The Impact of the THAAD Retaliation on Chinese Visitors to Korea*

Yoojin Bin**

Abstract

Economic sanction gives a negative impact on a targeted country. This paper examines the impact of THAAD retaliation on Chinese visitors to Korea. For analysis, difference-in-differences (DID) and DID with heterogeneous effects are employed. By analyzing the number of Chinese visitors based on age, gender, purpose, and port of entry, heterogeneous impacts are found. During the THAAD crisis, about 40% of Chinese visitors decreased. Both female and male Chinese visitors are affected negatively by the THAAD retaliation. Except for the 50s, all age groups are impacted negatively. Considering the purpose of the visit, only education shows a positive impact. The number of Chinese visitors dropped in all airports. In port cases, Busan and Jeju ports show negative impacts.

KRF Classification : B020503, B030104, B030800
Keywords : Economic Sanction, Tourists, China, THAAD retaliation, Difference-in-Differences (DID)

Ⅰ. Introduction

The Korean government announced the deployment of THAAD (Terminal High Altitude Area Defense). Because of missile

provocations from North Korea, the U.S. had proposed the deployment of THAAD on the grounds of peace on the Korean Peninsula, and the Korean government had discussed the issue. However, China strongly opposed the deployment of THAAD for its national security. China argued that THAAD is harmful to its national defense security because the X-brand radar for THAAD can monitor Chinese military activities. Despite China's strong opposition, the South Korean government decided to deploy THAAD. The first deployment was on April 20th in 2017.

The decision for THAAD resulted in economic retaliation from the Chinese government, which damaged the Korean economy. For example, Chinese authority restricted on Hally, called *Hanhanyeong*. The Chinese authority banned Korean artists shown on Chinese TV programs and rejected Korean artists' concerts or schedules. In addition, anti-Korean sentiment and boycotts occurred in China. Since Lotte corporation agreed to provide the land for THAAD deployment in Seongju, Chinese people boycotted the products from Lotte and Lotte Mart. As a result, Lotte Corporation became one of the most victims of THAAD retaliation.

During the THAAD dispute, the most noticeable sector was tourism because of direct restrictions on travel to Korea. The authority's verbal instructions reduced travel to Korea by 20% in October 2016. Also, the Chinese government did not allow charter flights and cruises to Korea. In figure 1, the number of Chinese tourists increased until 2016, but decreased significantly in 2017. Bank of Korea reported that more than 21 trillion won had been lost in the Korean tourism sector due to THAAD retaliation (Cho, 2020). Also, Hyundai Research Institute estimated that there would be a loss of 18.1 trillion won in 2017 (Jeon, 2017a). Hence, due to the possibility of economic loss, focusing on the impact of Chinese tourists during the THAAD dispute is necessary.

〈Figure 1〉 The number of Chinese Tourists from 2000 to 2019 (source:
　　　　　Korean Tourism Organization)
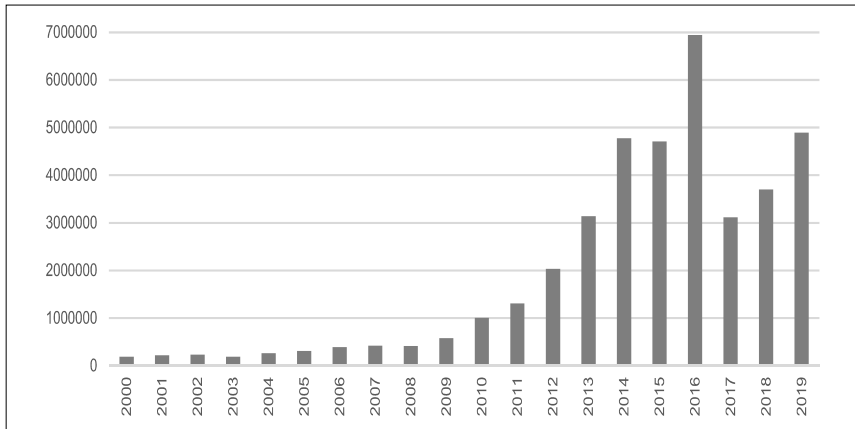
　　This paper focuses on Chinese visitors from 2013 to 2019. This study aims to examine the impact of the THAAD dispute on Chinese visitors to Korea, considering heterogeneous factors such as age, gender, purpose of visiting Korea, and the ports of entry. Setting July 2016 as the event date, the consequences of the event are estimated by two methods. Difference-in-differences (DID) is conducted to identify the impacts of THAAD retaliation on Chinese visitors compared to non-Chinese visitors. DID with heterogeneous effect is conducted to investigate the different impacts of THAAD dispute on Chinese visitors depending on age group, gender, purpose of visiting Korea, and the port of entry. There are some reasons for conducting DID with the heterogeneous model. First, investigating demographic factors, such as age, gender, and the purpose of visit, can be a proxy for purchasing power. For example, in duty-free shops, a woman is more likely to have more purchasing power than a man. The young generation is more likely to visit Korea because of *Hallyu*. Thus, analysis by demography can be a good proxy for finding purchasing power in certain industries or sectors. Second, analyzing the port of entry can be a proxy for regional impact. It is possible to estimate the

possible regional economic impact when the visitors' trend is estimated by the port of entry.

DID results show that during the THAAD retaliation, the number of Chinese visitors decreased by about 30-40 percent. The result of DID with heterogeneous analysis for gender shows that both female and male visitors are affected negatively by THAAD retaliation. The result for the Chinese age group shows that all age groups except the 50s present statistically significant negative impacts. The result for purpose indicates that Chinese tourists and visitors for public and business purposes decreased, and Chinese who came to Korea for education increased. The result for the port of entry shows that THAAD retaliation causes a decrease in Chinese people entering airports. In port cases, Busan port and Jeju port are negatively affected.

The paper is organized as follows. Section 2 explains the institutional backgrounds of economic sanctions, the THAAD dispute, THAAD retaliation on tourism, and previous studies regarding THAAD. Section 3 introduces the data and methodology of this analysis. Section 4 presents the results of the empirical analyses. Section 5 shows robustness check results. Section 6 explores some implications, and section 7 concludes.

Ⅱ. Institutional Background

2.1. Economic Sanction

Economic sanction is frequently implemented by countries. Economic sanction enforces economic punishment on a targeted country to comply with the country's wants or changed the behavior of the targeted country (Hackenbroich and Chugh, 2022). Economic

sanction negatively affects targeted economies. It hurts trade, investment, and even the economic growth of the targeted country (Kim and Lee, 2021). Sometimes, political conflict becomes the cause of economic sanctions.

China has implemented economic sanctions when political conflict occurred or when China judges its interests are violated. For example, in 2010, China and Japan had a sovereignty dispute over Senkaku Islands. China banned its exports of rare-earth elements to Japan and restricted tourism (Gu, 2018). In 2012, China and the Philippines had a territorial dispute over the South China Sea. Responding to the territorial disputes, China banned imports of bananas from the Philippines (Gu, 2018). In 2014, China and Vietnam had a territorial dispute over the South China Sea, and China strengthened customs for imported agricultural products from Vietnam and imposed sanctions on Vietnamese tourism (Gu, 2018). In 2016, there was a political conflict with Taiwan because of the inauguration of an independent government (Jeon, 2017b). As a result, China strengthens its economic sanctions on Taiwan. As with these examples, China used economic retaliation as a weapon for its own interests.

2.2. China's Economic Sanction on Korean Economy

The THAAD dispute is a complex and controversial issue related to the political and diplomatic conflict. The U.S. Obama administration focused on Asia to check China's rise and to maintain its dominance in the Asia region (Lee, 2018). The U.S. expanded military cooperation with allies (Lee, 2018). In response to the US, China strengthened economic partnerships and established strategic relations with neighboring countries (Lee, 2018). The international situation was under tension between the United States and China. This tension became one of the reasons why the THAAD dispute happened. Some

people argued that the reason why China opposes is that THAAD is developed by the U.S. and that the deployment of THAAD could strengthen the power of the U.S. military in Korea. Also, THAAD can be a tool for checking and monitoring Chinese military strategy. Thus, China disagreed with South Korea's deployment of THAAD. Under this complicated situation, the South Korean government decided to the deployment of THAAD in Korea. As a result, China inflicted THAAD retaliation on the Korean economy.

China's THAAD retaliation was a huge threat to the Korean economy because of its high dependency on the Chinese economy. The Korean economy is highly reliant on trade, but the problem is that Korean trade is highly dependent on China. In Figures 2 and 3, China is the largest trade partner of Korea. Export to China occupies 25% of total export, and the import from China is also large and even increasing. The trade dependency of China is still increasing. Yang (2019) found that more than 10% of the Korean GDP was Korean exports to China from 2010 to 2014. Thus, China's THAAD retaliation was a serious threat to the Korean economy.

〈Figure 2〉 The top 3 Korean Import Partners' Proportion (source: KITA)
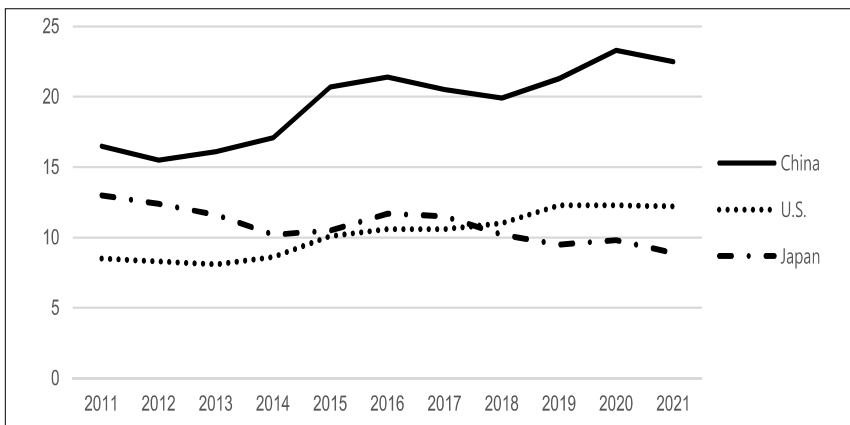
Note: The unit is a percentage. The proportion is calculated by (import from a country)/(total volume of Korean import).

〈Figure 3〉 The Top 4 Korean Export Partners' Proportion (source: KITA)
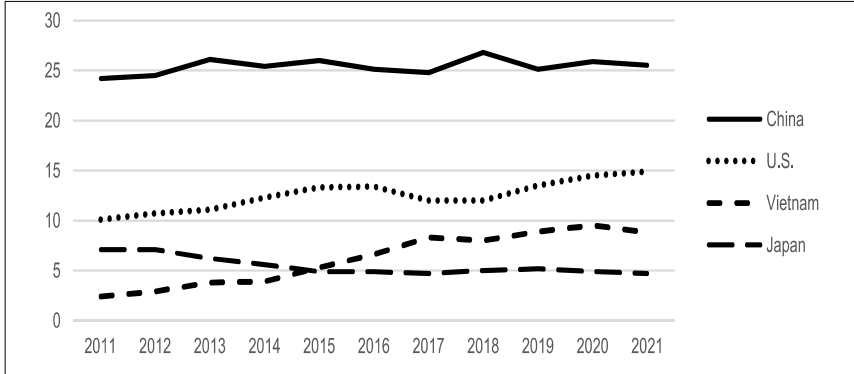
Note: The unit is a percentage. The proportion is calculated by (export to a country)/(total volume of Korean export)

During the THAAD dispute, there had been various economic measures related to trade, such as launching an anti-dumping investigation of Korean cosmetics or launching an investigation for safeguards on Korean sugar (Bae and Yang, 2017). For example, China banned some Korean cosmetic brands' imports so 11 tons of cosmetics were sent back to Korea (Yang, 2019). China authorities strengthen its customs on food products as well. In March 2017, Lotte Chilsung's beverage could not pass customs due to insufficient documentation in response to THAAD retaliation. In addition, many firms' sales are damaged because of the THAAD dispute. Orion's sales, a Korean food company, in the second quarter of 2017 were halved compared to the 3rd quarter of 2016 (Yang, 2019).

2.3. THAAD Dispute and Tourism

One of the most direct retaliation focused on the tourism industry. There was a direct retaliation against tourism such as travel agencies suspending Korean travel packages or canceling cruise trips. The problem was that Korea's tourism industry relied heavily on Chinese tourists. Figure 4 shows the proportion of Chinese tourists among

foreign tourists visiting Korea. The number of Chinese visiting Korea has 12 times increased from 2003 to 2019. Also, Korean tourism is largely dependent on not only the number of Chinese tourists but also on Chinese tourists' expenditure. In figure 5, it is found that China spends the most during the tour in Korea. Despite the decrease in the Chinese average expenditure from 2016, China still ranked first in expenditure. Hence, many researchers analyzed the impact of tourism and tourists.

〈Figure 4〉 The Proportion of Chinese Tourists from Total Foreign Tourists in Korea (source: Korean Tourism Organization)
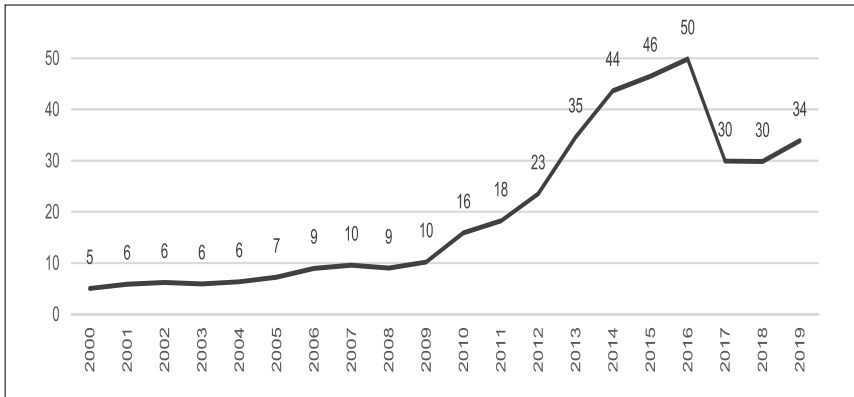
Note: The unit is percentage.

〈Figure 5〉 The Average Expenditure of Foreign Tourists visiting Korea (source: Korean Tourism Organization)
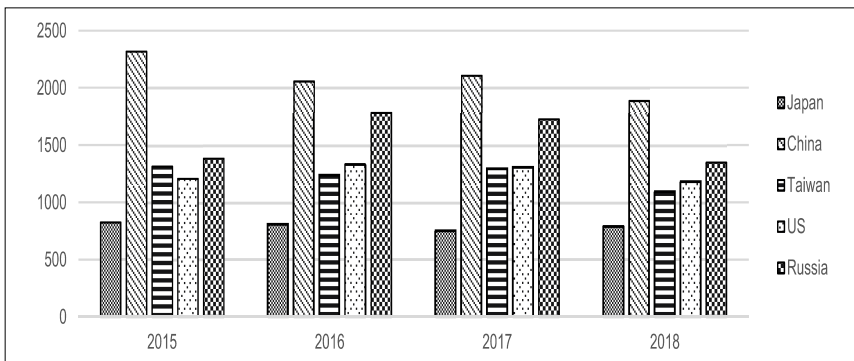
Note: The unit is US dollar.

KDB report (2017) expected that industries having a high dependency on China such as cosmetic, duty-free, and tourism industries are hurt the most due to the THAAD retaliation. Yuxian Juan et al. (2017) examined the characteristics of Chinese tourists who canceled their travel to Korea during the THAAD dispute using Q-methodology. They found that the THAAD issue greatly influenced personal values, beliefs, and identities, which affected Chinese tourists' decisions to visit Korea. Kim (2019a) analyzed the impact of THAAD on the demand for Chinese visitors to Korea using OLS regression considering both total prohibition and partial ban. He found that the coefficient of total prohibition was twice higher than the partial ban and that the Chinese visitors responded immediately based on the intensity of the policy. Yi and Kang (2019) found that the impact of THAAD retaliation caused a 4% drop in Korean tourism and lodging industries' productivity because of the decrease in Chinese tourists. Also, Jung and Choi (2019) found that the price stickiness in the Korean lodging industry was alleviated during the THAAD dispute because of the decrease in Chinese tourists and the pessimistic situation. Kim and Lee (2021) examined the impact of Chinese sanctions on the financial market using the synthetic control method. They found that the negative impact on the stock market related to tourism and cosmetics was immediately shown, but recovered in six months.

2.4. Empirical Analysis of THAAD Dispute

There are some previous studies that used the difference-in-differences (DID) model or the triple-differences (DDD) model to measure the impact of THAAD retaliation. First, Wei-Na Kong (2021) used DID and DDD models for examining the impact of THAAD on Korean export to China. The dependent variable is South Korean

exports to China. Five categories of trading goods, which are boycotted by Chinese consumers, are selected as a treated group and other trading goods are chosen as a control group. DID found that THAAD political conflict decreased Korean exports. DDD model added Korea-China FTA (free trade agreement) as a new dimension and analyzed the impact of THAAD retaliation on Korea's exports of FTA products. The result of DDD shows that FTA alleviated the negative impact on Korean exports.

Second, Shin et al. (2019) conducted the DID analysis to find the impact of Chinese consumers' boycotts on South Korean cosmetics and apparel products during the THAAD dispute. The result shows that THAAD reduced the Chinese consumption of Korean products. Also, they found the voluntary boycott reduced the consumption of Chinese products. In addition, another DID analysis is conducted for finding the difference between the two groups, who recognized the political conflict or not, and the result shows that the higher the animosity group is, the stronger boycott has shown.

Third, Kim and Lee (2021) used DID to find the impact of THAAD on Chinese tourists for a robustness check. The outcome variable is the number of tourists from each country (49 countries). They found that Chinese tourists had a negative effect after the announcement of the THAAD but the effect persisted for about 18 months.

Compared to these empirical studies, there are some differences in this paper. First, this paper mainly focuses on the number of visitors. Some papers focused on export or products. Kim and Lee used DID for robustness check and the main target was the stock market. For focusing on the visitors, I used countries' data and varied the time period. Second, the purpose of this paper is to find dynamic effects based on various demographic factors. Thus, the heterogeneous effect is considered to derive various effects in THAAD retaliation.

Ⅲ. Methodology

3.1. Data

This paper focuses on foreign visitors who came to South Korea from 2013 to 2019. The foreign visitor data are collected by nationality and monthly frequency. It is collected from January 2013 to December 2019. The year 2020 and 2021 are excluded because of the COVID-19 pandemic. The source of the data is the Korean Tourism Organization. The summary statistics are shown in Table 1. Also, Table 2 presents the portion of visitors from the top 5 foreign countries by year, which shows that China is the major country of foreign visitors to Korea from 2013 to 2017.

〈Table 1〉 Descriptive Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
Total Visitors	8568	11809.41	53940.82	5	917519
Male	4956	8057.60	25381.48	5	304229
Female	4956	10547.29	40888.84	1	579659
Tour	4956	16750.29	60355.24	5	884293
Business	4956	298.66	975.75	0	25012
Public	4956	73.68	279.63	0	3763
Education	4956	359.02	2307.91	0	44291
Age 10	4956	1864.48	7848.55	0	214101
Age 20	4956	4702.23	17844.28	2	205834
Age 30	4956	4189.72	15199.95	0	188557
Age 40	4956	3257.57	10862.80	0	139337
Age 50	4956	6724.50	25562.84	0	246692
Age 60	4956	1901.66	7416.16	0	109544
Incheon airport	4956	12681.35	36498.52	6	394089
Gimhae airport	4956	1401.01	4402.46	0	46845
Gimpo airport	4956	1447.20	7552.99	0	80767
Jeju airport	4956	1349.43	9181.37	0	133979
Other airports	4956	382.69	2968.89	0	65071
Busan port	4956	746.18	2838.67	0	57937
Incheon port	4956	733.68	5175.03	0	72200
Jeju port	4956	907.79	7907.67	0	147127
Other ports	4956	764.24	3457.65	0	47626

〈Table 2〉 The Portion of Visitors in Korea from Foreign Countries by Year

	2013		2014		2015		2016		2017	
1	CHN	35.5%	CHN	43%	CHN	45.2%	CHN	46.8%	CHN	31.3%
2	JPN	22.6%	JPN	16%	JPN	13.8%	JPN	13.3%	JPN	17.3%
3	USA	5.9%	USA	5%	USA	5.8%	USA	5.0%	TWN	6.9%
4	TWN	4.5%	TWN	4.5%	HKG	3.9%	TWN	4.8%	USA	6.5%
5	PHL	3.3%	HKG	3.9%	TWN	3.2%	HKG	3.8%	HKG	4.9%

Because this study conducts two different DID models, there are two different datasets. First, for the basic DID model, the main outcome variable is foreign visitors to Korea from country c at month t. The total number of foreign visitor data includes 102 countries. Thus, the maximum number of observations is 8,568 (102 countries $\times$ 84 months).

Second, for the DID model with heterogeneous effects, the foreign visitor data are collected by gender, age, the purpose of visit, and the port of entry. The outcome variable is foreign visitors from country c in month t and cell 'i'. Cell i includes 4 different demographic factors, which are gender, age, purpose, and port of entry. Four different factors classify each subgroup, which are gender (2 groups), age (6 groups), purpose (4 groups), and port of entry (9 groups). For gender, there are two subgroups which are male and female. Age data are divided into six subgroups, which are 10s (under the 20s), 20s, 30s, 40s, 50s, and above 60. The purpose of visit data is divided into four subgroups which are tour, business, public (official), and education. Lastly, ports of entry are divided into nine subgroups which are Incheon airport, Gimhae airport, Gimpo airport, Jeju airport, other airports, Busan port, Incheon port, Jeju port, and other ports. Likewise, the monthly data from January 2013 to December 2019 is used, but in this model, only 58 countries' data are available. Therefore, the maximum number of observations for each subgroup is 4,956 (58 countries$\times$84 months).

3.2. Method

This study used two different models. First, the difference-in-differences (DID model) is a basic model to empirically find the impact of THAAD retaliation on Chinese visitors to Korea compared to non-Chinese visitors. DID model is effective to find the causal effect when there is a policy or external shock affecting a certain group, called a treatment group. In this study, the treatment group is Chinese visitors because the Chinese government restricted tourism toward Korea after the Korean government's announcement of THAAD deployment. The equation is written as follows:

$$Y_\alpha = \alpha + \beta_1 Chna_c + \beta_2 THAAD_t + \beta_3 Chna_c * THAAD_t$$
$$+ \mu_c + \gamma_t + \epsilon_t \qquad (1)$$

The outcome variable is the logarithm of the total number of visitors from country c in month t. Compared to other variables, the outcome variable's value is large enough to take the logarithm to find the coefficient and relationship easily. $Chna_c$ is a dummy variable for treatment; the value is one if the visitors are Chinese and the value is zero if the visitors are non-Chinese. Chinese and non-Chinese are grouped based on nationality. $THAAD_t$ is a dummy variable for showing pre- and post-THAAD retaliation; the value is one when the month is after July 2016 and the value is zero when the month is before July 2016 (July 2016 includes pre-THAAD retaliation). The interaction term $Chna_c * THAAD_t$ captures the impact of the THAAD dispute on Chinese visitors, and β_3 is the parameter of interest. μ_c is a country-fixed effect. When country-fixed effect is applied, the China dummy variable is absorbed. γ_i is a time-fixed effect, and ϵ_t is an error term.

The second model is difference-in-differences (DID) with heterogeneous effects. In this model, a new subscript i is added for finding impacts based on different demographic factors and regional information. The equation is written as follows:

$$Y_{i,c,t} = \alpha + \beta_1 \dot{Chna}_{c,t} + \beta_2 THAAD_{t,i} + \beta_3 \dot{Chna} * THAAD$$
$$+ \mu_c + \gamma_t + \epsilon_{i,c,t} \tag{2}$$

The outcome variable is the logarithm of the total number of visitors from country c in month t and cell 'i'. Cell i is defined by gender (2 groups), age (6 groups), purpose (4 groups), and port of entry (9 groups). Depending the cell i, the different regressions are run separately, which is not a pooled sample. $\dot{Chna}_i$ is a dummy variable for treatment; the value is one if the visitors are Chinese and the value is zero if the visitors are non-Chinese. Chinese and non-Chinese are grouped based on nationality. $THAAD_t$ is a dummy variable for showing pre- and post-THAAD retaliation; the value is one when the month is after July 2016 and the value is zero when the month is before July 2016 (July 2016 includes pre-THAAD retaliation). The interaction term $\dot{Chna}_i * THAAD_t$ captures the impact of the THAAD dispute on Chinese visitors, and β_3 is the parameter of interest. μ_c is a country-fixed effect. When the country-fixed effect is applied, the China dummy variable is absorbed. γ_i is a time-fixed effect, and ϵ_t is an error term.

Ⅳ. Result

4.1. Difference-in-Differences (DID)

For finding short-term and medium-term impacts, four different

models are differentiating the period. Because the announcement for THAAD deployment was in July 2016, August 2016 is regarded as a time when the retaliation began. The first model used the timeline from January 2013 to December 2019, which is the baseline period (full-time). The second model used the timeline from August 2013 to August 2019, three years before and after the retaliation. The third model is from January 2014 to January 2019, two years and a half before and after the retaliation. The fourth and last model is from August 2015 to August 2017, considering one year each before and after the treatment. All models are fixed by time and country and clustered by country.

Before presenting the results for DID, let me check the common trends assumption first. For difference-in-differences (DID), a parallel trend test is the first step in finding the impact of an event. This is significant because the common trend assumption shows the validity of the comparison between the treated group and the control group. In this study, the treated group is Chinese visitors, and the control group is non-Chinese visitors. The common trend test measures whether Chinese visitors and non-Chinese visitors had a similar trend before the THAAD dispute occurs. If common trends are satisfied, it means that the two groups are comparable for DID model. Table 3 provides the results of the parallel trend test. Each column shows different periods. In table 3, all coefficients are insignificant, which supports the validity of the parallel trends between treated and control groups. Based on this test, I proceed with the DID model for finding the impacts of the THAAD dispute.

Table 4 presents the results for equation (1). Based on the observation numbers, columns (1) is the base period (full-time), columns (2) and (3) are the medium period, and column (4) is a relatively short period sample. The coefficient for the full period is -0.304 and shows a statistically significant result. The coefficients for

the second and third periods are -0.362 and -0.428, respectively, and show statistically significant results. These results show that the effect of THAAD retaliation by the Chinese government caused about a 30-40 percent decrease in Chinese visitors to Korea. Also, it is found that the shorter period shows a more severe drop in the number of Chinese visitors than the longer periods because the coefficient for the short term is -0.432. In other words, the short-term impact is larger than the medium- or full-period.

〈Table 3〉 Parallel Trend Test for DID

	(1)	(2)	(3)	(4)
Period	2013. 01 -2016.07	2013.08 -2016.07	2014.01 -2016.07	2015.08 -2016.07
China	-2.046 (16.38)	0.163 (21.68)	2.119 (27.49)	-8.064 (127.2)
Time	0.00406 (0.00247)	0.00291 (0.00325)	0.00429 (0.00411)	0.00829 (0.0187)
Time×China	0.0128 (0.0249)	0.00952 (0.0329)	0.00659 (0.0415)	0.0218 (0.189)
Observations	4,284	3,570	3,060	1,122
R-squared	0.095	0.096	0.097	0.097

Note: The outcome variable is the logarithm of the total number of visitors from country i in month t. China is a dummy variable. Time is monthly data. Standard errors are clustered by country in parentheses.

〈Table 4〉 The Result of DID for Chinese Visitors after THAAD Retaliation

	(1) male	(2) Female
China×THAAD	-0.197*** (0.0280)	-0.480*** (0.0258)
Fixed effect		
Time	Yes	Yes
Country	Yes	Yes
Observations	4,956	4,956
R-squared	0.978	0.980

Note: The outcome variable is the logarithm of the total number of visitors from country i in month t. China and THAAD are dummy variables. Standard errors are clustered by country in parentheses. ***, **, and * indicate the significance level at 1, 5, and 10 percent, respectively.

4.2. Difference-in-Differences (DID) with Heterogeneous Effect

In this study, time and country are controlled in all DID models. In addition, the standard error is clustered by country. This is because the data is collected and analyzed by country so that the different trends within the country should be controlled. Also, clustering by country helps control unobserved similar traits within the group. Therefore, all model is fixed by time and country, and the standard errors are clustered by country. The results are explained by different subgroups such as gender, age, purpose, and port of entry. The results are shown as follows.

Gender. Table 5 presents the DID result for gender. Two findings have to focus on. First, the coefficients of China×THAAD in both genders show negative values. The coefficient of China×THAAD for males is -0.197 and for females is -0.480 with statistically significant at the 1% level. Second, the coefficient of China×THAAD for females has a larger negative value. This result explains that after the THAAD

⟨Table 5⟩ The Result for DID by Gender

	(1) age10	(2) age20	(3) age30	(4) age40	(5) age50	(6) age60
China×THAAD	-0.662*** (0.0335)	-0.198*** (0.0272)	-0.150** (0.0322)	-0.494*** (0.0329)	0.146 (0.111)	-0.351*** (0.0305)
Fixed effect						
Time	Yes	Yes	Yes	Yes	Yes	Yes
Country	Yes	Yes	Yes	Yes	Yes	Yes
Observations	4,924	4,956	4,955	4,954	4,955	4,954
R-squared	0.941	0.976	0.979	0.976	0.874	0.966

Note: The outcome variable is the logarithm of the total number of visitors by gender from country i in month t. China and THAAD are dummy variables. Standard errors in parentheses are clustered by country. ***, **, and * indicate the significance level at 1, 5, and 10 percent, respectively.

retaliation, the number of Chinese women drops about 48% while men drop about 20%. It suggests that the impact of THAAD retaliation decreases both Chinese male and female visitors, but the impact on females is larger than on males.

Age. Table 6 presents the DID result for age. There is an interesting finding. All age groups except the 50s show negative coefficients with statistically significant results. The coefficients of age 10s, 20s, 30s, 40, and 60s are -0.662, -0.198, -0.15, -0.494, and -0.351, respectively. However, the coefficient of age 50s is 0.146, but there is no statistical significance. Except for the 50s, the number of Chinese visitors in all age groups decrease because of THAAD retaliation. Among the age groups, 10s is the most negatively affected during the THAAD dispute. Also, when compared to young people (20s and 30s) and older people (40s and 60s), young people are relatively less affected by the THAAD retaliation.

〈Table 6〉 The Result for DID by Age

	(1)	(2)	(3)	(4)
	tour	business	public	education
China×THAAD	-0.383***	-0.126*	-0.477***	0.267***
	(0.0290)	(0.0619)	(0.0454)	(0.0483)
Fixed effect				
Time	Yes	Yes	Yes	Yes
Country	Yes	Yes	Yes	Yes
Observations	4,956	4,876	4,117	4,779
R-squared	0.973	0.937	0.887	0.921

Note: The outcome variable is the logarithm of the total number of visitors by age group from country i in month t. China and THAAD are dummy variables. Standard errors in parentheses are clustered by country. ***, **, and * indicate the significance level at 1, 5, and 10 percent, respectively.

Purpose. Table 7 is a DID result for purpose of visiting Korea. There are two interesting results. The coefficients of DID results for tourism and public purpose indicate -0.383 and -0.477, respectively with a

statistically significant at 1% level. However, the result for business has a relatively small negative coefficient, which is -0.126, with a statistically significant at 10 percent. In contrast, the coefficient of education indicates a positive sign, which is 0.267 with a statistical significance at 1% level. These results show that the impacts of THAAD retaliation are different based on the purpose of visiting Korea. Tourists and visitors for public purposes are strongly affected by the THAAD dispute.

〈Table 7〉 The Result for DID by Purpose

	(1) Incheon	(2) Gimhae	(3) Gimpo	(4) Jeju	(5) Other airports
China×THAAD	-0.148*** (0.0262)	-0.280** (0.0948)	-0.113*** (0.0288)	-0.889*** (0.0723)	-2.235*** (0.141)
Fixed effect					
Time	Yes	Yes	Yes	Yes	Yes
Country	Yes	Yes	Yes	Yes	Yes
Observations	4,956	4,919	4,842	4,424	3,642
R-squared	0.981	0.931	0.958	0.888	0.798

Note: The outcome variable is the logarithm of the total number of visitors by purpose from country i in month t. China and THAAD are dummy variables. Standard errors in parentheses are clustered by country. ***, **, and * indicate the significance level at 1, 5, and 10 percent, respectively.

Ports of entry. Tables 8 and 9 are DID results for the port of entry. Table 8 shows airports in Korea, and table 9 shows ports in Korea. When focusing on our interest parameter (DID interaction), an interesting result is found. Considering airport cases, all airports in Korea have negative coefficients which are -0.148, -0.280, -0.113, -0.889, and -2.235. It indicates that the THAAD dispute affects negatively Chinese visitors taking an airplane to visit Korea. In port cases, the coefficients for Busan port and Jeju port are significantly negative signs which are -1.470 and -3.725. Incheon port and other ports show positive coefficients which are 0.361 and 0.483. Among airports and

ports, the most damaged place is Jeju port, which drops by 372%. These results indicate that THAAD retaliation impacts differently on Chinese visitors entering Korea through the port based on the destination.

〈Table 8〉 The Result for DID by Port of Entry (Airport)

	(1) Busan	(2) Incheon	(3) Jeju	(4) Other ports
China×THAAD	−1.470*** (0.0471)	0.361*** (0.0649)	−3.725*** (0.134)	0.483*** (0.0422)
Fixed effect				
Time	Yes	Yes	Yes	Yes
Country	Yes	Yes	Yes	Yes
Observations	4,647	3,894	3,245	4,344
R-squared	0.887	0.807	0.779	0.909

Note: The outcome variable is the logarithm of the total number of visitors by airport from country i in month t. China and THAAD are dummy variables. Standard errors in parentheses are clustered by country. ***, **, and * indicate the significance level at 1, 5, and 10 percent, respectively.

〈Table 9〉 Result for DID by Port of Entry (Port)

	(1)	(2)	(3)	(4)
Period	2013. 01 −2019.12	2013.08 −2019.08	2014.01 −2019.01	2015.08 −2017.08
China×THAAD	−0.304*** (0.0234)	−0.362*** (0.0219)	−0.428*** (0.0186)	−0.432*** (0.0143)
Fixed effect				
Time	Yes	Yes	Yes	Yes
Country	Yes	Yes	Yes	Yes
Observations	8,568	7,854	6,222	2,550
R-squared	0.979	0.980	0.981	0.985

Note: The outcome variable is the logarithm of the total number of visitors by port from country i in month t. China and THAAD are dummy variables. Standard errors in parentheses are clustered by country. ***, **, and * indicate the significance level at 1, 5, and 10 percent, respectively.

Ⅴ. **Robustness Checks**

5.1. Difference-in-Differences (DID): Hong Kong and Macao

I conduct another DID model for finding whether the impact of THAAD retaliation affects visitors from Hong Kong and Macao as well. The number of visitors from Hong Kong and Macao is collected separately from the Chinese because Hong Kong and Macao have their own passports. Thus, it is possible to find the impact of THAAD retaliation on visitors from Hong Kong and Macao. Both full-time and short-term effects are measured.

The first step for DID is parallel trend assumption. Table 10 provides the result of the common trends assumption. Columns (1) and (2) show Hong Kong and Macao's full-time parallel trend test and columns (3) and (4) show the results for the short term. In all cases, there is no statistical significance in the interaction term. It proves that the trend of Hong Kong and Macao's visitors was identical to the control group (other countries). Table 11 presents the results of DID including Hong Kong and Macao dummy variables. The result is remarkable. The coefficients for Hong Kong and Macro from columns (1) and (2) are 0.0963 and 0.243, respectively. Also, in the short term, Macao's visitors still increased in the short term. However, Hong Kong does not have a statistically significant result. It indicates that Hong Kong and Macao visitors increase while Chinese visitors decreased by 30% in table 4. Therefore, contrary to Chinese visitors from the mainland, Hong Kong and Macao are not negatively affected by THAAD retaliation.

This result is important. If the number of visitors to Hong Kong and Macao has decreased like in China, it is said that there may be other reasons or factors for the decrease in visiting Korea rather than

THAAD retaliation- such as the lack of attraction to travel to Korea. However, if there is no negative impact on Hong Kong and Macao visitors, it can be interpreted that the decline in Chinese visitors to Korea is caused by THAAD retaliation. Thus, this Hong Kong and Macao result proves that the negative impact on Chinese visitors is caused by THAAD restriction.

〈Table 10〉 Parallel Trend Test for DID (Hong Kong and Macao)

	(1) Hong Kong	(2) Macao	(3) Hong Kong	(4) Macao
Period	2013. 01 -2016.07	2015.08 -2016.07	2013. 01 -2016.07	2015.08 -2016.07
Country	0.111 (16.90)	-4.123 (17.19)	-11.50 (131.4)	-32.68 (133.6)
Time	0.00413 (0.00255)	0.00411 (0.00259)	0.00828 (0.0194)	0.00801 (0.0197)
Time×Country	0.00582 (0.0257)	0.00807 (0.0262)	0.0232 (0.196)	0.0506 (0.199)
Observations	4,284	4,284	1,122	1,122
R-squared	0.036	0.004	0.037	0.004

Note: The outcome variable is the logarithm of the total number of visitors from country i in month t. Country is dummy variables for Hong Kong and Macao. Time is monthly data.

〈Table 11〉 The Result for DID (Hong Kong and Macao)

	(1) Hong Kong	(2) Macao	(3) Hong Kong	(4) Macao
Hong Kong×THAAD	0.0963*** (0.0236)		-0.00194 (0.0149)	
Macao×THAAD		0.243*** (0.0234)		0.141*** (0.0148)
Fixed effect				
Time	Yes	Yes	Yes	Yes
Country	Yes	Yes	Yes	Yes
Observations	8,568	8,568	2,550	2,550
R-squared	0.979	0.979	0.985	0.985

Note: The outcome variable is the logarithm of the total number of visitors from country i in month t. China, Hong Kong, Macao, and THAAD are dummy variables. Standard errors are clustered by country in parentheses. ***, **, and * indicate the significance level at 1, 5, and 10 percent, respectively.

5.2. Short-Term Effect

For robustness checks, different periods are used. Results show the short-term effect of THAAD retaliation on Chinese visitors analyzed by subgroups. In this section, two different periods are used: August 2015 to August 2017 and from 2015 to 2017. The results are explained by the subgroups and shown as follows.

Gender. Table 12 presents the DID result for gender in the short term. The coefficients of China×THAAD in both genders and both periods show negative values. The impact of THAAD retaliation leads to around 27.5% for males and 55% for females, which shows that in the short term, there are greater drops in both males and females than in the previous result. Thus, It suggests that the short-term impact of THAAD retaliation has a stronger negative impact on both males and females.

⟨Table 12⟩ Robustness Checks: Result for DID by Gender in the Short-Term

	(1) Male	(2) Male	(3) Female	(4) Female
Period	2015m8–2017 m8	2015–2017	2015m8–2017 m8	2015–2017
China×THAAD	−0.272*** (0.0812)	−0.284*** (0.0736)	−0.541*** (0.111)	−0.560*** (0.0965)
Fixed effect				
Time	Yes	Yes	Yes	Yes
Country	Yes	Yes	Yes	Yes
Observations	1,475	2,124	1,475	2,124
R-squared	0.985	0.981	0.983	0.981

Note: The outcome variable is the logarithm of the total number of visitors by gender from country i in month t. China and THAAD are dummy variables. Standard errors in parentheses are clustered by country. ***, **, and * indicate the significance level at 1, 5, and 10 percent, respectively.

Age. Table 13 presents the DID result for the age group in the short term. Compared to the previous result (table 8), ages 20s, 30s, and 60s

show a greater drop in the short term, while age 10s and 40s show a similar result. For age 20s, the coefficients from columns (3) and (4) are almost doubled from the previous result, and for age 30s, the coefficients of short-term have more than twice larger negative values. In addition, for age 60s, the coefficients for short-term have a greater negative value than the full-time result shown in table 8. However, the most interesting finding is the age group 50s. In the previous section, age 50 is the only age group having a positive value. Surprisingly, the coefficients become negative values in short term but do not have statistical significance. Therefore, for ages 20s, 30s, 50s and 60s, the negative impacts caused by THAAD retaliation are larger in the short term than a longer period.

Purpose. Table 14 is a DID result for purpose of visiting Korea in the short term. There are different patterns based on the purpose of visiting. For tourism and the public, the coefficients for the short-term show a greater decrease than the previous result. Even, for the public, the coefficients for the short term almost double. However, the results of business and education do not have statistically significant results in the short term. Therefore, the short-term impact of THAAD retaliation has greater effects on people visiting for tourism and public.

Ports of entry. Tables 15 and 16 are DID results for Chinese visitors' port of entry in the short term. Table 15 shows airports, and table 16 shows ports in Korea. For Incheon, Gimhae, and Gimpo cases, the short-term impacts of THAAD retaliation show the greater negative impacts. However, the coefficients for Gimhae in the short term lose strong statistical significance. The coefficients for Gimpo become doubled but lose statistical significance. For Jeju airport, the short-term effects are similar to the result of the full-time effect, shown in columns 7 and 8, but still Jeju port is the most damaged airport during THAAD retaliation.

〈Table 13〉 Robustness Checks: Result for DID by Age Group in the Short-Term

	(1) age10	(2) age10	(3) age20	(4) age20	(5) age30	(6) age30	(7) age40	(8) age40	(9) age50	(10) age50	(11) age60	(12) age60
Period	2015m8-2017m8	2015-2017	2015m8-2017m8	2015-2017	2015m8-2017m8	2015-2017	2015m8-2017m8	2015-2017	2015m8-2017m8	2015-2017	2015m8-2017m8	2015-2017
China×THAAD	-0.606*** (0.202)	-0.674*** (0.169)	-0.377*** (0.102)	-0.346*** (0.0903)	-0.362*** (0.0819)	-0.355*** (0.0752)	-0.448*** (0.0913)	-0.493*** (0.0817)	-0.106 (0.0925)	-0.118 (0.0832)	-0.464** (0.144)	-0.530*** (0.123)
Fixed effect												
Time	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,467	2,111	1,475	2,124	1,475	2,124	1,475	2,124	1,475	2,124	1,474	2,123
R-squared	0.944	0.942	0.981	0.978	0.986	0.983	0.984	0.981	0.988	0.986	0.969	0.967

Note: The outcome variable is the logarithm of the total number of visitors by age group from country i in month t. China and THAAD are dummy variables. Standard errors in parentheses are clustered by country. ***, **, and * indicate the significance level at 1, 5, and 10 percent, respectively.

〈Table 14〉 Robustness Checks: Result for DID by Purpose in the Short-Term

	(1) tour	(2) Tour	(3) business	(4) business	(5) public	(6) public	(7) education	(8) education
Period	2015m8-2017m8	2015-2017	2015m8-2017m8	2015-2017	2015m8-2017m8	2015-2017	2015m8-2017m8	2015-2017
China×THAAD	-0.498*** (0.0951)	-0.528*** (0.0857)	-0.0372 (0.121)	0.0552 (0.112)	-0.827*** (0.229)	-0.791*** (0.191)	0.0674 (0.205)	0.131 (0.171)
Fixed effect								
Time	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,475	2,124	1,436	2,076	1,219	1,756	1,435	2,052
R-squared	0.984	0.981	0.972	0.965	0.908	0.906	0.929	0.924

Note: The outcome variable is the logarithm of the total number of visitors by purpose from country i in month t. China and THAAD are dummy variables. Standard errors in parentheses are clustered by country. ***, **, and * indicate the significance level at 1, 5, and 10 percent, respectively.

〈Table 15〉 Robustness Checks: Result for DID by Port of Entry (airport) in the Short-Term

Airport	(1) Incheon	(2) Incheon	(3) Gimhae	(4) Gimhae	(5) Gimpo	(6) Gimpo	(7) Jeju	(8) Jeju	(9) Other	(10) other
Period	2015m8–2017m8	2015–2017	2015m8–2017m8	2015–2017	2015m8–2017m8	2015–2017	2015m8–2017m8	2015–2017	2015m8–2017m8	2015–2017
China×THAAD	-0.295*** (0.0826)	-0.283*** (0.0752)	-0.367* (0.156)	-0.335* (0.143)	-0.227 (0.160)	-0.222 (0.142)	-0.770** (0.291)	-0.861*** (0.253)	-1.579*** (0.350)	-1.751*** (0.317)
Fixed effect										
Time	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,475	2,124	1,467	2,112	1,443	2,075	1,346	1,920	1,073	1,526
R-squared	0.986	0.983	0.961	0.951	0.964	0.959	0.905	0.897	0.843	0.814

Note: The outcome variable is the logarithm of the total number of visitors by airport from country i in month t. China and THAAD are dummy variables. Standard errors in parentheses are clustered by country. ***, **, and * indicate the significance level at 1, 5, and 10 percent, respectively.

〈Table 16〉 Robustness Checks: Result for DID by Port of Entry (port) in the Short-Term

Port	(1) Busan	(2) Busan	(3) Incheon	(4) Incheon	(5) Jeju	(6) Jeju	(7) other	(8) other
Period	2015m8–2017m8	2015–2017	2015m8–2017m8	2015–2017	2015m8–2017m8	2015–2017	2015m8–2017m8	2015–2017
China×THAAD	-0.957*** (0.248)	-0.781*** (0.229)	-0.390 (0.379)	-0.0350 (0.318)	-2.009*** (0.362)	-2.279*** (0.330)	0.179 (0.269)	0.210 (0.220)
Fixed effect								
Time	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,404	2,006	1,212	1,721	1,086	1,487	1,295	1,860
R-squared	0.917	0.897	0.808	0.804	0.864	0.839	0.920	0.924

Note: The outcome variable is the logarithm of the total number of visitors by ports from country i in month t. China and THAAD are dummy variables. Standard errors in parentheses are clustered by country. ***, **, and * indicate the significance level at 1, 5, and 10 percent, respectively.

Next, there are interesting patterns in port cases. In Busan, Jeju, and other ports cases, the short-term effects are smaller than the full-time effect, as shown in Table 16. Short-term effects of THAAD retaliation are easily found in airport cases because most airports have a greater negative impact than previous result. However, still, the decline in the number of Chinese visitors to Jeju port is the most overwhelming.

5.3. Different Treated Period

In this study, the post-treated period is after August 2016, when after the announcement of THAAD deployment by the Korean government (in equations (1) and (2)). However, in this section, it is measured how the THAAD deployment affects Chinese visitors to Korea after the THAAD deployment. Thus, another treated (affected) period is defined for DID model. The first THAAD deployment took place in April 2017, so the period after April 2017 become a treated period for Chinese visitors. As with previous models, time and country are fixed, and the standard error is clustered by country.

Gender. Table 17 is DID results for gender. After the deployment of THAAD, both male and female visitors drop. Compared to the DID previous result, the negative values of both males and females show larger decreases. Thus, it suggests that the greater negative impact of THAAD retaliation on both male and female visitors is shown after the THAAD deployment than after the announcement.

Age. The result of age groups is shown in Table 18. There are larger drops after THAAD deployment in all age groups except the 50s. In the case of age 50s, the positive value is shown as with the previous result, but the value becomes smaller; the coefficient becomes 0.0628. In other words, even though the age group 50s still comes to Korea, there is a negative impact of Chinese visitors in response to the

〈Table 17〉 Robustness Checks: Result for DID by Gender after THAAD
      Deployment

	(1) Male	(2) female
China×THAAD	−0.275***' (0.0284)	−0.572*** (0.0262)
Fixed effect		
Time	Yes	Yes
Country	Yes	Yes
Observations	4,956	4,956
R−squared	0.978	0.980

Note: The outcome variable is the logarithm of the total number of visitors by
    gender from country i in month t. China and THAAD are dummy
    variables. The treated period begins in May 2017. Standard errors in
    parentheses are clustered by country. ***, **, and * indicate the
    significance level at 1, 5, and 10 percent, respectively.

〈Table 18〉 Robustness Checks: Result for DID by Age after THAAD
      Deployment

	(1) age10	(2) age20	(3) age30	(4) age40	(5) age50	(6) age60
China× THAAD	−0.822*** (0.0354)	−0.294*** (0.0268)	−0.192*** (0.0316)	−0.540*** (0.0340)	0.0628 (0.0922)	−0.499*** (0.0321)
Fixed effect						
Time	Yes	Yes	Yes	Yes	Yes	Yes
Country	Yes	Yes	Yes	Yes	Yes	Yes
Observations	4,924	4,956	4,955	4,954	4,955	4,954
R−squared	0.941	0.976	0.979	0.976	0.874	0.966

Note: The outcome variable is the logarithm of the total number of visitors by
    age group from country i in month t. China and THAAD are dummy
    variables. The treated period begins in May 2017. Standard errors in
    parentheses are clustered by country. ***, **, and * indicate the
    significance level at 1, 5, and 10 percent, respectively.

deployment. Therefore, all age groups are negatively affected after the
Korean government deployed the THAAD.

   Purpose. Table 19 presents the result of visitors based on the
purpose of visit to Korea. A greater negative effect is shown in
Chinese tourists after THAAD deployment. Visitors for the public

purpose have still negative coefficients, but the value becomes smaller than the previous result shown in Table 9. The coefficient for business does not have a statistically significant result. For education, there is a similar result with the previous one. Even, when the treated period changes, the most affected subgroup is still tourism.

〈Table 19〉 Robustness Checks: Result for DID by Purpose after THAAD Deployment

	(1) tour	(2) Business	(3) public	(4) education
China×THAAD	-0.482*** (0.0287)	-0.0634 (0.0658)	-0.364*** (0.0441)	0.238*** (0.0461)
Fixed effect				
Time	Yes	Yes	Yes	Yes
Country	Yes	Yes	Yes	Yes
Observations	4,956	4,876	4,117	4,779
R-squared	0.973	0.937	0.887	0.921

Note: The outcome variable is the logarithm of the total number of visitors by purpose from country i in month t. China and THAAD are dummy variables. The treated period begins in May 2017. Standard errors in parentheses are clustered by country. ***, **, and * indicate the significance level at 1, 5, and 10 percent, respectively.

Ports of entry. Tables 20 and 21 present the result for ports of entry. Incheon, Gimpo, and Jeju airports have larger negative coefficients. Even, the coefficient of Jeju airport indicates over -1. On the other hand, in the case of Gimhae, it is seen that the value becomes smaller after the THAAD deployment. Busan and Jeju ports, which are one of the most damaged places, have greater negative coefficients. The coefficient of Jeju port becomes over -4.5. In contrast, still, the coefficients of Incheon and other ports are positive values as same the previous result. Moreover, the coefficient of Incheon has a much larger positive value. Interestingly, though the treated period is changed, Jeju port is still the most damaged place.

〈Table 20〉 Robustness Checks: Result for DID of Airport after THAAD Deployment

	(1)	(2)	(3)	(4)	(5)
Airport	Incheon	Gimhae	Gimpo	Jeju	Other airport
China×THAAD	-0.181*** (0.0265)	-0.233** (0.0871)	-0.137*** (0.0335)	-1.026*** (0.0782)	-2.524*** (0.139)
Fixed effect					
Time	Yes	Yes	Yes	Yes	Yes
Country	Yes	Yes	Yes	Yes	Yes
Observations	4,956	4,919	4,842	4,424	3,642
R-squared	0.981	0.931	0.958	0.888	0.799

Note: The outcome variable is the logarithm of the total number of visitors by ports from country i in month t. China and THAAD are dummy variables. The treated period begins in May 2017. Standard errors in parentheses are clustered by country. ***, **, and * indicate the significance level at 1, 5, and 10 percent, respectively.

〈Table 21〉 Robustness Checks: Result for DID of Port after THAAD Deployment

	(1)	(2)	(3)	(4)
Port	Busan	Incheon	Jeju	Other ports
China×THAAD	-1.990*** (0.0464)	0.527*** (0.0814)	-4.635*** (0.192)	0.441*** (0.0360)
Fixed effect				
Time	Yes	Yes	Yes	Yes
Country	Yes	Yes	Yes	Yes
Observations	4,647	3,894	3,245	4,344
R-squared	0.888	0.807	0.786	0.909

Note: The outcome variable is the logarithm of the total number of visitors by port from country i in month t. China and THAAD are dummy variables. The treated period begins in May 2017. Standard errors in parentheses are clustered by country. ***, **, and * indicate the significance level at 1, 5, and 10 percent, respectively.

Ⅵ. Discussion

In this section, some implications are discussed based on the empirical results. Demographical factors can give some proxy and

implications for purchasing power. The results of airports and ports are helpful to find some implications for a certain industry, such as cruise, and regional impacts.

In 2015 and 2016, the number of female tourists was over 10% higher than that of males, and the expenditure of female tourists was higher than males (Lee, 2017). The proportion of women among Chinese visiting Korea has steadily increased, and it accounted for 65% of all Chinese visiting Korea in 2015 because women are relatively more interested in Hallyu, cosmetics, and shopping than men (Shen, 2016). Park et al. (2014) found that Chinese women have a higher preference for most major consumption items than men. Thus, purchasing power of Chinese females is important. The results in this paper found that Chinese female visitors are affected by THAAD retaliation more than males. Hence, it is expected that a decrease in female tourists is influenced negatively. For example, Korean duty-free shops have a large dependency on Chinese tourists. In duty-free shops, the proportion of Chinese sales is 63% of the total sales. In figure 6, the number of foreign customers in 2017 dropped. Duty-free shop sales at Incheon International Airport declined from 62.7 billion won to 45.5 billion won (Kwon et al., 2017).

〈Figure 6〉 The number of foreign customers in duty-free shops (source: association of duty-free shops 한국면세점협회)
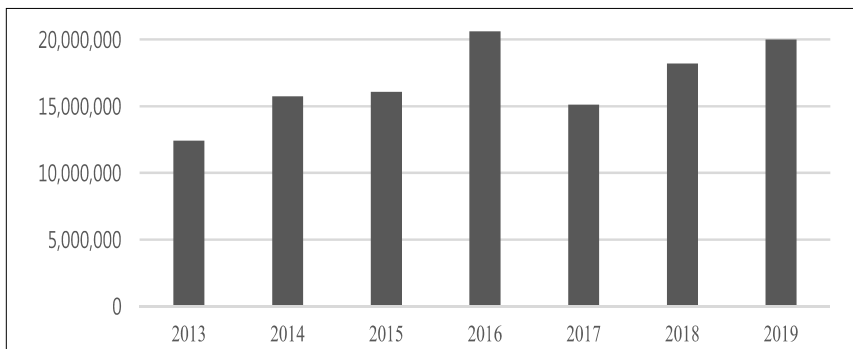
According to the result of age, age 10s are most affected by THAAD retaliation. The reason can be explained by the Chinese authorities' ban on group traveling. Since the Chinese government directly prohibited group tours, school trips for teenagers were also banned. In the case of teenagers, it is hard to go travel by themselves- usually, they travel by school programs or family trip. Thus, age 10s are sensitively affected by government restriction.

Also, the pattern of consumption varies depending on the age group. The young generation, who were born after 1980, has a high preference for cosmetics, apparel, and beauty services while the old generation born after 1980, has a high interest in purchasing Korean food and health supplement such as red ginseng (Park et al., 2014). Not only the products but also the service they use has differences. The young generation has a high preference for Korean artists' concerts or cultural experiences due to the popularity in Hallyu, but spa and massage services are popular with the older generation (Park et al., 2014). The result has shown that the decrease in Chinese visitors in ages 40s and 60s is greater than in other age groups and in Chinese young people (ages 20s and 30s) is relatively less than the in older generation. Thus, it is expected that the sales of items and services that the older generation was interested in had decreased. There were differences in major shopping items for Chinese tourists in 2017. The trends are shown in figure 7, which is based on the survey of foreign tourists by the Ministry of Culture, Sports, and Tourism, and the most major items dropped in 2017. For example, cosmetics dropped by 4.1% points, and apparel dropped by 2.9% points. However, there are some different trends. The items favored by the old generation dropped more in 2017 while the items favored by the young generation increased relatively. For example, according to the survey, health supplements such as ginseng fell 4.1 percentage points year-on-year, and Kimchi fell 1.8%p. However, items related to K-pop stars rose

1.2%p, and CD rose 0.9%p. Exports say that group tour restriction seems to have negatively impacted older people's traveling to Korea (Kim, 2019b). In contrast, exports found that the younger generation (age 20s-30s) still contributes significantly to inbound Korea because they can purchase tickets and book accommodation individually (Kim, 2019b).

〈Figure 7〉 The Percentage of Major Items that Chinese Visitors Bought (source: Korean Statistics 통계청)
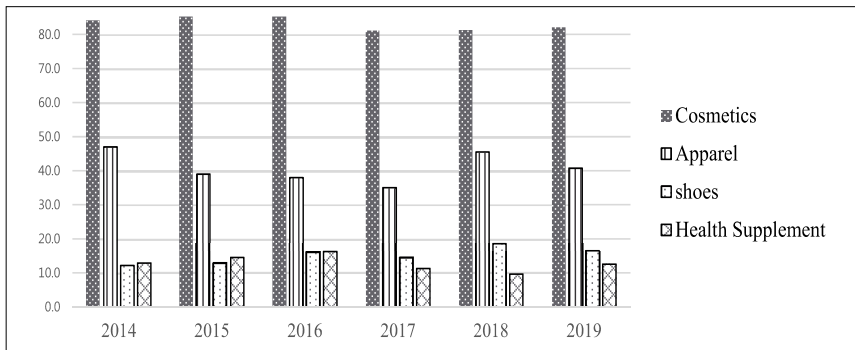
All airports have negative coefficients. Daegu Airport is a good example of supporting this result. Daegu Airport benefited from chartered flights. In 2016, about 70,000 Chinese tourists arrived at Daegu Airport by chartered flights (Lee, 2017). However, it seems that Daegu Airport had been damaged by the Chinese government's prohibition of chartered flights to Korea. Another example is Yang-yang airport. In July and August of 2016, the total number of Chinese visitors coming to Korea through Yang-yang airport was about 26,000, but after March 2017, there was no air route from China (Choi, 2017a).

The most damaged port of entry is Jeju Port. Jeju port had recorded No.1 port performance and became the center of the cruise route in Northeast Asia (Hur and Shin, 2018). However, the problem was the high dependency on China. In 2016, 97% of Jeju Island's cruise was

from China (Hur and Shin, 2018). Therefore, THAAD retaliation has caused serious damage to Jeju port. Since March 15, 2017, all Chinese cruises had not arrived at Jeju Port, and only 20 non-Chinese cruises had arrived for 9 months. It was significant suffering compared to the 507th arrival in 2016 (Hur and Shin, 2018). It implies that the number of tourists dropped a lot, and it is expected that it influenced tourism at Jeju Island negatively. According to the figure 8, it is expected that Jeju tourism is affected negatively by THAAD retaliation. The number of foreign tourists decreased a lot in 2017. The place of tourist attractions regardless of whether paid or not damaged a lot in 2017. Also, according to Korean Statistics, foreign currency tourism receipts decreased by 2,356 million won from 2016. Therefore, it is expected that THAAD retaliation affected negatively Jeju Island tourism economy.

〈Figure 8〉 The Number of Foreign Tourists Visiting Major Attractions in Jeju Island (source: Korean Statistics 통계청)
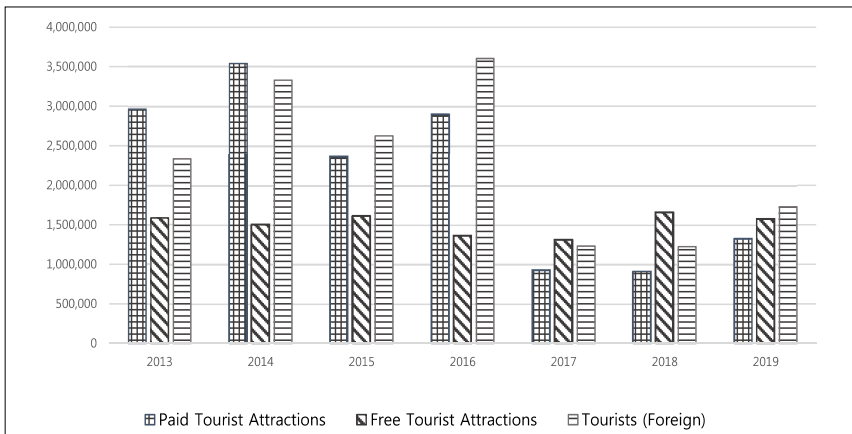
What we learned from the THAAD dispute is that the higher China's dependency, the more damage Korean industries suffer. For example, duty-free shops or Jeju Island where the dependency of Chinese tourists was high experienced relatively larger damage.

However, through the THAAD dispute, we can think of a new strategy: diversify dependency. The number of tourists visiting Korea is steadily increasing, and the competitiveness of Korean Tourism is also increasing. Tourism Competition Rank made by World Economic Forum has improved (Choi, 2017b). In addition, these days, *Hallyu* and Korean dramas or movies such as BTS or Squid Game have become popular in the world. According to the Hyundai Research Institute, it is estimated that 7.6% of foreign tourists visited Korea to see BTS and the economic value that BTS created has greater than the Pyeong Chang Winter Olympics (Jeong, 2018). Kwon et al. (2017) explained that the popularity of *Hallyu* in Southeast Asia led to visiting Korea, which was about 15% of the total Southeast Asian tourists in March 2017. Thus, there are many ways that we can attract foreign tourists from various countries through the competitiveness of the Korean tourism industry and the popularity of the *Hallyu*. Like the 'China Plus One' strategy, Korean tourism must target visitors from various countries not relying on only a specific country.

Ⅷ. Conclusion

Economic sanction negatively impacts on targeted country. In the THAAD retaliation case, direct retaliation occurred, which was the prohibition of tourists. Due to the high dependency on Chinese tourists, the large decrease in tourists has been an issue for the Korean tourism industry. Thus, this study investigates the impact of THAAD retaliation on Chinese tourists from January 2013 to December 2019. I conduct difference-in-differences (DID) and DID with heterogeneous empirical models for estimating THAAD retaliation's impact on Chinese visitors.

The DID result indicates that the impact of the THAAD retaliation

decreased Chinese visitors by about 41%. Also, it is found that the negative effects were greater in the medium and short term. The DID results by subgroups present the heterogeneous effect of different demographic factors and by port of entry. The impact is different within subgroups.

Before closing this paper, the limitations and future research issues are pointed out. First, this paper does not analyze the spillover effect (compensation effect) which is briefly mentioned in the discussion section. Accordingly, it would be another interesting study to see whether there was an increase in the number of domestic and non-Chinese foreign travelers, which results in a compensation effect.

Second, similar to previous studies, this paper does not measure the economic cost of the Korean tourism industry suffered by THAAD retaliation. Based on this result, it would be interesting to estimate the economic costs resulting from THAAD retaliation.

Third, it would be a good future study to find out the recovery trend after 2017. It is hard to find whether, after 2017, there was a recovery in Chinese tourists and visitors because of the COVID-19 crisis in 2020. The tourism industry has continued to suffer due to COVID-19. Therefore, it would be good to study in the future how the trend of Chinese tourists will change after COVID-19.

◈ *References* ◈

Bae, H., and S. Yang (2017), "The Analysis of Economic Impact of Airline Industry on THAAD Placement," 『한국항공경영학회지』, 15(4).

Cho, Jiwon (2020), "Due to THAAD Retaliation, Korean Tourism Revenue

Decreased,” Seoul Economy. Retrieved from https://www.sedaily.com/NewsVIew/1ZBJ0J7EIY.

Choi, Dahee (2017a), “사드 배치 관련 중국 정부의 조치가 강원경제에 미친 영향,” 한국은행 강원본부, 『강원금융경제포커스』, 12.

Choi, Byeongil (2017b), “Korean Tourism Competitiveness ranks 19 in the world,” Hankyung. Retrieved from https://www.hankyung.com/sports/article/2017041119871.

Gu, Gain (2018), “美국방부 “中, 사드보복 등 美동맹 경제공격… 안보-산업위협”,” 동아일보.

Hackenbroich, Jonathan, and Chugh Abhinav (2022), “What do Sanctions Help Achieve? An Export Explains,” World Economic Forum. Retrieved from https://www.weforum.org/agenda/2022/03/what-do-sanctions-help achieve-an-expert-explains/.

Hur, Yun-Seok, and Beom-Soo Shin (2018), “A Study on the Influence of THAAD Dispute on Jeju Cruise Market,” The Journal of Maritime Business, 41.

Jeon, Hye-Young (2017a), “사드 갈등 장기화에 따른 국내관광산업 손실 규모 추정,” 『현안과 과제』, Hyundai Research Institute.

Jeon, Soo-Yong (2017b), “무역을 무기로 휘두르는 중국.. 대부분 ‘단기쇼크’로 끝났다,” Chosun Biz. Retrieved from https://biz.chosun.com/site/data/html_dir/2017/12/05/2017120500385.html.

Jeong, Min et al. (2018), “Economic Effect of BTS (방탄소년단의 경제적 효과)” 『현안과 과제』, Hyundai Research Institute.

Jung, Hoon, and Choi, Young-Mok (2019), “The Effect of THAAD on the Cost Stickiness of Korean Lodging Industry,” Korean Journal of Hospitality & Tourism, 28(4), 143-157.

KDB Bank (2017), “사드배치와 한중관계 악화에 따른 산업별 영향,” KDB 미래전략연구소.

Kim, Dohoon (2019a), “Empirical Analysis on the Effects of China’s Tourism Policy on the Demand of Chinese Inbound Tourists,” 『관광연구』, 대한관광경영학회, 34(5), 47-61.

Kim, Hyoungjong (2019b), “시계열 데이터로 바라본 중국인 방한 관광,” Culture & Tourism Insight, Korean Culture & Tourism Institute,

134.

Kim, Hyejin, and Jungmin Lee (2021), "The Economic Costs of Diplomatic Conflict: Evidence from the South Korea-China THAAD Dispute," *The Korean Economic Review*, 37(2).

Kwon, Tae Young, Woosuk Kim, and Ha Young Kang (2017), "The Effect of THAAD on Korean Consumers and Distributors," *Journal of Marketing Thought*, 4(3), 49-65.

Lee, Jungmin (2017), "사드가 관광산업에 미치는 영향과 시사점," 『한국 관광정책』, 67, 63-68.

Lee, Kihyun (2018), "Chinese Awareness and Response to the THAAD: Strategic Discomfort and Wishful Thinking," *Journal of International Politics*, 23(2), 41-65.

Park, Moon Su et al. (2014), "Analysis of Chinese Tourists Spending Patterns in Korean and How to Spread the Effects of Chinese Tourist Expenditure to Other Industries," KIET (Korea Institute for Industrial Economics &Trade) Research Reports.

Shen, J. (2016), "Economics of Uker(遊客)," *LGERI Report*, LG Business Insight.

Shin, Sue-Ae, Uk Hwang, and Jin Kwon Lee (2019), "Voluntary and Government Induced Consumer Boycotts: The Case of a Conflict between China and Korea Regarding THAAD," *Journal of Economic Studies*, 37(1), 161-183.

Wei-Na Kong (2021), "Economic Effect and Resolution Idea of the THAAD Political Conflict on South Korea's Exports to China," *The Chinese Economy*,   DOI:10.1080/10971475.2021.1930300.

YANG, Florence (Wen-Tin) (2019), "Asymmetrical Interdependence and Sanction: China's Economic Retaliation over South Korea's THAAD deployment," *Issues & Studies*, 55(04), 1940008.

Yi, Woo Pyeong, and Sang Mok Kang (2019), "Effect of Chinese Tourist Fluctuation on Productivity Change of the Tourist Accommodation Business," *Journal of Tourism and Leisure Research*, 31(2), 237-257.

Yuxian Juan, Youngjoon Choi, Sohyun An, Choong-Ki Lee, and Seung

Jae Lee (2017), "The Constraints of Chinese Tourists to Visit Korea Caused by THAAD using Q-methodology," *Asia Pacific Journal of Tourism Research*, 22(12), 1261-1273.

사드(THAAD)보복이 방한 중국인에 미치는 영향에 관한 연구*

빈 유 진**

논문초록

　본 연구에서는 사드 보복 사태가 방한 중국인들에게 미치는 영향을 분석한다. 분석을 위해, 이중차분모형(DID)이 사용되었다. 나이, 성별, 방한 목적, 입국장을 기준으로 2013년부터 2019년까지의 방한 중국인의 수를 분석함으로써, 각 집단별 이질적인 영향을 분석한다. 분석 결과, 사드 보복 사태 때, 중국인 방문객은 40%가량 줄었음을 확인하였다. 남성과 여성 방한 중국인 모두 사드 보복에 부정적인 영향을 받았음을 발견하였다. 연령대별로 분석했을 경우, 50대를 제외한 모든 연령층이 사드 규제로 인해 방한 방문이 감소하였다. 방한 목적별로 분석하였을 때, 관광 목적뿐 아니라 공적인 목적과 개인 사업을 위해 입국한 중국인들도 사드 규제의 부정적인 영향을 받았다. 입국장을 기준으로 했을 때, 모든 공항에서 중국인의 입국자 수가 줄었으며, 항구의 경우, 부산항과 제주항으로 입국한 중국인의 수가 많이 줄었음을 확인하였다.

주제분류 : B020503, B030104, B030800
핵심 주제 : 경제 제재, 관광객, 중국, 사드보복(THAAD crisis), 이중차분모형(DID)

　** 서울대학교 국제학부 국제학 석사, e-mail: binyoojin@gmail.com