

# The Effect of Trade Agreements on Korea's Bilateral Trade Volume: Mitigating the Impact of Economic Uncertainty in Trading Countries\*

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## Abstract

**Purpose** – This research empirically analyzes the influence of economic policy uncertainty and free trade agreements (FTAs) on bilateral trade volumes between Korea and its trading partners. The study investigates whether fluctuations in the Economic Policy Uncertainty Index (EPU) for both Korea and its trading partners significantly impact trade volumes and whether the implementation of FTAs mitigates these effects.

**Design/methodology** – The study employs dynamic panel data analysis using the system generalized method of moments (system GMM) estimation method to achieve its research objectives. It utilizes country-month-level panel data, including the EPU, trade volume between Korea and its trading partner countries, and other pertinent variables. The use of system GMM allows for the control of potential endogeneity issues and the incorporation of country-specific and time-specific effects.

**Findings** – The analysis yields significant results regarding the impact of economic policy uncertainty on Korea's exports and imports, particularly before the implementation of FTAs. An increase in the EPU of trading partners leads to a notable increase in Korea's exports to them. Conversely, an increase in Korea's EPU negatively affects its imports from trading partners. However, post-FTA implementation, the influence of each country's EPU on trade volume is neutralized, with no significant difference observed.

**Originality/value** – This research contributes to the existing literature by providing empirical evidence on the interaction effects between economic policy uncertainty and FTAs on bilateral trade volumes. The study's uniqueness lies in its examination of how FTAs mitigate the impact of economic uncertainty on trade relations between countries. The findings underscore the importance of trade agreements as mechanisms to address economic risks and promote international trade relations. In a world where global market uncertainties persist, these insights can aid policymakers in Korea and other countries in enhancing their trade cooperation strategies and navigating challenges posed by evolving economic landscapes.

**Keywords:** Bilateral Trade Volumes, Economic Policy Uncertainty, Free Trade Agreements (FTAs), System GMM Estimation, Trade Relations

**JEL Classifications:** F13, F14, F15, F42

## 1. Introduction

The economic landscape of South Korea has long been intertwined with international trade, making it imperative to adapt to shifting dynamics among trading partners. In the face

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of external challenges such as the 2012 Eurozone crisis, the 2015 MERS outbreak, and the 2019 US-China trade dispute, South Korea has consistently maintained an annual economic growth rate of 2%-3%, achieving a per capita GDP exceeding \$30,000 by 2017. However, the global trade and supply chain disruptions wrought by the COVID-19 pandemic in 2020 led to negative growth rates worldwide, including in South Korea. Even as the global economy exhibited signs of recovery in the latter half of 2021, the Russian-Ukrainian War cast a shadow on the overall economic outlook. According to the IMF's projections, this conflict resulted in a 1% reduction in growth rates in 2022, with further declines of 0.7% and 0.3% anticipated in 2023 and 2024, respectively.

Additionally, global consumer inflation averaged 9.6% in 2022, with South Korea grappling with a relatively high inflation rate of 5.1%. These elevated inflation levels are expected to persist into the foreseeable future. Furthermore, the interest rate disparity between the United States and South Korea has steadily widened, reaching its most significant difference of 1.75% as of July 2023. This expanding gap is likely to endure, fueled by factors such as reduced foreign capital inflows, mounting inflation pressure resulting from rising import prices, and consumer expectations of interest rate hikes in South Korea, leading to reduced consumer spending.

Since the establishment of the WTO in 1995, globalization has forged ahead, bolstering interdependence among nations, especially under the leadership of major powers such as the United States and Europe. This heightened interdependence implies that developments in one country can reverberate across borders. Pivotal events like the 2008 global financial crisis, ignited by U.S. subprime mortgage loans, and the Brexit referendum in 2016 spurred a growing backlash against globalization. With the "America First" policy during the Trump presidency, the United States prioritized its own interests, sparking the US-China trade dispute. As countries increasingly pursued reshoring policies, accelerated by the COVID-19 pandemic, it became evident that anti-globalization sentiments had evolved into an irreversible global trend.

In this context, South Korea's economy remains heavily reliant on trade amidst the global trend of deglobalization. Changes in the social and economic conditions of its trading partners significantly impact South Korea's imports and exports. While traditional economic factors, encompassing industries and technologies, have historically driven trade, recent trends emphasize the more substantial role of non-economic factors. These non-economic factors encompass politics, culture, diplomacy, legal systems, and institutions, contributing to rapid shifts in trade dynamics. In this milieu, trade agreements such as free trade agreements (FTAs) and regional agreements (e.g., RCEP) emerge as pivotal instruments for mitigating the inherent volatility of international trade. An all-encompassing understanding of these factors and their intricate interplay is essential for a comprehensive analysis of the determinants of trade. Therefore, this study endeavors to incorporate these factors into its analysis.

The exploration of the determinants of international trade has been a focal point of numerous studies. Some pertinent studies on both economic and non-economic factors are briefly reviewed herein. Feng et al. (2017) delved into trade changes for Chinese firms in the U.S. and Europe, finding that reduced trade policy uncertainty encouraged new firms to enter trade, leading to the convergence of product prices and quality with those of trading partners. Studies have also examined the impact of social and economic uncertainties on trade in countries with trade agreements. Kehoe and Ruhl (2013) observed a significant increase in

trade volume for least-traded goods following the implementation of free trade agreements. Baier et al. (2014) scrutinized the dynamic effects of economic integration using U.N. Com-trade data, unveiling positive effects on both the extensive and intensive margins of trade. Jung (2023) provided empirical evidence of increased trade prior to the implementation of the EU-Korea Free Trade Agreement. Ando et al. (2022) dissected Japan's trade effects, distinguishing between the long-term and short-term effects of free trade agreements, revealing that certain products exhibited greater effects in the long run. In summary, there is a general consensus that international trade agreements lead to increased trade volumes.

Active research has also explored the effects of FTAs and trade agreements within the context of South Korea. For example, Won, Yong-Kul (2022) employed the difference-in-differences and gravity models to investigate the export-promoting effects of the FTA between Korea and ASEAN. The results from both methods demonstrated positive impacts on exports. Song, Back-Hoon (2019) conducted a comprehensive analysis of the impact of the Korea-Central America FTA, revealing an overall surge in exports, particularly in the transportation sector, with a resultant minor boost in GDP. Lee, Soon-Cheul (2019) probed into the effects of the Korea-India CEPA and third-party FTAs on bilateral trade, establishing that India played a pivotal role in boosting bilateral trade. However, third-party agreements, such as India's agreements with other countries, had an adverse effect on Korea-India trade due to competitive relationships.

Moreover, research has explored the effects of country-specific or macroeconomic indices on the economy and global trade markets. Mao and An (2021) empirically investigated how the Economic Complexity Index (ECI) influenced a country's development level by analyzing panel data. Dar et al. (2020) employed the ECI and Revealed Comparative Advantage (RCA) to elucidate Korean international trade diversification by visualizing Korea's import and export status. La and Song (2019) focused on the potential impact of the Logistics Performance Index (LPI) on trade facilitation, uncovering that LPI components could positively affect trade facilitation.

This research comprises four main chapters. The first chapter, the Introduction, provides an overview of the study's background, objectives, and significance. Chapter 2 offers insights into the Analysis Model and Data Description, presenting a detailed explanation of the analytical models used and describing the data sources and datasets employed for the analysis. Chapter 3 encompasses the Descriptive Statistics and Empirical Analysis Results, presenting basic data statistics and discussing the findings of the empirical analysis. Finally, Chapter 4, the Conclusion and Implications, summarizes the entire research, offering a comprehensive discussion of the findings and their implications.

## 2. Empirical Method and Data

### 2.1. Hypothesis

This study revolves around the primary research question: Do fluctuations in economic uncertainty in both trading partner countries and South Korea exert a substantial influence on the volume of trade between these nations? In pursuit of a comprehensive answer to this query, the study sets forth two key hypotheses:

*H1: An escalation in economic policy uncertainty within trading partner countries has a*

*discernible impact on the trade volume shared by the two nations.*

*H2: The effect described in H1 is mitigated through the enforcement of a free trade agreement (FTA) between the two countries.*

To empirically examine H1, the study scrutinizes the manner in which an augmentation in the Economic Policy Uncertainty Index (EPUI) for both South Korea and its trading partners correlates with alterations in the quantities of imports and exports exchanged between the two nations. To empirically investigate H2, the study delves into whether the EPUI for South Korea and its trading partners displays any notable disparities before and after the implementation of an FTA between the two countries.

## 2.2. Model

This paper undertakes empirical analysis to explore the impact of the Economic Policy Uncertainty Index and free trade agreements on trade relations between South Korea and its diverse partner countries. To this end, we present a regression equation (Equation 1) for the evaluation of log-transformed values representing the export and import quantities between South Korea and each respective partner country.

$$\begin{aligned}
 Y_{it} = & \alpha + \beta_0 Y_{it-1} + \beta_1 FTA_{it} \\
 & + \beta_2 \ln(EPUI)_{it} + \beta_3 (\ln(EPUI) \times FTA)_{it} \\
 & + \beta_4 \ln(EPUI \text{ KOR})_t + \beta_5 \ln(EPUI \text{ KOR} \times FTA)_{it} \\
 & + \gamma_1 Pre_{it}^1 + \gamma_2 Pre_{t-1}^2 + \gamma_3 X_{it}^1 + \gamma_4 X_t^2 + \mu_i + \epsilon_{it}
 \end{aligned} \tag{1}$$

Here, the dependent variable ( $Y_{it}$ ) represents the logarithm of export and import amounts between South Korea and each partner country ( $i$ ) at time  $t$ . The explanatory variables employed to elucidate the trade volume between the two parties are categorized as follows:

- 1) Lagged values of trade volume between South Korea and each partner country (i.e., the lagged value of the dependent variable,  $Y_{it-1}$ ),
- 2) Exogenous variables of interest for this study, encompassing the logarithm of EPUI for each partner country, a dummy variable for FTA, an interaction term between EPUI and FTA, and the logarithm of South Korea's EPUI at time  $t$  ( $FTA_{it}$ ,  $\ln(EPUI)_{it}$ ,  $(\ln(EPUI) \times FTA)_{it}$ ,  $\ln(EPUI \text{ KOR})_t$ ,  $\ln(EPUI \text{ KOR} \times FTA)_{it}$ ),
- 3) Pre-determined variables at time  $t$  refer to indices set between  $t - 1$  and  $t$ , covering elements associated with the global and country-specific economic environment, such as industrial production indices of South Korea and each partner country, the global supply chain pressure index, exchange rates, and leading economic indicators like oil price, gold price, copper price, soybean price, etc. ( $Pre_{it}^1$ ,  $Pre_{t-1}^2$ ),
- 4) Control variables are integrated to account for the level effect of trade volume between South Korea and its trading partners, encompassing the total export-import volume of both countries and trade conditions. Additionally, we incorporate South Korea's terms of trade index at time  $t$  (the ratio between Korea's export prices and its import prices) as a proxy variable for its trade environment. ( $X_{it}^1$ ,  $X_t^2$ ).

To estimate the effects of EPUI and FTA while considering country-specific fixed effects ( $\mu_i$ ) and controlling for potential endogeneity, we employ a sophisticated estimation strategy.

In summary, this paper scrutinizes the trade volume between South Korea and its partner countries, taking into account the influence of the Economic Policy Uncertainty Index, free trade agreements, and other pertinent economic factors. The study also addresses potential endogeneity concerns and controls for country-specific and time-specific effects, ensuring the robustness and reliability of its findings.

### 2.3. Empirical Strategy

This study employs a panel dataset that combines cross-sectional data from 15 countries with monthly time series data spanning from 2004 to 2019. The objective is to scrutinize the influence of government-to-government (G2G) trade agreements on South Korea's trade volume. Employing panel data is indispensable for capturing the dynamic characteristics of imports and exports at the country level. To accommodate these dynamic attributes, a dynamic panel model is employed, wherein the lagged dependent variable is included as an explanatory variable.

In typical panel data analysis, researchers often turn to conventional fixed-effects and random-effects models. However, these models may not meet the exogeneity assumption when the lagged dependent variable is employed as an independent variable (Anderson and Hsiao, 1981; Arellano, 1989; Arellano and Bond, 1991; Ahn and Schmidt, 1995). Although panel analysis methods like fixed or random effects can partially address endogeneity concerns, they may still be susceptible to omitted variable bias stemming from unobservable country-specific factors. To mitigate these potential biases and limitations, this study adopts the first difference dynamic panel model proposed by Arellano and Bond (1991).

Nonetheless, this model may produce biased estimates when the lagged dependent variable lacks exogeneity as an instrumental variable or when the time series data is relatively limited. To tackle these challenges and enhance estimation accuracy, the generalized method of moments (system GMM) estimation approach is adopted. This approach, introduced by Arellano and Bover (1995) and Blundell and Bond (1998), amalgamates level and first-differenced equations into a unified system. By introducing level variables and the lagged values of differenced variables as additional instrumental variables, the system GMM estimation harnesses a more extensive information set, culminating in more robust and consistent estimates. Importantly, it yields consistent results even when the dependent variable reaches a long-run stationary state. Given the advantages of the system GMM approach, this study opts to employ it for analyzing the impact of government-to-government trade agreements on South Korea's trade volume.

The research follows a two-step approach: In the first step, we estimate Equation (1) using the system GMM. In the second step, a statistical test is conducted to assess the second hypothesis. This hypothesis centers on evaluating the statistical significance of a linear combination of the estimated coefficients. To conduct this statistical test, we employ the delta method. The delta method is a statistical technique used to compute the uncertainty or standard errors associated with complex functions of estimated parameters. It approximates the sampling distribution of a function by utilizing the first-order Taylor expansion. By applying the delta method in this study, we are able to calculate the standard errors of the

linear combination of the estimated coefficients, facilitating the assessment of the second hypothesis, which focuses on understanding the impact of the EPUI on trade volumes before and after the implementation of FTAs. The delta method in this study builds upon prior research and draws from seminal work by Hajivassiliou and Ruud (1994), as well as other relevant literature on econometric methods for panel data analysis.

#### 2.4. Data

The dataset employed in this study is constituted as panel data, encompassing information related to trade amounts specific to individual countries on a monthly basis, alongside other pertinent control variables. These control variables include data such as the industrial production index by country and the U.S. dollar exchange rate. This dataset was sourced from the Organization for Economic Cooperation and Development (OECD). Furthermore, total trade volumes involving South Korea and its partner countries, along with the trade volumes of each respective country, were gathered and structured in panel data format to facilitate further analysis. It is important to note that the industrial production index for China was not available within the OECD dataset. In response to this limitation, data from the International Monetary Fund (IMF) was utilized as a substitute.

A pivotal exogenous variable in this study is the Economic Policy Uncertainty Index. The EPUI is meticulously designed to accumulate and furnish monthly data on economic policy uncertainty for each country. It amalgamates various components, including news analysis, government announcements, economic forecasts, and financial market fluctuations, to gauge the level and fluctuations of economic policy uncertainty.

Additionally, variables concerning the global macroeconomic environment, such as crude oil, gold, copper, soybeans, and others, were procured from monthly index data made available by the Korea National Statistical Office. Moreover, an index that quantifies global supply chain pressure, directly impacting international trade, was incorporated as an additional control variable. This particular index is publicly accessible and generated by the Federal Reserve Bank of New York, with updated data provided on a monthly basis.

An essential variable in this study is a dummy variable denoting the presence of a Trade Agreement between South Korea and its trading partners. Over the analyzed period, the status of both free trade agreements (FTAs) and regional trade agreements (RTAs) that were concluded and enacted by South Korea was examined and translated into variables. By identifying the point at which these trade agreements became applicable, based on their enforcement dates, dummy variables were created. The majority of the trade agreements in focus took the form of FTAs. Table 1 below delineates the categorization of FTA enforcement dates for each trading partner under examination in this study:

The final dataset employed for analysis is an amalgamation of data from various sources as mentioned earlier. These data sources are harmonized based on country and time period (monthly). The dataset encompasses information regarding South Korea and its trading partner countries at time point "t," inclusive of trade levels between South Korea and each partner country, as well as the macroeconomic environment at the same time point. Index variables were standardized for comparability, assuming a base value of 100 in January 2010, and currency variables were logarithmically transformed for inclusion in the analysis. The analysis covers a total of 15 countries (Netherlands, Germany, Russia, Mexico, the United

States, Brazil, Sweden, Spain, the United Kingdom, Italy, India, Japan, China, Chile, and Canada) and spans from January 2004 to December 2019. The data is predominantly collected on a country-specific and monthly basis. It's crucial to acknowledge that the macroeconomic environment-related variables and fundamental trade conditions in South Korea at time point "t" are treated as independent of those in its trading partners. Following data collection, any missing values were omitted, resulting in a final sample size of 2,843 for analysis.

**Table 1.** Period during which the FTA was in force for each trading partner

Country	Period the FTA was in force
Chile	After April 2004
India	After January 2010
France	After July 2011
Germany	After July 2011
Netherlands	After July 2011
Sweden	After July 2011
Spain	After July 2011
Ireland	After July 2011
Italy	After July 2011
United States	After March 2012
Canada	After January 2015
China	After January 2016
Colombia	After July 2016
United Kingdom	After July 2011
Japan	After March 2009

**Notes:**

- 1) FTA = free trade agreement; EU = European Union
- 2) For E.U. countries, the FTA enforcement date is based on the one-EU FTA.
- 3) For Japan, the date refers to the enforcement of other trade agreements, not an FTA.
- 4) If the FTA enforcement date falls after the 15th day of the month, the FTA is considered as being enforced from the following month.

**Source:** Author's composition based on official announcements from the Ministry of Foreign Affairs, Republic of Korea.

### 3. Estimation Results

#### 3.1. Descriptive Statistics

Tables 2 and 3 offer an overview of the key variables within the analysis sample. Table 2 provides the descriptive statistics for the entire sample, while Table 3 categorizes the sample into sub-samples based on the presence of FTA enforcement. The variables analyzed in the descriptive statistics align with those employed in the regression analysis. Among the 2,843 observations used in this analysis, 1,253 observations pertain to the pre-FTA enforcement period or encompass countries where FTAs have not been established. The remaining 1,590 observations encompass data from the post-FTA enforcement period involving South Korea.

Fig. 1 illustrates the temporal trends of each country's primary variable, the Economic Policy Uncertainty Index, across the analysis sample. The EPUI is an economic gauge that



quantifies the level of uncertainty surrounding a country's economic policies. A higher EPUI value signifies greater uncertainty, while a lower value reflects reduced uncertainty. Consequently, a higher EPUI generally indicates elevated economic policy uncertainty compared to historical averages. This heightened uncertainty can lead to cautious decision-making among businesses, consumers, and investors and may contribute to increased financial market volatility. Conversely, a lower EPUI value suggests decreased economic policy uncertainty, potentially encouraging businesses and investors to make more confident, long-term decisions.

In this study, the EPUI serves as a proxy for the economic uncertainty experienced within a specific country. As illustrated in Fig. 1, most countries demonstrate similar values and trends when examining the monthly fluctuations of EPUI across countries during the analysis period spanning from 2004 to 2019. However, certain countries experienced heightened political and economic instability, particularly in the latter part of the 2010s. Notably, the United Kingdom encountered substantial economic uncertainty during this period, driven by economic crises and Brexit-related concerns. Russia and Brazil, renowned for their elevated levels of political and economic uncertainty, exhibited higher EPUI levels in contrast to other countries. South Korea also displayed increased uncertainty in recent years when compared to its global counterparts.

These findings underscore the appropriateness of the EPUI employed in this study for effectively characterizing a country's economic uncertainty.

**Table 2.** Descriptive Statistics for the Main Variables

Variables	N	Mean	S.D.	Min	Max
Economic Policy Uncertainty Index(logarithm)	2,843	4.687	0.559	2.141	7.040
Korea's Economic Policy Uncertainty Index(logarithm)	2,843	4.832	0.445	3.619	6.288
Global Supply Chain Pressure Index	2,843	-0.200	0.491	-1.646	1.513
Korea's Terms of Trade Index	2,843	104.0	16.37	84.11	149.4
Export to Partner Country(logarithm)	2,843	13.28	1.279	10.28	16.51
Import from Partner Country(logarithm)	2,843	13.20	1.303	10.10	16.15
Partner Country's Total Export(logarithm)	2,843	3.507	0.887	0.916	5.475
Korea's Total Export(logarithm)	2,843	3.627	0.275	2.952	4.009
Partner Country's Total Import(logarithm)	2,843	3.501	0.946	0.358	5.464
Korea's Total Import(logarithm)	2,843	3.532	0.267	2.860	3.881
Partner Country's Dollar Rate(logarithm)	2,843	-1.642	2.103	-6.659	0.728
Korea's Dollar Rate(logarithm)	2,843	-7.002	0.0873	-7.278	-6.819
Oil Price(logarithm)	2,843	4.207	0.370	3.373	4.917
Gold Price(logarithm)	2,843	6.924	0.418	5.958	7.510
Copper Price(logarithm)	2,843	8.708	0.305	7.903	9.198
Soybean Price(logarithm)	2,843	6.890	0.289	6.244	7.476
Dummy variable for FTA enforcement	2,843	0.441	0.497	0	1
Partner country's Industrial Production Index	2,843	106.4	24.87	0.00634	270.1
Korea's Industrial Production Index	2,843	102.7	16.78	69.09	125.6

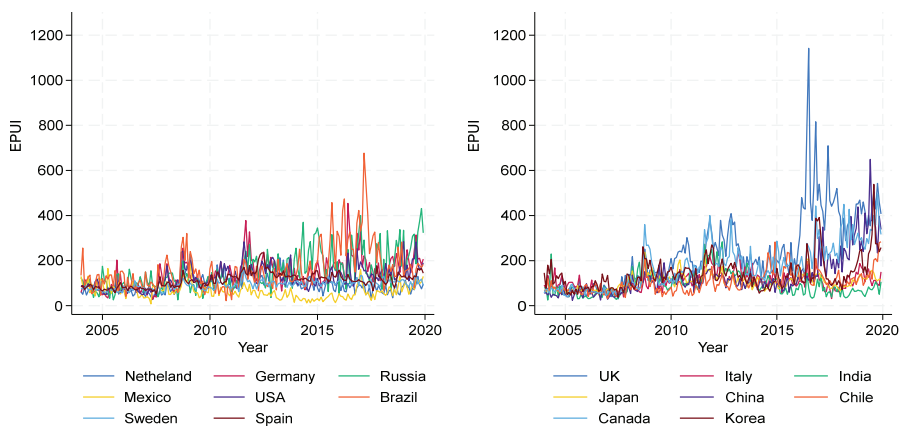


**Table 3.** Comparison by FTA Status

FTA Status Variables	Y			N		
	N	Mean	S.D.	N	Mean	S.D.
Economic Policy Uncertainty Index(logarithm)	1,253	4.863	0.519	1,590	4.548	0.551
Korea's Economic Policy Uncertainty Index (logarithm)	1,253	4.959	0.443	1,590	4.731	0.421
Global Supply Chain Pressure Index	1,253	-0.168	0.463	1,590	-0.225	0.511
Korea's Terms of Trade Index	1,253	96.11	8.769	1,590	110.3	18.19
Export to Partner Country(logarithm)	1,253	13.18	1.355	1,590	13.35	1.213
Import from Partner Country(logarithm)	1,253	13.39	1.233	1,590	13.04	1.335
Partner Country's Total Export(logarithm)	1,253	3.506	1.029	1,590	3.508	0.756
Korea's Total Export(logarithm)	1,253	3.792	0.150	1,590	3.496	0.280
Partner Country's Total Import(logarithm)	1,253	3.546	1.094	1,590	3.466	0.809
Korea's Total Import(logarithm)	1,253	3.675	0.156	1,590	3.420	0.283
Partner Country's Dollar Rate(logarithm)	1,253	-1.988	2.537	1,590	-1.370	1.634
Korea's Dollar Rate(logarithm)	1,253	-7.020	0.0513	1,590	-6.987	0.105
Oil Price(logarithm)	1,253	4.234	0.360	1,590	4.186	0.376
Gold Price(logarithm)	1,253	7.153	0.218	1,590	6.744	0.449
Copper Price(logarithm)	1,253	8.757	0.196	1,590	8.670	0.365
Soybean Price(logarithm)	1,253	6.967	0.218	1,590	6.830	0.322
Partner Country's Industrial Production Index	1,253	110.8	22.83	1,590	102.9	25.84
Korea's Industrial Production Index	1,253	113.9	9.028	1,590	93.81	16.14

**Note:** FTA = free trade agreement.

**Fig. 1.** The Time Trend of the Economic Policy Uncertainty Index (EPU) from Each Country



**Note:** We divided the EPU of 15 target countries and South Korea into two separate graphs for better readability. Please pay attention to the legends in each graph to interpret the results accurately.

**Source:** Economic Policy Uncertainty(n.d.), *Monthly EPU Indices for 22 Countries*.

### 3.2. Dynamic Panel Analysis Results

Table 4 presents the outcomes of estimating Equation 1 utilizing the system GMM method. This approach includes lagged values of the dependent variable, the total trade volume of trading partners and Korea, and fixed effects for each country as explanatory variables. The estimation is designed to mitigate endogeneity concerns in the analysis.

In Equation 1, we examine the H1 and H2 hypotheses concerning the influence of the EPUI and FTA on trade volumes. H1 centers on the impact of trading partners' EPUI on trade volumes, represented by  $\beta_2$  when no FTA is in effect, and  $\beta_4$  indicating the influence of Korea's EPUI when no FTA exists. H2 investigates the interaction effects between EPUI and FTA implementation on trade volumes, captured by the combined coefficients of  $\beta_2 + \beta_3$  (percentage change in exports or imports when trading partners' EPUI increases by 1% post-FTA) and  $\beta_4 + \beta_5$  (percentage change in exports or imports when Korea's EPUI increases by 1% post-FTA). As both dependent variables and EPUI are logarithmically transformed, the interpretation of these coefficients reflects the percentage change in exports or imports when the EPUI of trading partners or Korea increases by 1%.

To test H1 and H2, the Delta method was employed to calculate the sum of these coefficient estimates and their standard errors, as displayed in the lower part of each column. This approach facilitated the examination of the statistical significance of the linear combination of the coefficients and the assessment of EPUI's impact on trade volumes both pre- and post-FTA implementation.

The results in Table 4, Column (1), suggest that when the trading partners' EPUI increases by 1% in the absence of FTA, the export amount from Korea to the trading partners rises by approximately 4.9%. This implies that, in the absence of a trade agreement, Korea augments its imports from trading partners whose economic conditions are uncertain. This may be due to increased import volume from the trading partners or purchasing imported goods from Korea at higher prices. Although the effect appears to decrease after FTA implementation, it was not statistically significant. The Delta method was also employed to estimate that EPUI does not impact Korea's exports. Whether FTA is in effect or not, Korea's EPUI does not significantly impact its exports, indicating consistent results before and after FTA implementation. In summary, the increase in export volume due to the uncertainty of trading partners' economic conditions only occurs when no trade agreement exists. However, this effect diminishes after FTA implementation, although not to a statistically significant extent. Additionally, the Delta method suggests that EPUI does not significantly affect Korea's exports, irrespective of the presence of an FTA.

Column (2) presents the analysis results for exports from trading partners to Korea (i.e., Korea's imports). Trading partners' EPUI is found to have no substantial effect on Korea's import volume. Furthermore, there is no statistically significant change before and after FTA implementation. A noteworthy distinction from the export analysis is that an increase in Korea's EPUI leads to a reduction in Korea's import volume. Specifically, when Korea's EPUI increases by 1%, imports from trading partners decrease by approximately 4.0%. This outcome stands in contrast to the export findings, where an increase in Korea's EPUI did not significantly impact trading partners' import volumes. Importantly, this negative effect of Korea's EPUI on imports is offset after the implementation of FTAs, rendering it statistically insignificant.

**Table 4.** Estimation Results of System GMM

Variables	(1) Log of Export	(2) Log of Import
Log of Export(t-1)	0.748 *** (0.074)	
Log of Import(t-1)		0.678 *** (0.066)
FTA	0.038 (0.181)	-0.097 (0.222)
Log of Partner's EPUI	0.049 ** (0.022)	0.044 (0.029)
Log of Partner's EPUI * FTA	-0.021 (0.031)	0.000 (0.050)
Log of Korea's EPUI	-0.010 (0.019)	-0.040 ** (0.017)
Log of Korea's EPUI * FTA	0.003 (0.019)	0.030 (0.025)
GSCPI	0.008 (0.010)	0.014 (0.009)
Partner's Industrial Production Index	-0.000 (0.000)	-0.002 ** (0.001)
Korea's Industrial Production Index	0.001 (0.002)	-0.002 (0.001)
Log of Partner's Dollar Rate(t-1)	-0.107 *** (0.039)	-0.139 *** (0.036)
Log of Korea's Dollar Rate(t-1)	-0.024 (0.114)	-0.310 ** (0.135)
Oil Price(t-1)	0.042 (0.037)	-0.065 ** (0.032)
Gold Price(t-1)	-0.015 (0.058)	-0.142 * (0.074)
Copper Price(t-1)	-0.052 (0.046)	-0.043 (0.046)
Soybean Price(t-1)	0.036 (0.033)	0.072 *** (0.024)
Korea's Terms of Trade Index	0.012 *** (0.001)	0.009 *** (0.002)
Log of Partner's Total Import	0.388 *** (0.142)	
Log of Korea's Total Export	0.684 *** (0.078)	
Log of Partner's Total Export		0.482 *** (0.121)
Log of Korea's Total Import		0.976 *** (0.119)
Year Fixed Effects	Y	Y
Constant	-2.156 ** (1.069)	-2.819 (2.005)
EPUI+(EPUI*FTA) ( $\beta_2 + \beta_3$ )	0.027 (0.027)	0.044 (0.036)
Delta Method Results EPUI KOR+(EPUI KOR*FTA) ( $\beta_4 + \beta_5$ )	-0.007 (0.015)	-0.010 (0.016)
Obs.	2,843	2,843
Wald Test	2273.15 ***	4.26e+09 ***

**Note:** Robust standard errors are provided in parentheses. \*  $p < 0.1$  \*\*  $p < 0.05$  \*\*\*  $p < 0.01$ . EPUI = Economic Policy Uncertainty; FTA = free trade agreement.

In summary, economic uncertainty within Korea negatively affects its import volume, with this negative impact mitigated and rendered insignificant following FTA implementation. When a country's domestic economic environment becomes uncertain, two main reasons can lead to an increase in imports: 1) purchasing goods at higher prices and 2) importing larger quantities. This import surge is presumed to be driven by the country's domestic production instability. On the other hand, reducing imports can be attributed to two factors: 1) purchasing goods at lower prices and 2) importing smaller quantities. Importing goods at lower prices seems less plausible in an unstable economic situation. However, the reduction in imports is more likely attributed to a contraction in domestic consumption.

In the context of trade with partner countries, an increase in the partner country's economic policy uncertainty leads to increased exports from Korea. This indicates that the partner country's production is affected by its economic instability, which drives them to import more from Korea. However, when Korea's own economic policy uncertainty arises, it decreases exports from the partner country to Korea, suggesting a negative impact on Korea's imports. This is presumed to be driven by the contraction in domestic consumption within Korea.

Based on these findings, it can be inferred that domestic economic uncertainty has a limited impact on exports but a more significant effect on imports. However, whether imports increase or decrease depends on the specific situation of each country. The direction of this impact on a country's imports depends on whether the economic uncertainty stems from supply-side or demand-side factors. For instance, a country experiencing significant production contraction might increase its imports, while a country facing a decline in domestic consumption might reduce its imports.

Moreover, the analysis indicates that the impact of economic uncertainty on exports and imports becomes imperceptible after the implementation of FTAs between countries. Such agreements imply that trade, production, and transactions between countries are integrated within an expanded market. Consequently, even if one country experiences increased risk due to domestic economic and social uncertainties, the effect can be mitigated within the framework of economic and trade cooperation like FTAs. This finding aligns with the statistical insignificance of the EPUI effect on trade between Korea and its FTA partners in this study.

#### 4. Conclusion

This research delves into the intricate relationship between economic policy uncertainty, free trade agreements, and bilateral trade volumes between South Korea and its trading partners. The study conducts a rigorous empirical examination of how economic policy uncertainty in trading partner countries affects trade volumes and explores the interaction effects brought about by the implementation of FTAs. Employing the System Generalized Method of Moments estimation allows the investigation of these hypotheses while addressing endogeneity and accounting for country-specific and time-specific fixed effects. The research draws upon a diverse range of data sources, combining them to construct a comprehensive panel dataset. This dataset comprises key elements such as the EPUI, OECD country-month-level panel data, and the Global Supply Chain Pressure Indicator(GSCPI). Integrating these diverse datasets created a comprehensive panel dataset, allowing for a thorough analysis of

the relationship between economic policy uncertainty, trade agreements, and bilateral trade volumes between Korea and its trading partners over time. The use of panel data enables the researchers to control for individual country-specific and time-specific effects, providing more robust and reliable insights into the dynamics of trade relations in the presence of economic policy uncertainty and trade agreements.

The principal findings of this study can be summarized in two key insights. First, in the absence of FTAs, the EPUI of South Korea and its trading partners exerts a substantial impact on trade volumes, particularly in the realm of imports. To elaborate, an escalation in trading partners' EPUI results in a significant increase in South Korea's exports to these nations. In contrast, an upsurge in South Korea's EPUI has a detrimental effect on imports from trading partners. However, post-FTA implementation, the significant influence of both South Korea's EPUI and the EPUI of its trading partners on trade volumes diminishes. The interplay of EPUI and FTA implementation counteracts the adverse impact on trade volumes. Consequently, FTAs serve as effective instruments in mitigating the repercussions of economic uncertainty on trade relationships between South Korea and its trading partners.

This study underscores the crucial importance of comprehending the roles of economic policy uncertainty and trade agreements in shaping bilateral trade volumes. The findings underscore that FTAs adeptly alleviate economic risks arising from partner countries, fostering international trade relations between South Korea and its trading partners.

In summary, heightened economic uncertainty within a nation can yield fluctuations in the trade environment, resulting in either an increase or decrease in imports from other countries. Yet, the impacts of economic uncertainty on trade volumes can be counterbalanced through economic and trade agreements such as FTAs. Given the diverse and evolving social and economic uncertainties in the global market, South Korea must proactively expand and fortify multilateral or bilateral trade agreements to effectively navigate emerging threats and address issues like deglobalization and the ascent of new protectionist trade paradigms. This entails the necessity to discern and enhance collaborations with a spectrum of trading partners to collectively tackle the ever-changing landscape of international trade.

This study's significance lies in its empirical exploration of how qualitative indicators related to a country's economic conditions can influence international trade between nations and how trade agreements can offset such impacts. The utilization of system GMM as a suitable model to manage endogeneity in the dynamic panel analysis of country-month-level trade volumes amplifies the research's contribution. However, it's important to acknowledge that the study does not deeply delve into the specific factors underlying fluctuations in a country's EPUI or the precise mechanisms through which EPUI fluctuations impact trade activities. Despite this limitation, the study succeeds in achieving its research objectives using available data at a commendable level of analysis.

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