity model was first adapted to international trade theories by Tinbergen (1962). The basic idea of the gravity model is based on a kind of formulated fact that the economic size and distance between countries is closely related to the trade flows between the countries. Namely, it is based on the estimation that the trade volume among countries is proportional to square of economic size and inverse-proportional to distances. It can be mathematically expressed as follows:

$$T_{ij} = A \times (\frac{Y_i Y_j}{D_{ij}}) \quad (1)$$

Here, T_{ij} stands for trade size between the two countries, A is a proportional constant, Y_i is the GDP of i country, Y_j is the GDP of j country, and D_{ij} is the distance between i and j countries, respectively. Applying the natural logarithm to Equation (1), if it is rearranged as a model for quantitative analysis, it can be the following equation (2).

$$lnT_{ij} = \beta_0 + \beta_1 lnY_i + \beta_2 lnY_j + \beta_3 lnD_{ij} \quad (2)$$

Equation (2) is the process to decide the total trade of nations conducting domestic and overseas economic activities, and yet, it does not explain the revealed comparative advantage in trade among the related countries. T_{ij} stands for the total trades between both i and j countries, and it is valid when partially contributing to an increase in the GDPs of both countries. $Y_i(Y_j)$ is a representative variable for $i(j)$ country as an important measure to determine total trade. The main merit of the gravity model is that the distance of both countries in trade plays a clear role.

Since the 1980s, there have been studies using gravity models. In particular, the gravity model has been the main model for analyzing trade between two units, and it was established with theoretical evidence through studies by Anderson (1979), Anderson and van Wincoop (2003), Bergstrand (1989), Deardorff (1998) and Eaton and Kortum (2002). In addition to the main variables of the gravity model, GDP and distance, these studies included population, trade cost, whether to combine local economies, whether to conclude FTAs, customs, foreign currency exchange rate, and policy factors as descriptive factors. As seen in these studies, the gravity model is very useful for measuring the influences of various factors, including GDP

and distance, on trade flows. However, it is disadvantageous that the model can neither reflect the alternative effects between countries, nor consider some factors which cannot be explained; therefore, it is necessary to be careful in interpreting the estimated results of the model.

3.1.2. Research Model Setting

In this study, the gravity model was established for the determinants of exports between New Southern countries and Korea. For the analysis, a basic gravity model was adopted to compose an export equation, and the determinants of Korea's exports to New Southern countries were analyzed. A gravity model is an efficient model for explaining a trade pattern of two of countries, and for estimating trade volume; yet, the export equation is set by focusing on the exports between Korea and New Southern countries instead of the trade patterns between the countries. Then, adding the variable for short-tern export insurance to the export equation, the analysis was conducted on the influence of short-term export insurance on exports to New Southern countries. For the countries analyzed, seven nations were selected as research objects among the 11 in the New Southern countries, excluding Laos, Myanmar, Brunei, and Cambodia because of the smaller trade amounts. Hereafter, the New Southern countries refer to the seven countries in this research for the purpose of convenience.

The descriptive variables in the research model include the underwritten amount of the short-term export insurance program, GDP, population, and distance to other countries. The conclusion of FTAs with Korea was added as a dummy variable. Export insurance or short-term export insurance in the research model refers to the Short-Term Export Credit Insurance of K-SURE. Because of its sizable insured volume and the applicable transactions of the program, Short-Term Export Credit Insurance can be a representative insurance program.

In order to empirically review how much the short-term export insurance has contributed to Korea's export promotion to the New Southern countries, the basic theoretical model is the following equation (3). For the model, an empirical study was conducted using available data between 2000 and 2018.

$$EX_{ijt} = \beta_0 + \beta_1 EXINS_{jt} + \beta_2 GDP_{jt} + \beta_3 POP_{jt} + \beta_4 DIST_{jt} + \beta_5 RPI_{jt} + \beta_6 Dummy + \epsilon_{jt} \quad (3)$$

With the application of the log to Equation (3), it is converted to the log linear form of Equation (4). The values of each variable in Equation (4) mean elasticity, i.e., the effects of changes of each variable on the changes in Korean exports.

$$lnEX_{ijt} = \beta_0 + \beta_1 lnEXINS_{jt} + \beta_2 lnGDP_{jt} + \beta_3 lnPOP_{jt} + \beta_4 lnDIST_{jt} + \beta_5 RPI_{jt} + \beta_6 Dummy + \epsilon_{jt} \quad (4)$$

In Equation (4), EX_{ijt} stands for Korea's annual export size to the New Southern countries. i stands for Korea, j for New Southern countries, and t for the POI between 2000 and 2018 for 19 years.

Here, the estimated coefficient β_1 is a variable for export insurance, and if exporting transactions are more insured with short-term export insurance, risks are reduced, resulting in increases in exports. Therefore, the estimated coefficient of export insurance is expected to be positive (+).

The estimated coefficients of β_2 and β_3 are variables showing the market sizes of other countries, and if the market size is bigger, reflecting the income level and the population size of each country, it is expected that Korean exports will increase to that market. Accordingly, the estimated coefficients of other countries' incomes and populations would be positive (+).

The estimated coefficient β_4 stands for the distance between the capital city of Seoul of Korea and those of other countries, and if the distance is farther, the cost of trade will be higher. Because the distance will have a negative influence on the trade, the estimated coefficient would be negative (-).

The estimated coefficient β_5 is the relative export price index, showing the changes in exports according to the relationship of the export price indices of Korea and other countries. If export prices increase for certain products produced in Korea, the demand for the product will decrease in other countries. If another country's consumer price increases for certain products produced there, the demand for Korean products will increase. Accordingly, the estimated coefficient of the relative export price would be negative (-).

The estimated coefficient β_6 is whether an FTA was concluded between Korea and another country. The conclusion of FTAs with other countries lowers the obstacles to trade, creating a positive influence on exports. Therefore, the estimated coefficient would be positive (+) for exports.

3.2. Data

For the data used in this study, panel data from 2000 to 2018 were used for the seven countries after excluding Laos, Myanmar, Brunei, and Cambodia because of their insufficient trade volumes. Among the variables used in this analysis for export determinants, data on export volume were provided by the Korea Trade Statistics Promotion Institute. The exports used in this study are exports of goods or services which were supplied after being produced or processed or gathered in Korea, i.e., 'the direct exports'. The direct exports take a share of 85% of the total exports to the seven countries for the POI.

The insured amount of export insurance was restricted to the underwritten amount of the Short-term Export Credit (General) program to focus on foreign transactions deeply related to domestic economic activities. Out of the total underwritten volume of the Short-term Export Credit (General) program, only the insured amount for the direct exports is considered in after excluding underlying exports related to resale transactions, intermediary trade, and consignment exports. Two-thirds of the total insured volume of K-SURE was underwritten for direct exports under the Short-term Export Credit (General) program. The other programs in K-SURE were excluded for the same reason. For example, the insured amount for the Medium and long-term Export Credit Insurance program covers the export financing of the underlying contracts, which considerably exceed the amount of the national content of the contract. The underwriting amount of the Export Credit Guarantee is double the insured amount of the Short-term Export Credit (General) program.

If any empirical research is conducted without processing and selecting data reflecting the features of each insurance program, there may be errors in the statistical results and interpretations. By the defining and refining the insured amount to match direct exports, this research can draw a validated effect of export insurance on exports to a certain overseas market.

Other nations' GDPs as income variable were collected from the national statistics portal system of the Statistics of Korea. The relative export price index was calculated as the outcome of the Korean relative export price index divided by the other countries' consumer price indices. The base year is 2010 for the price indices. The related data were acquired from the

Statistics of Korea.

For the distance variable, the distance between Seoul and of the capital of the other country was measured. In quantifying the distance variables, there are some critical arguments among scholars. The most general method is to measure the distance between capitals. The related data were extracted from the website of www.indo.com/distance. In order to show the effects of concluding FTAs, the dummy variable was set at 0 before, and 1 after, the effective dates of the conclusions of FTAs. The details of the variables are in Table 1.

Table 1. Description of Analysis Data

Variables	Variable Description	Source
ln(EX)	Total export volume to exporting countries	Korea Trade Statistics Promotion Institute (KTSPI)
ln(EXINS)	Insured values of Short-Term Export Credit Insurance for the research object countries (exporting countries)	K-SURE
ln(GDP)	GDP of exporting countries	Statistics Korea
ln(POP)	Population of exporting countries	Statistics Korea
ln(DIST)	The distance between the capital city of Korea and the capital cities of the exporting countries	www.indo.com/distance
RPI	Relative Price Index (Korea's export price index / consumer price index of exporting countries)	Statistics Korea
FTA	Free Trade Agreement with Korea (dummy variable)	FTA Homepage

3.3. Methodology

This study analyzes the impact of Korea's export insurance on exports to New Southern countries. That is, it aims to empirically evidence how the Korean export insurance contributes to export promotion. For this, the research follows the features of panel analysis in utilizing data which reflect the characteristics of both cross-section data and time-series data (Park Hyun-Hee and Cho Sung-Je, 2020). Accordingly, the data used in this research are those such as time-series data by nation, cross-section data on entire research object countries, and the subjects of the analysis.

Ahead of finding the main causal relations among variables included in the model, it is necessary to analyze the long-term stationarity of the variables, along with the suitability of the established model. In this study, a panel unit root test and panel cointegration test are conducted to confirm the stationarity of the data.

Because of the existence of a unit-root in time-series data, there may be a strong correlation between variables without the actual correlation, resulting in a problem of spurious regression. Therefore, it is necessary to conduct empirical analysis after checking the stationarity of the panel data as it includes a time-series. In general, a 'unit root' is tested through an Augmented Dickey-Fuller (ADF) test and Phillips Perron (PP). However, many scholars have recently pointed out that both ADF and PP unit-root tests cannot reject the null hypothesis 'there is no unit root' well. Accordingly, a new unit root test method is required to supplement the standard unit root test. This study adopts the test methods suggested by Im, Pesaran and Shin (2003) and Levin, Lin and Chu (2002) to supplement the lack of a unit-root test.

After conducting a unit root test, a panel cointegration test was conducted in order to confirm long-term stationarity and balance among the variables. For the panel cointegration test, because the Johansen integration test is highly recognized, this research uses a Fisher-type cointegration test derived from the Johansen cointegration test.

Based on these test results, the empirical analysis will be done using panel OLS. However, if Equation (4) is empirically analyzed by simple panel OLS, there is chance of bias from the national characteristics of each country. Therefore, this research additionally adopts varying coefficient models, i.e., the random effects model and fixed effects model in order to more effectively analyze unobservable factors in the panel data.

In addition, a Hausman test was conducted to confirm which model had greater validity between the random effects and fixed effects models (Wooldridge, 2008). The Hausman test is used to analyze correlation between independent variables and individual effect error terms in estimating which model is more suitable. If there is correlation between the individual effect and independent variables, the fixed effects model is chosen; if there is no correlation, the random effects model is selected (Kennedy, 2003).

In this study, Equation (4) is classified into two models for analysis. Model I is without the dummy variable, and Model II includes the dummy.

4. Empirical Evidence

4.1. Basic Statistics Analysis

Ahead of the empirical analysis, the characteristics of the main variables were found, and the descriptive statistics are displayed in Table 2.

Table 2. Basic Statistics of the Variables

Variables	Average	Standard Deviation	Minimum Value	Maximum Value	Number of Samples
ln(EX)	8.623	0.729	7.157	10.676	133
ln(EXINS)	6.629	0.759	6.739	7.980	133
ln(GDP)	5.595	0.959	3.440	7.911	133
ln(POP)	11.286	1.595	8.301	14.117	133
ln(DIST)	7.797	0.260	7.392	8.094	133
RPI	1.093	0.376	0.516	2.518	133
FTA	0.586	0.494	0.000	1.000	133

4.2. Panel Unit Root Test

For verifying the stationarity of the data, a panel unit-root test was done, and the results are seen in Table 3. In this study, in order to reduce errors, the unit root test has been performed with LLC (Levin, Lin and Chu), IPS (Im, Pesaran and Shin), ADF (Augmented Dickey-Fuller), and PP (Phillips-Perron) tests.

The results of the unit root test show that the levels of the concerned variables are not stationary at any reasonable level of significance. However, in the case of the first difference, by rejecting the null hypothesis 'there is unit root', it shows that there is stationarity in the first difference. That is, all the variables used in the analysis are tested as panel data in the series of I(1), not I(0).

Table 3. Results of the Panel Unit-root Test

Variables	Level		First Difference	
	Statistics	Prob. Value	Statistics	Prob. Value
ln(EX)				
Levin, Lin and Chu t-test	-2.461	0.006***	-2.652	0.004***
Im, Pesaran and Shin W-stat	-0.566	0.285	-3.783	0.000***
ADF-Fisher Chi-square	17.127	0.249	39.230	0.000***
PP-Fisher Chi-square	12.384	0.574	113.54	0.000***
ln(EXINS)				
Levin, Lin and Chu t-test	-2.928	0.002***	-3.797	0.000***
Im, Pesaran and Shin W-stat	-0.502	0.307	-4.055	0.000***
ADF-Fisher Chi-square	13.883	0.458	41.634	0.000***
PP-Fisher Chi-square	10.379	0.734	75.533	0.000***
ln(GDP)				
Levin, Lin and Chu t-test	-4.464	0.000***	-2.946	0.001***
Im, Pesaran and Shin W-stat	-0.843	0.199	-2.525	0.005***
ADF-Fisher Chi-square	14.987	0.379	27.550	0.016***
PP-Fisher Chi-square	5.8828	0.969	51.942	0.000***
ln(POP)				
Levin, Lin and Chu t-test	-0.648	0.258	-2.547	0.005***
Im, Pesaran and Shin W-stat	0.8585	0.804	-2.179	0.014***
ADF-Fisher Chi-square	15.187	0.365	35.453	0.001***
PP-Fisher Chi-square	16.256	0.298	438.62	0.000***
RPI				
Levin, Lin and Chu t-test	0.1178	0.546	-3.496	0.000***
Im, Pesaran and Shin W-stat	2.3264	0.990	-6.196	0.000***
ADF-Fisher Chi-square	2.6974	0.999	62.334	0.000***
PP-Fisher Chi-square	25.386	0.031**	203.32	0.000***

Notes: 1. ***and ** mean significance at the 1% and 5% levels, respectively.
2. Probabilities for Fisher tests are computed by using an asymptotic Chi-square distribution. All other tests assume asymptotic normality.
3. The Null hypothesis is that the panel unit root exists.

4.3. Panel Cointegration Test

If the variables of the panel data belong to I(1), a panel cointegration test is required to confirm long-term stationarity and balance among the variables. This study has conducted a Fisher-type integration test based on the Johansen cointegration test. The results of the cointegration test, arrayed in Table 4, show rejection of the null hypothesis that 'there is no cointegration relation'. Accordingly, it was confirmed that there was long-term balanced relationship among the panel data. That is, it could be said that there is a long-term stable relationship among all the variables.

If the panel data are unstable as a result of the panel unit-root test, the difference data should be used to secure stationarity of the individual data, and in this case, there may be a problem of information loss in the data due to the use of the difference. If there is a cointegration relationship in the panel data, it means that there is long-term balance among the individual panel data, and the empirical analysis can use the original data instead of the differenced data (Kim Shin-Jou, 2017). Accordingly, in this study, in spite of the individual

data belonging to I(1), the original data were used in estimating the gravity model in order to decrease the information loss caused by the difference method.

Table 4. Results of the Panel Cointegration Test

Hypothesized No. of CE(s)	Fisher Stat. from trace test	Prob.	Fisher Stat. from max-eigen test	Prob.
None	25.35	0.031	43.77	0.000
At most 1	94.88	0.000	94.88	0.000
At most 2	421.9	0.000	231.2	0.000
At most 3	550.2	0.000	158.4	0.000
At most 4	128.3	0.000	85.13	0.000
At most 5	67.54	0.000	67.54	0.000

Note: The Null Hypothesis of the Fisher type Johansen test is no cointegration in trace and max-eigen.

4.4. Model Estimation

Since all variables show long-term stability, a panel OLS (Ordinary Least Square) analysis has been performed. The estimated result of Equation (4) is arrayed in Table 5. Model I is the result of this analysis without the dummy variable, and Model II is the result of analysis with the dummy variable.

In the analysis of Model I, statistically significant results were confirmed at the 1% significance level for those variables, i.e., the distance to another country (DIST), relative export price (RPI), and the underwritten amount of short-term export insurance (EXINS). In Model II, relative export price (RPI), conclusion of FTAs as a dummy variable, and the underwritten amount of short-term export insurance (EXINS) had statistically significant results at the 1% significance level as well.

To summarize the result of panel OLS analysis, the distance to other countries, relative export price, conclusion of FTAs, and short-term export insurance had influence on Korea's exports to the New Southern countries. In particular, the coefficient of the underwritten amount of short-term export insurance is about 0.58-0.64, which is statistically significant at the 1% level. This means that Korean short-term export insurance has a positive influence on export promotion to New Southern countries.

It was confirmed that the gravity model would be useful for analyzing Korea's export determinants through the results of panel OLS analysis. However, for the panel OLS analysis method, there is a limitation in not comprehensively considering the individual characteristics and time characteristics, which are merits of the panel data used in this study. Therefore, the analysis on the effects of Korean short-term export insurance on exports to New Southern countries has been conducted using a varying coefficient model, i.e., the fixed effects and random effects models. The analysis results are suggested in Table 6, which have been found through the random effects and fixed effects models.

A Hausman test was conducted to verify which model provided greater validity between the random effects and fixed effects models. If the null hypothesis of the Hausman test is rejected, the fixed effects model is more valid. However, if the null hypothesis is not rejected, the random effects model has greater validity. As a result of the Hausman test, the null hypothesis has not been rejected, which confirms that the random effects model has greater validity. Accordingly, this study explains the analysis results based on the estimated results of random effects model.

Table 5. Results of Panel OLS Estimation

Independent Variables	Dependent Variable : ln(EX)			
	Model I		Model II	
	Coefficient	P-value	Coefficient	P-value
Constant	8.603***	0.000	7.046***	0.000
	(5.981)		(4.907)	
ln(EXINS)	0.641***	0.000	0.586***	0.000
	(10.597)		(9.835)	
ln(GDP)	0.023	0.815	-0.051	0.605
	(0.235)		(-0.517)	
ln(POP)	0.022	0.595	0.048	0.244
	(0.532)		(1.169)	
ln(DIST)	-0.494***	0.014	-0.280	0.160
	(-2.486)		(-1.413)	
RPI	-0.699***	0.000	-0.533***	0.000
	(-4.818)		(-3.661)	
Dummy(FTA)	-	-	0.339***	0.000
			(3.677)	
Adj. R-squared	0.78		0.79	
No. of Obs.	133		133	

Notes: 1. Values within the parentheses below the estimated coefficients denote the calculated t-statistics.
2. *** statistically significant at 1 % level.

Table 6. Estimation Results of the Fixed Effects and Random Effects Models

Independent Variables	Dependent Variable : ln(EX)			
	Model Ⅰ		Model II	
	Fixed Effect	Random Effect	Fixed Effect	Random Effect
Constant	20.297***	9.044***	19.171***	7.046***
	(3.158)	(8.027)	(2.990)	(6.436)
ln(EXINS)	0.387***	0.638***	0.405***	0.585***
	(4.106)	(13.563)	(4.302)	(12.899)
ln(GDP)	0.986***	0.062	1.098***	-0.051
	(5.376)	(0.793)	(5.674)	(-0.678)
ln(POP)	-1.745***	0.009	-1.706***	0.048
	(-2.817)	(0.266)	(-2.772)	(1.532)
ln(DIST)	omitted	-0.562***	omitted	-0.280*
		(-3.643)		(-1.852)
RPI	-0.043	-0.661***	-0.023	-0.533***
	(-0.306)	(-6.060)	(-0.164)	(-4.802)
Dummy(FTA)	-	-	-0.158*	0.339***
			(-1.702)	(4.822)
Adj. R-squared	0.88	0.78	0.89	0.79
No. of Obs.	133	133	133	133

Notes: 1. Values within the parentheses below the estimated coefficients denote the calculated t-statistics.
2. ***, * mean significance level at the 1% and 10% levels, respectively.

The empirical results of the random effects model can be explained as follows. The estimated coefficients for the incomes and populations of the countries were not statistically significant at any significance level in the analyses of Models I and II. However, in the analysis of Model I, the distances between countries and export price index had statistically significant influences at the 1% significance level.

Model II analysis also shows elasticity in distance between countries at -0.28, which is

statistically significant at the 10% significance level. The relative export price coefficient is about -0.53, which is statistically significant at the 1% level. The FTA variable used as a dummy also had statistically significant influence at the 1% significance level.

Lastly, the analysis result of the effects of short-term export insurance is summarized as follows. In the analysis of Model I, the estimated coefficient of underwritten amount of short-term export insurance is 0.638 with a statistically significant result at the 1% level. In Model II, the coefficient is 0.585, and statistically significant at the 1% level. For the comprehensive analysis results of both Models I and II, the estimated elasticity shows that a 1% increase in the supply of short-term export insurance increases exports between 0.59% and 0.64% to New Southern countries. In other words, the elasticity of the export insurance has a multiplier effect of 4.1 to 4.7, which is expressed by the ratio of the increased exports to the increased insured amount for the region.

5. Summary and Conclusion

This study analyzed the effect of Korean short-term export insurance on exports to the New Southern region using a gravity model. As for the research object countries, empirical studies were conducted using POI data from 2000 to 2018, excluding Laos, Myanmar, Brunei, and Cambodia because of the insignificant trade volumes.

Before finding important causal relations between variables included in the gravity model, the research analyzed long-term stationarity among the variables, along with the suitability of the established model. In order to verify the stationarity of the data, a panel unit root test and panel cointegration were conducted. It was confirmed that the variables of the panel data did not belong to I(0), but to I(1), according to the panel unit root test. As a result of the panel cointegration test, it was established that there were long-term stable relationships among all variables. Accordingly, the gravity model was estimated using original data in order to reduce the information loss caused by the first difference, in spite of individual data belonging to I(1).

In summary of the estimated panel OLS, the estimated coefficient of short-term export insurance was 0.641 with a statistically significant result at the 1% level in the analysis of Model I. In addition, the estimated coefficient was 0.586 with a statistically significant result at the 1% level in the Model II analysis.

However, for panel OLS analysis as a fixed coefficient model, there was a limitation in not comprehensively considering individual and time characteristics, which are merits of the panel data used in this study. Therefore, in this study, additional empirical analysis was performed on the random effects and the fixed effects models corresponding to the coefficient of the variation model. A Hausman test was conducted in order to verify which model had greater validity. The random effects model was selected by the Hausman test.

Based on the random effects model analysis, the estimated coefficient of short-term export insurance was 0.638, with a statistically significant result at the 1% level in the analysis of the Model I, while the analysis of Model II had an estimated coefficient of 0.585 with a statistically significant result at the 1% level. For the comprehensive analysis of both models, a 1% increase in short-term export insurance could increase exports to research object countries by 0.59% to 0.64%. Accordingly, this research empirically proves that export insurance promotes exports to the New Southern countries with a multiplier of 4.1 to 4.7. This outcome implies that export insurance plays an effective role as a part of the trade policy for export promotion. In consideration of the premium level of the short-term export insurance of K-SURE, as the insurance is provided without cost to the government of Korea, this could be a measure of export promotion without a breach of the subsidies regulations of the WTO.

Therefore, export insurance can be provided with more actively for exports to New Southern countries. Market expansion in the region would entail the diversification of the export market of Korea, which is still concentrated in China and the United States. Moreover, in the sense that the export insurance is a measure of exporters to advance into a new risky market, export insurance should be provided for exports to the four countries excluded from this research due to insufficient trade volumes.

The contribution of this research lies in highlighting the role of export insurance for Korean exports to New Southern countries, which are a strategic area of foreign economic policy for Korea. This research intensively studied the role of export insurance for the selected countries, which is different from existing studies.

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