Journal of Korea Trade Vol. 24, No. 5, August 2020, 1-17
https://doi.org/10.35611/jkt.2020.24.5.1
ISSN 1229-828X

What Is the Difference between Chinese and Japanese FTAs?

Da-Yeon Kang
Financial Economy Institute, South Korea

Young-Seo Jeon†
Department of Economics & Finance, HanYang University, South Korea

JKT 24(5)

Received 7 May 2020
Revised 20 June 2020
Accepted 11 August 2020

Abstract

Purpose – This paper tries to estimate the effects of China's and Japan's free trade agreement (FTA) by panel generalized least squares (GLS).

Design/methodology – The GLS model includes the basic gravity theory and Difference in Difference (DD) method to divide FTA conclusion countries and non-FTA conclusion countries with China and Japan. In order to empirically research the difference between Chinese and Japanese FTAs, we use the Difference in Difference in Difference (DDD) method.

Findings – This paper finds the distance variable has more influence on Japanese than Chinese trade. The exchange rate indicates that Chinese trade depends on export and Japanese trade has the structure of re-import; shows that the countries that concluded FTAs with China and Japan have more positive trade effects than those that did not; finds the Chinese FTA promotion effects greater than the Japanese FTA because China had pushed ahead with trade policy since joining the WTO in 2001.

Originality/value – This study shows that a single country's FTA and trade policies are an important factor concerning not just the promotion of trade but also the issue of trade conflicts.

Keywords: China FTA, DD Method, Effect of FTA, Japan FTA, Panel GLS
JEL Classifications: F1, O5

1. Introduction

As of 2018, after the South Korean, Chinese, and Japanese FTAs conducted joint research in 2003, the three countries held five summit meetings, followed by a seventh FTA negotiation in April 2015, the same year that Japan joined the Trans Pacific Partnership (TPP). South Korea, China, and Japan have different aims for their FTA conclusions. South Korea aims for a large economic bloc to broaden its trade area and thus has multiple FTA conclusions, while China and Japan are attempting to take on leadership roles in East Asia's economy.

While South Korea has been making simultaneous and global FTA conclusions since 2004, China and Japan had similar numbers of FTA conclusions, mainly with other Asian countries in the same period. Thus, we note the Chinese and Japanese FTAs as this empirical research issue to compare differences for both countries. August 2018, China had FTA conclusions with 24 countries and was preparing FTA conclusions with fourteen other countries. Sixteen countries had FTA conclusions with Japan and 41 were preparing FTAs with Japan. South Korea preceded multiple FTA conclusions with 51 countries. Meanwhile, China and Japan are keeping their defensive FTA policy. Specifically, China started to make FTAs with geographically closed areas like Hong Kong and Macau, and other Asian countries. China has strategic FTAs with countries that have abundant natural resources, like Pakistan, Peru, Costa

† **Corresponding author:** jeonys456852@naver.com

Rica, and New Zealand (Kang Da-Yeon and Jeon Young-Seo, 2014b).

The Chinese government has its own FTA procedures, which means the first stage is opening for commodity trading. The second stage is extending to service trade. New Zealand had the first comprehensive FTA conclusion with China in 2008. Japan has been joining in the Economic Partnership Association (EPA) with restricted tariff cuts since it has domestic issues regarding agricultural products. Focusing on keeping South Korea and China's trade tendencies in East Asia in check, since 2009, the Japanese government has been concerned about economic growth and promoting trade, as demonstrated by its involvement the TPP to show this (Kang Da-Yeon and Jeon Young-Seo, 2015a). Therefore, we try to statistically measure the Chinese FTA effect as compared to the Japanese FTA effect. We also consider the distinctive features of the two countries through the DDD method. Previous FTA studies used the CGE and gravity equation.[1]

In China, Jin Huang-Gui (2004) empirically researched Chinese, South Korean, and Japanese FTA effects through the gravity model. Wang Kai (2007) presents the processing of China and Japan's FTA by researching economic and political barriers to economic cooperation by using the gravity model. Huang Ye-Jin and Zhang Yu (2008) study Chinese trade effects with 15 trading partners through a gravity model. They find that FTAs have a positive effect on Chinese trade. Gao Xin-Shou and Mei Lan (2012) study China and Kyrgyzstan's trade policy by using a basic gravity model. They find that the Chinese population and policy affect trade, but GDP has a negative effect on promoting trade. Ao Lin-Hong and Zhao Ru-Yu (2013) conduct empirical research on the South Korea-China-Japan FTA using the gravity model. As their regression results show, their own trade policies are the most important variable. This means if three countries have FTA conclusions, trade growth will be active in East Asia. Dong Li-Fu, Jiang Ya-Heng and Bai Shu-Qiang (2014) study economic integrations by using the gravity model for 177 countries over two decades and find that opening up the economy promotes trade. Kuang Zeng-Jie (2015) argues that economic cooperation and potential profits have a positive effect in South Korea, China, and Japan's FTA according to the gravity equation.

Meanwhile, most of the previous studies on FTA in Japan are not economy effect but studies on trade policy. Lee Hong-Bea (2004) researches the Japanese FTA policy on South Korea and Japan's FTA. Kim Yang-Hee (2008) investigates previous Japanese FTA conclusions and argues that Japan must strengthen its agricultural sector. Sekizawa (2008) holds that the Japanese FTA policy is lagging those of South Korea and China. Ando Mitsuya (2007) conducts an empirical study on Singapore and Mexico's EPA using the gravity model. She finds that the EPA has a positive impact on Mexican export and investment. Ando Mitsuyo and Urata Shujiro (2011) conduct a qualitative and quantitative analysis on the FTA effect and find more positive effects than those for non-FTA countries to promote trade. In South Korea, the initial access of the gravity model is used by Ham Shee-Chang (1997). Park Jea-Jin (2003) uses the gravity model to find the patterns of trade among South Korea, China, and Japan, finding that South Korea and China show a domestic market effect, but Japan does not. Kang Da-Yeon and Jeon Young-Seo (2014b) researches China's FTA effects using a panel gravity model and shows that Chinese FTA conclusions have a trade-promoting effect compared with non-FTA countries.

There has been an ongoing debate on the Spaghetti Bowl Effect of Mega FTAs, which is a

[1] Ahn Young-Cheul (2013), Cheong In-Kyo (2004/2006), Cheong In-Kyo and Cho Jung-Ran (2008), Lim Jae-Kyu (2011), Yoon Ki-Kwan and Park Sang-Gil (2005) study the FTA effect of China and Japan by using CGE model. Gravity model is frequently used by Baier, Bergstrand and Feng (1994), Benedictis and Vicarelli (2005), Frankel (1997), Glick and Rose (2001), Tamirisa (1999), Wall (1999), and others in trade theory and economy bloc issues.

result of the negative impact of FTAs. However, the following studies, which utilized panel data by year and by country to estimate the effects of bilateral FTAs, prove that the bilateral trade effect caused by FTAs is greater than that of Mega FTAs. First, research by Glick and Rose (2001) applies a panel gravity model to analyze the bilateral FTA effect among 217 countries, demonstrating that the monetary union of bilateral trading partners had a trading effect twice the size of multilateral monetary unions. Egger and Pfaffermavr (2003) used a panel gravity model to study 11 APEC countries, showing that through the fixed effect of bilateral relationships, bilateral trade effects are long term. Kim Wan-Joong (2005) analyzed the bilateral import and export effects of Korea with other countries, showing that the impact of bilateral FTAs was more positive than that of regional trade blocs. Bussière, Fidrmac and Schnatz (2008) used the effect between countries to study trade between Western and Eastern European countries following the expansion of the European Union. The results show that there was a positive effect of the trade of the countries newly recruited to the European Union with those that are already part of the European Union.

There are many previous analyses of the expected effect of FTA studies on South Korea, China, and Japan after FTA conclusion. Moreover, previous results show that FTA effects promote trade for each country. We recognize each country's own FTA policy is closely connected to the trade effects then we try to estimate China's and Japan's FTA effects using the panel gravity equation and DD method.[2] For Korea that has FTAs with many of the East Asian countries, the positive effect of FTAs can be rather intuitively expected. In contrast, during the similar period, China and Japan had a similar number of FTA trading partners comprising Asian countries. Therefore, these two countries were chosen as research targets to study the differences in the effects of FTA agreements between Japan and China, both of which have almost no overlapping FTA agreements. All countries are aware of the importance of promoting trade through FTAs and trade policies, which are aimed at lowering tariffs. However, as a result of the domestic agricultural economy and security concerns, Japan has not actively implemented FTA policies. Moreover, after joining the WTO in 2001, China has strategically implemented FTA policies.[3] Therefore, it is expected that the findings of this paper can contribute to policies related to the future direction of FTAs and trade for China and Japan, countries that are sensitive to security and political issues.

We start with two groups for FTA conclusion countries with FTAs and prepare FTAs with China and Japan. Then we estimate each Chinese and Japanese FTA effect and pool all the panel data and use the DDD method to estimate local differences in China and Japan. We extend the period of 1990–2013 to compare Chinese FTAs with Japanese FTAs. The DDD method is used to estimate the difference between the Chinese and Japanese model. Moreover, we add exchange rates as an explanatory variable to consider China's and Japan's own trade features and price effects. First, we describe the FTA backgrounds and review the previous studies in the introduction. Chapter 2 includes current Chinese and Japanese FTA

---

[2] The DD method is used in Moon Byung-Chul (2008) for a study on service FTAs and Kang Da-Yeon and Jeon Young-Seo (2014a/2014b/2014d) for a study on South Korean and Chinese FTAs. Along the same lines, Kang Da-Yeon and Jeon Young-Seo (2014c) research the export effect that causes South Korea to make FTA conclusions with trading partners by using the DD method.

[3] This paper on the relationship between trade effects and political economy by Chiu (2019) examines the determinant factors of trade conflicts in regards to 41 emerging market economies between 1995 and 2015. Their findings show that political factors have an effect on trade. In other words, their study showed that the higher the democracy and power capability of a country, the fewer are its trade conflicts. Studying panel data from 62 countries between 1980 and 2008, Angkinand and Chiu (2011) analyzed the effect of institutional reform on bilateral trade. According to their results, all three forms of institutional reform have a trade promotion effect; however, only in the case of permanent reform was a positive effect shown to be achieved.

policies and trends of trade. We establish the panel gravity equation and add the DDD method as an empirical model in Chapter 3. After treating the variables of Chinese and Japanese GDP, capital per GDP, distance with trading partners and exchange rate, we analyze the FTA effects in China and Japan. In Chapter 4, we conduct stationary tests and an LR test, drawing panel GLS model results. Finally, in Chapter 5, we provide results and suggestions.

2. China and Japan FTAs

2.1. Status of FTAs

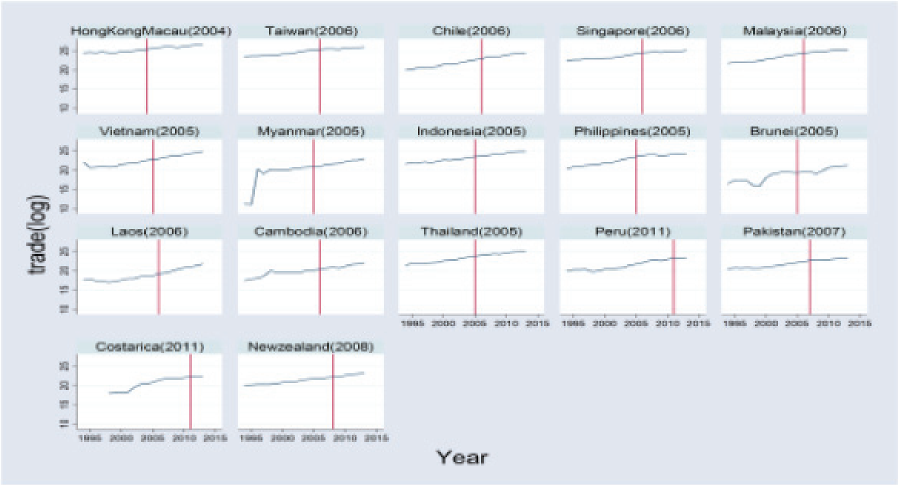
The customs administration states that the four stages of FTAs are preparing negotiation, joint research, negotiations, and concluding by signing the FTA. After making an FTA assessment of about one year, the FTA conclusion relationship is officially recognized. China had FTA conclusions with 17 countries, some of which are geographically close to China and have similar cultures, such as Hong Kong, Macau, Taiwan, Singapore, and South Korea. China had an FTA conclusion for commodity trade with Chile, its first country partner in South America in 2006. This was followed by Peru, which had a comprehensive FTA conclusion with China in 2010. China also has strategic FTA conclusions with Pakistan, New Zealand, and Costa Rica because these countries have abundant natural resources. Australia and Switzerland have also signed FTAs with China, as have the Gulf Cooperation Council (Saudi Arabia, Kuwait, the United Arab Emirates, Qatar, Oman, and Bahrain), Iceland, Norway, and the SACU. Japan has been holding FTA negotiations with China. Five countries—India, Argentina, Brazil, Paraguay, and Uruguay—are preparing negotiations and joint research with China (KITA, 2015). Chinese FTAs have FTA conclusions that involve both commodity and service trade. After opening service trade, the country proceeds to the agreement of investment stage. Therefore, Chinese FTA conclusions have a phased tariff cuts (Kang Da-Yeon and Jeon Young-Seo, 2014b). China joined the World Trade Organization (WTO) in 2002 and made a comprehensive FTA conclusion with New Zealand in 2008. China has retained comprehensive tariff cuts, especially in its FTAs with Hong Kong and Macau, which China has modified several times before. They have been China's biggest trading partners after opening the phased tariff cut. This means the Chinese government is changing to an active FTA policy and their FTA pattern is moving forward to a comprehensive tariff cut from a restricted tariff cut.

Japan has been the EPA as the defensive FTA policy when it makes trade conclusions with trade partners. However, the Japanese government has recognized the importance of FTA since 2009. Japanese economic aims changed the reconstruction of economic measures and of free trade (Kim Hyun-Jung, 2013). Japan usually regards South Korea as its competitor in various industries. South Korea has made FTA conclusions with the EU, the United States, and China, after which Japan recognized their FTA policy is far behind South Korea's. Consequently, Japan declared it would join the TPP and take action to proceed in the Comprehensive Economic Partnership in East Asian negotiations (Sekizawa, 2008). Japan had FTA conclusions with ASEAN, Mexico, Chile, Switzerland, Peru, and Australia. Among these, the Japan-Singapore FTA was achieved before the Japan-South Korea FTA and the FTA conclusions with ASEAN countries since Japan desires to lead the East Asian economic bloc and security as a check against China and the United States within Asia (Kim Jung-Uk, 2006). Japan included an additional energy article in an FTA conclusion with Brunei and Indonesia to secure supply of energy resources. Other FTA conclusions were made with Mexico, Chile, and Peru to broaden Japan's South American trade market. Only one

European country, Switzerland, had an FTA conclusion with Japan before that (KITA, 2015). Additionally, Japan is negotiating FTAs with the GCC, Iceland, Norway, SACU, Canada, Mongolia, and Colombia, as well as the South Korea-China-Japan FTA. It is also conducting joint research and preparing an FTA negotiation with the EU, New Zealand, the United States, South Korea, India, and MERCOSUR.

Fig. 1. Flow of the Trade with China (1990–2013)

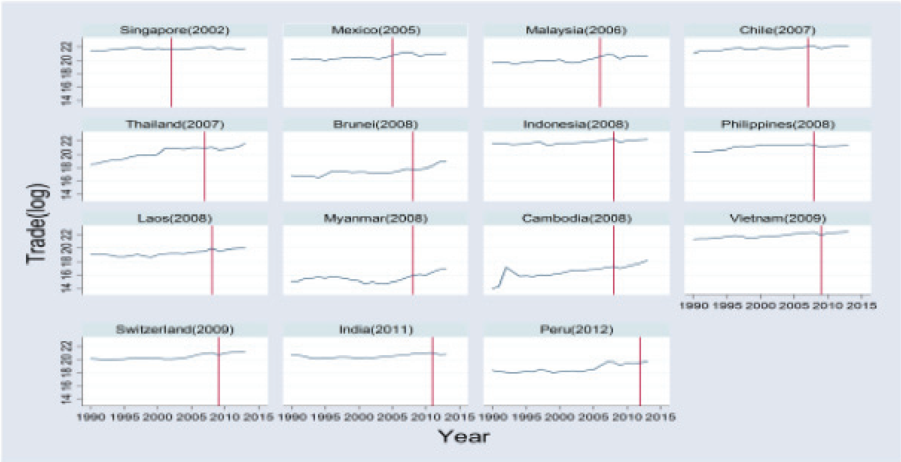
(Unit: US $)



Note: Parenthesis indicates the year of FTA conclusion with China.
Source: Author's calculation using KITA (2015).

Fig. 2. Flow of Trade with Japan (1990-2013)

(Unit: 1,000 ￥)



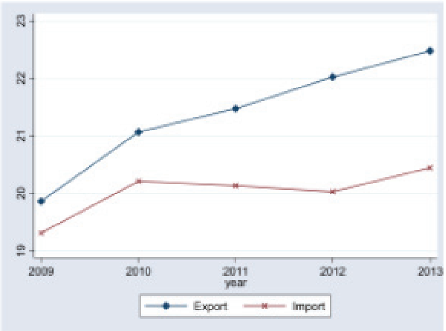
Note: Parenthesis indicates the year of FTA conclusion with Japan.
Source: Author's calculation using KITA (2015).

As seen in Fig. 3, the Chinese flow of trade with FTA conclusions shows the incremental flow as a gradually increasing part of exports and imports. The Japanese trade ratio is not as big as the Chinese ratio. It accounts for 20% in both export and import, and the incremental rate is also lower than the Chinese. The Chinese export ratio was more than 60% with FTA conclusion countries in 2013. This reflects the importance of the FTA conclusions to the Chinese economy, which is the biggest exporting country in the world. After 2000 when the Chinese government conducted positive FTA policy, incremental trade improved growth. Thus, we analyze the effect of FTA conclusions against non-FTA conclusions in China and Japan. Then we try to estimate the differences between the Chinese FTA and Japanese FTA effects.

Fig. 3. Flow of Chinese and Japanese FTA Trade (2009–2013)

(Unit: %)

China



Japan

Source: Author's calculation using KITA (2015).

3. Empirical Method

3.1. Gravity Equation and DD·DDD Method

We establish the basic gravity equation as an empirical tool. The gravity equation is generally used for trade issues, and we omit detailed description here.[4] We try to estimate the effects of FTA conclusions against non-conclusion in China and Japan by using the panel gravity equation and Difference in Difference (DD) method and then compare the Chinese FTA to Japanese FTA by using the Difference in Difference in Difference (DDD) method with pooling panel data set. Firstly, the DD method is a useful tool in medicine and pharmacy recently, it defines two groups: the treatment group and the control group. This method can be adopted to estimate the effect of new policy or program in social science studies.

Thus, we apply this panel gravity equation due to each country presents FTA conclusions and non-FTA conclusions with yearly data. This method used is that of Viscusi and Durbin (1995). The DD method and FTA conclusions before and after the defined time periods can

[4] Baier and Bergstrand (2005) used instrumental variable to control the panel data endogeneity in the gravity equation, when they used panel data set. Baier, Bergstrand and Feng (2014) considered fixed effect which are country and year, when they use the panel gravity equation and divide FTA before and after 5 years to estimate tariff effects. Baier, Yotov and Zylkin (2018) tried to estimate the trading pair FTA and multiple FTA by using Gravity equation, considering terms of trade variable.

estimate the effect of FTA conclusions in future easily (Wooldridge, 2012).[5] The DD method denotes the treatment group effects minus control group effects:

$$\text{DD effect} = (T_A\text{-}T_B) - (C_A\text{-}C_B) \tag{1}$$

Where T is the treatment group, C is the control group. Where A stands for the post-FTA conclusion, and B means pre-FTA conclusion. Secondly, we apply the DDD method to analyze the difference between Chinese FTA and Japanese FTA to the existing DD method. The DDD method is equal to the Chinese FTA effects minus the Japanese FTA effects, as in:

$$\begin{aligned}\text{DDD effect} &= \text{China FTA Effects} - \text{Japan FTA Effects}\\ &= \{(T_{ChA}\text{-}T_{ChB}) - (C_{ChA}\text{-}C_{ChB})\} - \{(T_{JaA}\text{-}T_{JaB}) - (C_{JaA}\text{-}C_{JaB})\}\end{aligned} \tag{2}$$

Following Mayer, Viscusi and Durbin (1995), we set up the panel gravity equation by adding a dummy variable that FTA before is 0 and after is 1 during the same period. In this, the DDD method is inserted into the panel gravity equation:

$$\begin{aligned}Y_{ijt} = \beta_0 + \beta_1 fta_j + \beta_2 after_t + \beta_3 Country_i + \beta_4 fta_i * after_t + \beta_5 fta_i *\\ country_i + \beta_6 country_i * after_t + \beta_7 fta_i * after_t * country_i + e_{it}\end{aligned} \tag{3}$$

Where *i* is China or Japan and *j* is their trading partner, and y is Chinese or Japanese trade volume with trading partner. When we apply this model, we insert the $fta_i * after_t * country_i$ variable because of multicollinearity error and β_7 indicates the Chinese FTA effects, rather than Japanese FTA effects. Table 1 reports the descriptions of the treatment group and baseline year. The Chinese treatment group is made of 17 countries, including Hong Kong and Macau, which are the first FTA conclusion countries in 2004. The baseline year is 10 years since they had FTA conclusions and before FTA conclusion 10 years.

Table 1. Countries with FTAs and Treatment Year

China			Japan		
Treatment Group	**FTA before**	**FTA after**	**Treatment Group**	**FTA before**	**FTA after**
Hong Kong·Macau	’94–’03(10yr)	’04–’13(10yr)	Singapore	’90–’01(12yr)	’02–’13(12yr)
Taiwan	’98–’05(8yr)	’06–’13(8yr)	Mexico	’96–’04(9yr)	’05–’13(9yr)
Chile	’98–’05(8yr)	’06–’13(8yr)	Malaysia	’98–’05(8yr)	’06–’13(8yr)
Singapore	’98–’05(8yr)	’06–’13(8yr)	Chile	’00–’06(7yr)	’07–’13(7yr)
Malaysia	’98–’05(8yr)	’06–’13(8yr)	Thailand	’00–’06(7yr)	’07–’13(7yr)
Vietnam	’97–’04(9yr)	’05–’13(9yr)	Brunei	’99–’04(6yr)	’08–’13(6yr)
Myanmar	’97–’04(9yr)	’05–’13(9yr)	Indonesia	’99–’04(6yr)	’08–’13(6yr)
Indonesia	’97–’04(9yr)	’05–’13(9yr)	Philippines	’99–’04(6yr)	’08–’13(6yr)
Philippines	’97–’04(9yr)	’05–’13(9yr)	Laos	’99–’04(6yr)	’08–’13(6yr)
Brunei	’97–’04(9yr)	’05–’13(9yr)	Myanmar	’99–’04(6yr)	’08–’13(6yr)
Laos	’97–’04(9yr)	’05–’13(9yr)	Cambodia	’99–’04(6yr)	’08–’13(6yr)

[5] The DD method refers to Kang Da-Yeon and Jeon Young-Seo (2014a/2014d) and Moon Byung-Chul (2008).

Table 1. (Continued)

China			Japan		
Treatment Group	**FTA before**	**FTA after**	**Treatment Group**	**FTA before**	**FTA after**
Cambodia	’97–’04(9yr)	’05–’13(9yr)	Vietnam	’04–’08(5yr)	’09–’13(5yr)
Thailand	’97–’04(9yr)	’05–’13(9yr)	Switzerland	’04–’08(5yr)	’09–’13(5yr)
Peru	’08–’10(3yr)	’11–’13(3yr)	India	’08–’10(3yr)	’11–’13(3yr)
Pakistan	’06–12(7yr)	’07–’13(7yr)	Peru	’10–’11(2yr)	’12–’13(2yr)
Costa Rica	’08–’10(3yr)	’11–’13(3yr)	Australia	’14(1yr)	’15(1yr)
New Zealand	’02–’07(6yr)	’08–’13(6yr)			

Source: KITA (2015).

The Japanese treatment group is formed of 16 countries; Singapore is the first FTA country in 2002. The total period covers 24 years, including before and after the FTA conclusion year. The Chinese control group is made up of 21 countries, including those preparing FTA conclusions such as negotiations and joint research with China. The Japanese control group is made up of 41 countries that have never conducted an FTA conclusion with Japan (Table 2). The other trading partners exclude both groups, due to their trade frequency and volume, which do not equally include groups of countries. The control group of the after variable is applied for 2000–2013 to measure treatment group effects against control group effects, since the 2000 globalization activation.

Table 2. Groups and FTA State

Group · FTA State	China	Japan
Treatment Group		
FTA Conclusion	Hong Kong·Macau, Taiwan, Chile, ASEAN, Peru, Pakistan, Costa Rica, New Zealand (17 counties)	ASEAN, Mexico, Chile, Switzerlan d, India, Peru, Australia (16 countries)
Control Group		
Agreement, Negotiation	Korea, Japan, GCC, Australia, Norway, Iceland, SACU, Switzerland (16 countries)	Colombia, GCC, Mongolia, Canad a, Korea, China (11 countries)
Prepare for Negotiation, Research	MERCOSUR, India (5 countries)	EU, TPP, New Zealand, Taiwan, U SA, Korea (30 countries)

Source: KITA (2015).

Eventually, we use the panel gravity equation with the DD and the DDD methods, as shown below. Equations (4) and (5) indicate Chinese FTA effects and Japanese FTA effects. Equations (6) and (7) provide the DDD method by using pooling panel data set. Those equations present the log value and thus refer to the dependent variable effect in which the elastic coefficients are reflected by a 1% rate of change in the explanatory variable.

$$\ln trade_{ijt} = \beta_0 + \beta_1 \ln[Y_{it} * Y_{jt}] + \beta_2 \ln\left[\left(\frac{Y}{P}\right)_{it} * \left(\frac{Y}{P}\right)_{jt}\right] + \beta_3 lndis_{ij} + \beta_4 lnrate_{it} + \beta_5 afta_j + \beta_6 after_t + \beta_7 fta_j * after_t + \mu_{ij} + \varepsilon_{ijt} \qquad (4), (5)$$

Where the trade variable is affected by the country's economy size and purchasing power as presenting the GDP and per GDP figures. $Y_{it} * Y_{jt}$ is the multiplication of real GDP China or Japan (i) and trading partner j at time t. $\left(\frac{Y}{P}\right)_{it} * \left(\frac{Y}{P}\right)_{jt}$ is the multiplication of capital per GDP China or Japan (i) and trading partner j at time t. P_{ijt} is the population of China or Japan (i) and trading partner j at time t. $rate_{it}$ is the exchange rate of yuan (元) or yen (￥) against dollar at time t. The distance variable indicates the cost of delivery, accessibility of market and cultural difference of trading partners. The exchange rate variable can account for the difference between Chinese and Japanese features as part of the trade pattern. fta_j denotes the dummy variable for which treatment group (FTA conclusion country) is 1, control group is 0. $after_t$ is dummy variable for which trading partner j is 1 after FTA conclusion, otherwise 0 at time t. $fta_j * after_t$ is interaction variable for which between treatment group and after FTA conclusion with China or Japan is 1, otherwise 0. Where $fta_j * after_t$ variable presents the effect of China's and Japan's FTA in equations (4) and (5). μ_{ij} denotes the constant or random variable from the panel data error term and ε_{ijt} is the original error terms.

$$\ln trade_{ijt} = \gamma_0 + \gamma_1 \ln[Y_{it} * Y_{jt}] + \gamma_2 \ln\left[\left(\frac{Y}{P}\right)_{it} * \left(\frac{Y}{P}\right)_{jt}\right] + \gamma_3 lndis_{ij}$$
$$+\gamma_4 lnrate_{it} + \gamma_5 fta_j + \gamma_6 after_t + \gamma_7 country_i + \gamma_8 fta_j * after_t + \gamma_9 fta_j * country_i$$
$$+\gamma_{10} after_t * country_i + \gamma_{11} fta_j * after_t * country_i + \mu_{ij} + \varepsilon_{ijt} \qquad (6), (7)$$

Where $country_i$ variable is a dummy variable that indicates the country j's trading partner is China or Japan. $fta_j * country_i$ is an interaction variable that denotes the FTA conclusion country (treatment group) with China is 1, the control group or FTA conclusion with Japan is 0 in equation (6). The FTA conclusion country with Japan is 1 or otherwise 0 in equation (7). $after_t * country_i$ variable indicates the period of FTA conclusion with China and is equal to 1, before FTA conclusion or with Japan is 0 in equation (6). It presents a reverse meaning in equation (7). $fta_j * after_t * country_i$ is an interaction variable for treatment group after the FTA conclusion with China in equation (6). It is the control group before FTA conclusion or FTA conclusion with Japan. However, the treatment group after FTA conclusion with Japan is 1 in equation (7). When we pool all the panel data, we can explain each effect of Chinese FTA and Japanese FTA as controlling the country option in equations (6) and (7).

According to basic gravity theory, this study result will be predicted that the coefficient of the GDP variable and capital per GDP variable has a positive impact on the trade variable. Meanwhile, the distance variable's coefficient has a negative impact on the trade variable. The coefficient of the exchange rate variable indicates the ratio of export and import in total trade volume. If it shows a signal of β_4 as positive, this means the proportion of import is more than export; otherwise, a negative result means that the export portion is more than import in total trade volume. The result is predicted with the signal of the $fta_j * after_t$ variable's coefficient, which means both China's and Japan's FTA effects are positive. Due to the treatment group, trade volume shows as greater than the control group. The $fta_j * after_t * country_i$ variable's coefficient indicates the difference between China FTA and Japan FTA.

4. The Data and the Result

4.1. Data Structure

We try to contract the yearly panel data for 96 countries' export and import figures, their real GDP, capital per GDP, distance, and exchange rate against the US dollar in 1990–2013.

We use as a dependent variable the Japanese and Chinese trade volume from the Korea International Trade Association (KITA) for trade statistics. The explanatory variables include the real GDP, capital per GDP, and population of each country, according to the World Bank's World Development Indicators (WDI) and IMF's World Economic Outlook (WEO) through 2005 holding constant the US dollar. We also use the distance data from previous literature at Rose's website (2004). The exchange rate variable is from the Bank of Korea showing the yearly rates of the yuan and yen against the US dollar.

Table 3 and Table 4 report the description of the panel data. If some data were not retrievable from those sources, it was handled the missing value to confirm the strongly balanced panel data set. Table 3 reports the description of data for treatment groups and Table 4 displays the description of data for control groups. Noting the difference of the two groups in China, we see the treatment group has higher values of trade is more than that of the control group. However, the mean of real GDP is more than the treatment group's. In Japan, the control groups of GDP and capital per GDP are greater and the distance variable is longer than the treatment group's. Moreover, between the Chinese treatment group and Japanese treatment group for the distance variable, the FTA country's distance from China is shorter than Japan's.

Table 3. Descriptive Data for Treatment Group

Variable	Mean	Std. Dev.	Min	Max	Obs
China					
lntrade	22.06879	2.345764	11.11345	26.79642	336
lnrealgdp	44.33381	11.76832	24.99014	60.73673	336
lnpcgdp	41.96224	7.343812	33.40281	56.05057	336
lndis	7.897725	0.8478225	6.89949	9.39301	340
lnrate(元/$)	2.040472	0.1085066	1.816452	2.152924	340
Japan					
lntrade	19.9516	1.99975	13.95331	22.62776	384
lngdp	24.85341	2.419362	6.733402	28.00859	373
lnpcgdp	8.083386	1.643915	5.488037	10.92193	343
lndis	8.221843	0.5311271	7.53477	9.27785	384
lnrate(￥/$)	4.686368	0.1435266	4.378771	4.901862	384

Table 4. Descriptive Data for Control Group

Variable	Mean	Std. Dev.	Min	Max	Obs
China					
lntrade	21.33448	2.594216	14.66539	26.5572	424
lngdp	51.37503	5.724604	35.08443	58.40929	438
lnpcgdp	41.40556	7.610486	33.55872	58.40929	437
lndis	8.402441	0.5829425	7.13934	9.33486	440
lnrate(元/$)	2.040472	0.1084703	1.816452	2.152924	440
Japan					
lntrade	19.29589	2.310115	9.823903	24.13393	972
lngdp	25.67152	1.871134	21.11705	30.30507	965
lnpcgdp	9.585146	1.134142	5.628903	11.38187	886
lndis	8.480053	0.489922	6.3736	9.11038	984
lnrate(￥/$)	4.686368	0.1433866	4.378771	4.901862	984

4.2. The Results

We combine the panel data set that includes time series data from 1990 to 2013. Thus, we conduct the panel unit root test and panel cointegration test to confirm the stationary panel variable. In Table 5, almost all panel variables are rejected with the null hypothesis, because they have a unit root excluding the Chinese exchange rate variable. This yields that the panel variables are stationary in this panel model.

Table 5. Panel Unit Root Test

Variable	Fisher-ADF			Fisher-PP		
	lags(0)	lags(1)	lags(2)	lags(0)	lags(1)	lags(2)
China						
lntrade	253.2145 (0.0000)***	298.6953 (0.0000)***	249.9972 (0.0000)***	132.6030 (0.0001)***	138.8982 (0.0000)***	149.9174 (0.0000)***
lnGDP	179.9246 (0.0000)***	196.9325 (0.0000)***	226.6433 (0.0000)***	6.6287 (1.0000)	6.6484 (1.0000)	5.5043 (1.0000)
lnpcGDP	212.0409 (0.0000)	166.0430 (1.0000)	179.9794 (0.0000)***	98.3545 (0.0596)*	101.1203 (0.0403)**	100.4218 (0.0446)**
lnrate	5.9912 (1.0000)	20.6079 (1.0000)	23.6903 (1.0000)	0.1888 (1.0000)	1.9788 (1.0000)	2.0728 (1.0000)
Japan						
lntrade	454.6389 (0.0000)***	302.3833 (0.0000)***	262.1920 (0.0000)***	322.1156 (0.0000)***	313.6340 (0.0000)***	306.8518 (0.0000)***
lnGDP	1813.5629 (0.0000)***	338.9105 (0.0000)***	188.6426 (0.0000)***	2475.3815 (0.0000)***	2147.0317 (0.0000)***	2006.7556 (0.0000)***
lnpcGDP	284.7520 (0.0000)***	328.0250 (0.0000)***	228.0341 (0.0000)***	158.3232 (0.0038)***	160.2874 (0.0028)***	171.9617 (0.0004)***
lnrate	422.8241 (0.0000)***	637.8990 (0.0000)***	426.6435 (0.0000)***	158.6251 (0.0037)***	180.1582 (0.0001)***	178.6361 (0.0001)***

Notes: 1. The results conclude drift term, except trend time.
2. P-values are in parenthesis: $*p < 0.1$, $** p < 0.05$, $*** p < 0.01$.

Table 6. Panel Cointegration Test

Variable	*lntrade*(China)		*lntrade*(Japan)	
	trace-st	max-st	trace-st	max-st
lnGDP	45.479 (0.0000)***	28.866 (0.0001)***	45.479 (0.0000)***	28.866 (0.0001)***
lnpcGDP	45.425 (0.0000)***	30.486 (0.0001)***	45.425 (0.0000)***	30.486 (0.0001)***
lnrate	201.551 (0.0001)***	179.224 (0.0001)***	201.551 (0.0001)***	179.224 (0.0001)***

Note: P-values are in parenthesis: $*p < 0.1$, $** p < 0.05$, $*** p < 0.01$.

However, the panel variable that has a unit root could transfer to a stable variable through the lag process. Its process let those variables lose their own information. Hence, we conduct the panel cointegration test; Table 6 shows the result. The result is rejected that dependent variables and explanatory variables do not have a cointegration relationship. As a result of the panel cointegration test, we can distinguish that panel variables are stationary. Additionally, we estimate the panel GLS model to control heteroscedasticity of the error term. According to the result of the likelihood ratio (LR) test, the error term is not homoscedastic at a significance level of 1%. Thus, we use the panel GLS model in this study.

First, Table 7 reports the result of equations (4) and (5) regarding China and Japan FTA effects, against non-FTA conclusion with China and Japan. The GDP variable's coefficients are –0.013 and 0.689, reflecting a Chinese trade decrease of 0.01% and Japanese trade increase of 0.69%, whereas China, Japan, and their trading partners' GDPs increased by 1%. This result indicates that GDP is greater, and the Chinese trade volume is less, but the Japanese trade volume is also greater in equations (4) and (5). The Chinese trading partners are East Asian countries with abundant natural resources, which is why their results are not related to their GDP.

Second, the capital per GDP's coefficient indicates that the market size and purchasing power are 0.093 and 0.327, respectively, at a significance level of 1%. Chinese trade volume increased by 0.1% and Japanese trade volume increased by 0.33% when their trading partners' capital per GDP increased by 1%. Comparing Chinese and Japanese trade volume, it is clear in equations (4) and (5) that Japanese trade is more affected by capital per GDP than is Chinese trade.

Table 7. Results

Variable	(4)		(5)		(6)		(7)	
	GLS	**OLS**	**GLS**	**OLS**	**GLS**	**OLS**	**GLS**	**OLS**
lnGDP	−0.013 (3.46)***	−0.006 (0.70)	0.689 (69.91)***	0.658 (31.16)***	0.040 (7.04)***	0.052 (6.23)***	0.043 (6.15)***	0.042 (5.10)***
lnpcGDP	0.093 (16.69)***	0.078 (7.37)***	0.327 (15.76)***	0.396 (11.31)***	0.060 (10.82)***	0.064 (6.30)***	0.075 (11.71)***	0.076 (7.43)***
lndis	−0.867 (16.68)***	−0.657 (6.16)***	−1.531 (20.03)***	−1.597 (17.05)***	−0.977 (20.28)***	−0.709 (8.94)***	−1.083 (22.50)***	−0.796 (10.09)***
lnrate	−8.239 (20.09)***	−7.827 (9.60)***	0.826 (8.18)***	1.170 (3.96)***	0.380 (5.95)***	0.558 (4.25)***	0.435 (5.86)***	0.497 (3.75)***
fta*after	0.321 (2.74)***	0.459 (1.89)*	0.796 (8.12)***	1.267 (7.24)***				
fta*after* country					1.673 (14.36)**	1.677 (7.73)***	1.193 (9.76)***	1.085 (4.55)***
Cons	42.469 (40.91)***	6.994 (4.20)***	7.919 (10.37)***	6.994 (4.20)***	24.454 (45.61)***	20.930 (21.55)***	24.854 (41.27)***	22.003 (22.81)***
Obs	753	753	1,319	1,319	2,072	2,072	2,072	2,072
Id	39	39	57	57	96	96	96	96
R^2		0.27		0.54		0.27		0.26
LR (likelihood ratio) (p-value)	1457.23 (0.0000)		4599.39 (0.0000)		3585.02 (0.0000)		2554.49 (0.0000)	

Note : T-values or Z-values are in parenthesis: *$p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Third, the distance variable's coefficients are -0.867 and -1.531, which shows the assumption of the gravity theory. In this model, distance has a negative impact on trade volume. This result indicates that Japanese trading partners are closer than are Chinese trading partners**.**

Fourth, the coefficient of the exchange rate variable is –8.239 in equation (4) and 0.826 in equation (5). It tends to the export/import ratio in total Chinese and Japanese trade volume. It indicates that Chinese export ratio is greater than its import ratio, and Japanese import ratio is greater than its export ratio. It addresses each country's trading feature that depends on export in China and the structure of reimport in Japan. When the yuan is higher against the US dollar Chinese trade volume decreases by 8.2%. Japanese trade volume increases by 0.83% when the yen is higher. Considering the increasing amount of export and import, Chinese trade is more sensitive than Japanese trade to the exchange rate.

Fifth, according to the results of applying the DD method to the fta*after variables' coefficient, the FTA effects in China and Japan are 0.321 and 0.796, respectively, at a significance level of 1% in equations (4) and (5). It shows that both countries have a positive FTA effect of 0.32% and 0.8%, respectively, when we compare FTA conclusions to preparing FTAs. Moreover, the Japanese promotion effect is higher than the Chinese when it refers to the value of the coefficient. Although the Japanese treatment group is smaller than the Chinese treatment group in scale and has a restricted tariff cut, the FTA effect has a positive impact on Japanese trade. It can have implications for Japanese FTA progress and trade policy.

Lastly, equation (6) uses the pooled panel data set and controls Chinese trading partners' data in a panel GLS model. The result of equation (6) shows that GDP and capital per GDP variables have positive effects on trade, whereas the distance variable has a negative effect, like that shown in a basic gravity theory. This fta*after*country variable, which considers Chinese FTA against Japanese FTA, has a coefficient of 1.673 at a significance level of 1%. This explains how Chinese FTA conclusions have a 1.67% greater promotion trade effect than Japanese FTA conclusions. On the contrary, the fta*after*country variable's coefficient is 1.193 at a significance level of 1% in equation (7). When we control the Japanese trading partners, Japanese FTA conclusions have a positive effect on trade by 1.19% greater than Chinese FTA conclusions.

Consequently, the Chinese FTA effect compared to the Japanese FTA has a 1.67% trade promotion effect, whereas the Japanese FTA effect as compared to the Chinese FTA has a 1.19% promotion effect. Although the FTA effects of China and Japan are both positive on trade, there is a difference between their effects. This result indicates that the Chinese government has been taking positive action to progress the FTA conclusion since joining the WTO. Japan joined the Economic Partnership Association (EPA) with restricted tariff cuts on the defensive, due to domestic issues regarding agricultural products. In other words, the difference in FTA effects between China and Japan is the government's active trade policy.

5. Conclusion

While South Korea has had simultaneous and global FTAs since 2004, China and Japan had similar number of FTA conclusions and mainly made FTA conclusions with Asian countries. We note the difference between Chinese and Japanese FTAs, then we suggest empirical research for China's and Japan's FTAs with 96 trading partners from 1990 to 2013 by using a panel GLS. The model is established the basic gravity theory with the DD method by dividing FTA conclusion countries and non-FTA conclusion countries with China and Japan. We try to measure the differences of Chinese and Japanese FTA effects through the DDD method. It conducts the panel unit root test and panel cointegration test to confirm the stationary of the panel data set. Finally, this model estimates the panel GLS result through the LR test, which is considered to hold a heteroscedasticity of error term.

According to the results, first, China's and Japan's GDP and capital per GDP provide a positive impact on the trade volume. The distance variable has a negative relationship with trade in China and Japan, as shown with gravity theory. Second, distance is more significant to Japan than China, more sensitive to Japanese trade. Third, we consider the exchange rate variables—yuan and yen against the US dollar—to control the countries' own trade propensity. The coefficients of exchange rate variable are shown with the opposite signs. This presents the ratio of exports and imports in total trade volumes in China and Japan. We find trading features which depend on exports in China and the structure of re-import in Japan. The variation of exchange rate is more significant to China than Japan. Fourth, as a result of the DD method, we address that the FTA conclusion countries have more positive trade effect in China and Japan than non-FTA conclusion countries. Even if China and Japan had FTA conclusions with a few countries, the results show a positive impact on trade in both countries. Lastly, the DDD method results found the Chinese FTA effect against the Japanese FTA has a 1.67% promotion effect, whereas the Japanese FTA effect against the Chinese FTA has a promotion effect of 1.19%. When we consider the country's differences, the Chinese FTA promotion effect is greater than Japanese FTA. This result indicates that the Chinese government has provided benefits due to taking action to proceed with the FTA conclusions since China joined the WTO in 2002. Japan, on the other hand, has joined the Economic Partnership Association (EPA) with restricted tariffs cut on the defensive due to its domestic issues regarding agricultural products.

A country's trade policy is immensely important and a factor of competitiveness. Until now, China and Japan have followed different FTA policies and actions. We argue that both countries' FTA effects have a positive relationship with trading partners. In this paper, the difference between the FTA policies of China and Japan were studied for the period between 1990 and 2013; however, when observed in the long term, it appears that a more important difference will emerge. Even more recently, the far-reaching impact of China's trade policies on the international economy—evidenced by worsening of trade disputes with the United States—is reaching alarming proportions that cannot be disregarded. Therefore, similar to the findings of Chiu (2019) as well as Angkinand and Chiu (2011), this study shows that a single country's FTA and trade policies are an important factor concerning not just the promotion of trade but also the issue of trade conflicts.

This result also involves a positive outlook for economic integration in East Asia. China and Japan are negotiating an FTA conclusion, and Japan joined the TPP in 2013. The Korea-China-Japan FTA has been in negotiation since 2013, and its FTA effects must be studied in depth. The economic integration of the FTA and forming economy blocs predict a positive effect on the economy, but some are worried about China and Japan's political and security issues. Specifically, Japanese domestic and agriculture industries are important issues, and the Chinese security issue is sensitive in East Asia. Therefore, both countries must find the measures for complementary cooperation. We will estimate the effect of China's and Japan's trade volume and offer research topics for the export and import effects of each industry and all commodities through FTA conclusions in China and Japan in the future.

References

Ahn, Young-Cheul (2013), "The Study on the Effect of the FTA between China and Korea on the Korea's Open Economy: The Dynamic CGE Model of Non-linear Simultaneous Equations", *Journal of Korea Trade*, 38(5), 1-25.

Ando, Mitsuya (2007), "Economic Effect of FTA/EPA: Ex post Evaluation", *Mita Business Review*, 50(5), 67-84.

Ando, Mitsuyo and Shujiro Urata (2011), *Impacts of the Japan-Mexico EPA on Bilateral Trade* (RIETI Discussion Paper Series, No. 11-E-020), Tokyo: The Research Institute of Economy,

Trade and Industry, 1-46.
Angkinand, P. A. and E. M. P. Chiu (2011), “Will Institutional Reform Enhance Bilateral Trade Flows? Analyses from Different Reform Aspects”, *Journal of Economic Policy Reform,* 14(3), 243-258.
Ao, Lin-Hong and Ru-Yu Zhao (2013), “Empirical Analysis on the Construction of China - Japan - Korea Free Trade Area”, *Northeast Asia Forum,* 73-81.
Baier, S. L. and J. H. Bergstrand (2005), *Do Free Trade Agreements Actually Increase Members’ International Trade*? (Working Paper, No. 2005-3), Atlanta, GA: Fedral Reserve Bank of Atlanta, 1-25.
Baier, S. L., J. H. Bergstrand and M. Feng (2014), Economic Integration Agreements and the Margins of International Trade”, *Journal of International Economics*, 93, 339-350.
Baier, S. L., Y. V. Yotov and T. Zylkim (2018), “On the Widely Differing Effects of Free Trade Agreements: Lessons from Twenty Years of Trade Intergration”, *Journal of International Economics,* 116, 206-226..
Baldwin, R. E. (2006), “Multilateralising Regionalism: Spaghetti Bowls as Building Blocs on the Path to Global Free Trade”, *The World Economy*, 29(11), 1451-1518.
Benedictis, L. D. and C. Vicarelli (2005), *Trade Potentials in Gravity Panel Data Models* (Working Paper, No. 44), Berkeley, CA: Topics in Economic Analysis & Policy, 11-14.
Bussière, J. F. and B. Schnatz (2008), “EU Enlargement and Trade Integration: Lessons from a Gravity Model”, *Review of Development Economics*, 12(3), 562-576.
Cheng, I-Hui and H. J. Wall (1999), “Controlling for Heterogeneity in Gravity Models of Trade and Integration”, *Federal reserve Bank of St. Louis Review*, 87(1), 49-63.
Cheong, In-Kyo (2001), *Korea·Japan FTA’s Economic Effects and Implications* (KIEP Working Paper, No. 1-4), Sejong, Korea: Korea Institute for International Economic Policy, 1-23.
Cheong, In-Kyo and Jung-Ran Cho (2008), “Development of Korea-China Trade and the Impact of Its Bilateral FTA on Korean Industry”, *International Area Studies Review*, 12(1), 349-374.
Cheong, In-Kyo and Jung-Ran Cho (2010), “Rules of Origin and Agricultural Trade Liberalization in Major Free Trade Agreements”, *Free Trade Agreements in the Asia Pacific World Scientific Publishing*, 1-28.
Chiu, E. M. P. (2019), “The Determinants of Trade on Conflict: Some Evidence from Emerging Market Economies”, *Thammasat Review*, 22(2), 36-49.
Choi, Bong-Ho (2005), “A Study on Analysis of Trade Pattern of Korea and Effect of Regional Economic Integration by Gravity Model: Using Panel Data Analysis”, *Journal of Industrial Economics and Business*, 18(3), 1035-1052.
Choi, In. (2001), “Unit Root Tests for Panel Data”, *Journal of International Money and Finance*, 20, 249-272.
Dong, Li-Fu, Ya-Heng Jiang and Shu-Qiang Bai (2014), “An Empirical Analysis of the Effects of Regional Trade Agreements on Trade Promotion”, *Forum of World Economics & Politics*, 4, 85-102.
Egger, P. and M. pfaffermayr (2003), “The Proper Panel Econometric Specification of the Gravity Equation: A Three-way Model with Bilateral Interaction Effects”, *Empirical Economics*, 28(3), 571-580.
Frankel, J. A. (1997), *Regional Trading Blocs in the World Economic System,* Washington, DC: Institute for International Economics, 115-148.
Gao, Xin-Cai and Mei Lan (2012), “Analysis on the Economic and Trade Relations of Zhongji Based on Gravity Model and Its Strategy”, *Social Sciences Review*, 38-41.
Garman, G. and D. Gilliard (1999), “Economic integration in the American: 1975-1992”, *The Journal of Applied Business Research*, 14(3), 1-12.
Glick, R. and A. K. Rose (2001), *Does a Currency Union Affect Trade? The Time Series Evidence*

(NBER Working Paper, No. 8396), Cambridge, MA: National Bureau of Economic Research, 1-15.

Ham, Shee-Chang (1997), “Trade Patterns of Korea’s Major Trading Partners: An Analysis Based on the Gravity Model”, *International Economic Journal*, 3(2), 199-230.

Harris, R. D. and E. Tzavalis (1999), “Inference for Unit Roots in Dynamic Panels Where the Time Dimension Is Fixed”, *Journal of Econometrics*, 91, 201-226.

Huang, Ye-Jin and Zhang Yu (2008), “An Empirical Analysis of the New Trend of China’s Foreign Trade: Based on Gravity Model”, *International Economics and Trade Research,* 2, 23-28.

Hummels, D. and J. A. Levinshon (1995), “Monopolistic Competition and International Trade: Reconsidering the Evidence”, *Quarterly Journal of Economic*, 110(3), 99-836.

Im, K. S., M. H. Pesaran and Yong-Cheol Shin (2003), “Testing for Unit Root in Heterogenous Panels”*, Journal of Econometrics*, 115, 53-74.

Jin, Huang-Gui (2004), “A Study on the Effect of Economic Cooperation between China, Japan and Korea: Using Gravity Model”, *Economic Science*, 113-120.

Jung, Taik-Hyun (2005), “Free Trade Agreements in East Asian Countries: What Has Been Done and What Needs to Be Done?”, *East Asian Economic Review*, 9(1), 3-28.

Kang, Da-Yeon and Young-Seo Jeon (2014a), “An Analysis on the Economic Effects of China FTA”, *International Area Studies Review*, 18(1), 141-172.

Kang, Da-Yeon and Young-Seo Jeon (2014b), “An Analysis on the Economic Effects of FTA on Korea’s Trade”, *Journal of International Trade and Industry Studies*, 19(3), 89-119.

Kang, Da-Yeon and Young-Seo Jeon (2014c), “A Study on the Effects of FTA on the Korea’s Exports”, *Journal of Korea Trade*, 39(5), 21-41.

Kang, Da-Yeon and Young-Seo Jeon (2014d), “A Study on the Economic Effects of FTAs by Korea and China”, *Developing Economy Review*, 20(2), 1-32.

Kang, Da-Yeon and Young-Seo Jeon (2015a), “An Empirical Analysis on the Effects of FTA in Japan”, *The Korean-Japanese Journal of Economics & Management Studies*, 67, 3-28.

Kang, Da-Yeon and Young-Seo Jeon (2015b), “A Comparative Analysis on the FTA Effects by Korea and Japan”, *International Economic Journal*, 21(3), 23-51.

Kim, Hyun-Jung (2013), “An Analysis on the EU’s FTA Strategy by Framework of Three-level Games Theory: Focus on the Korea-EU FTA, EU-ASEAN FTA and EU-Japan EPA”, *The Journal of International Relations*, 16(2), 138-157.

Kim, Jung-Uk (2006), “Japan’s FTA Policy and Economic Effect of FTA”, *Journal of International Commerce and Information*, 8(2), 249-274.

Kim, Wan-Joong (2005), “The Impacts of Regional Trade Blocs on Korea’s Trade: An Analysis Using Panel Gravity Model”, *International Economic Journal*, 11(2), 97-120.

Kim, Yang-Hee (2008), “An Analysis of the Characteristics of Japan’s Existing FTAs”, *Journal of Asia-Pacific Studies*, 15(1), 125-146.

Korea International Trade Association (2015), *FTA Conclusion*. Available from http://stat.kita.net (accessed May 30, 2015)

Kuang, Zeng-Jie (2015), “China·Japan·Korea FTA Trade Potential, Constraints and Strategy”, *International Business and Economics*, 26-39.

Lee, Hong-Bea (2004), “Changes in Japan’s Trade Policy and Implication for Japan-Korea FTA”, *The Korean-Japanese Journal of Economics & Management Studies*, 28, 1-23.

Levin A, C. F. Lin and C. S. Chu (2002), “Unit Root Tests in Panel Data: Asymptotic and Finite-Sample Properties”, *Journal of Econometrics*, 108, 1-24.

Lim, Jae-Kyu (2011), “The Economic Impacts of Free Trade Agreements in Korea”, *Journal of International Trade and Industry Studies*, 16(1), 63-102.

Maddala, G. S. and Shao-Wen Wu (1999), “A Comparative Study of Unit Root Tests with Panel Data and a New Simple Test”, *Oxford Bulletin of Economics and Statistics*, 61, 631-652.

Matyas, L. (1998), “The Gravity Model: Some Econometric Considerations”, *The World Economy*, 21, 397-401.

Meyer, B. D., W. K. Viscusi and D. L. Durbin (1995), “Workers’ Compensation and Injury Duration: Evidence from a Natural Experiment”, *The American Economic Review*, 85(3), 322-410.

Mitsuya, An-Do (2007), “Impacts of Japanese FTAs/EPAs: Preliminary Post Evaluation”, *The International Economy*, 11, 57-83.

Moon, Byung-Chul (2008), *Empirical Analysis of Trade Effects of FTAs: Focusing on Effects on Trade in Services* (Doctoral Dissertation), Seoul: Hanyang University, 23-50.

Park, Jae-Jin (2003), “Empirical Tests on Export Patterns of Korea, China and Japan Using Gravity Model”, *Journal of Economics Studies*, 21(1), 51-80.

Pedroni, P. (1996), “Fully Modified OLS for Heterogenous Cointegrated Panels and the Case of Purchasing Power Parity”, *Nonstationary Panels, Panel Cointegration and Dynamic Panels*, 15, 93-130.

Rose, A. K. (2004), *Distance Data*. Available from http://faculty.haas.berkeley.edu/arose/ (accessed July 30, 2018).

Sekizawa, Y. (2008), “Japan’s FTA Policy: Analysis of the Political Process”, *Tokyo University Institute of Social Science*, 26, 24-25.

Song, Back-Hoon (2010), “Sequential FTA: Korea’s FTAs with China and Japan”, *The Journal of the Korean Economy*, 28(4), 113-139.

Tamirisa, R. (1999), *Exchange and Capital Controls as Barriers to Trade* (IMF Staff Papers, No. WP/98/81), Washington, DC: International Monetary Fund, 69-88.

Wall, H. J. (1999), “Using the Gravity Model to Estimate the Costs of Protection”, *Federal Reserve Bank of St. Louise Review*, 81, 33-40.

Wall, H. J. (2000), *Gravity Model Specification and the Effect of Canada-US border* (Working Paper, No. 2000-024A), St. Louis, MO: Federal Reserve Bank of St. Louise Review, 1-22.

Wang, Kai (2007), “A Research on the Effect of China·Japan FTA”, *Asia-Pacific Economic Review*, 7-11.

Wooldridge, J. M. (2002), *Econometric Analysis on Cross Section and Panel Data*, Cambridge, MA: MIT Press, 130-132.

Wooldridge, J. M. (2007), *What’s New in Econometrics?: Difference in Differences Estimation* (NBER, Summer Institute), Cambridge, MA: National Bureau of Economic Research, 1-31.

Wooldridge, J. M. (2012), *Difference-in-Differences Estimation* (IFS Programme Evaluation for Policy Analysis), London: Institute for Fiscal Studies, 1-57.

Yeo, Ji-Na (2009), *China・Peru FTA Conclusion and Implication* (KEIP Working Paper, No. 2009-001), Sejong, Korea: Korea Institute for International Economic Policy, 1-6.

Yoon, Ki-Kwan and Sang-Gil Park (2005), “A Study on the Change of Industry and Trade Structure among Korea, China and Japan Resulting From FTA of the Three Countries”, *International Area Studies Review*, 9(3), 554-586.

Yoon, Sung-Wook (2010), “Korea-China FTA: Focusing on Korea’s Strategy”, *The Society of China Culture in Korea*, 29, 229-254.