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Analysis of the Impacts of South Korea's Political Relations on its Bilateral Trade: Focus on South Korea's Political and Trade Relations with China, Japan, Russia, and North Korea

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ANALYSIS OF THE IMPACTS OF SOUTH KOREA'S POLITICAL RELATIONS ON ITS BILATERAL TRADE

By

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An Abstract of the Thesis Presented
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Through all chapters, this thesis is finding answers to the following questions: Why are political relations and trade important to South Korea? What are current problems that South Korea confronts in political relations and trade? How are political relations of South Korea with the trading partners and North Korea? Does South Korea's political relations with the four countries have impacts on South Korea's bilateral trade with the countries? If it does, how does it affect South Korea's trade? In answering these questions, this thesis demonstrates how South Korea's political relations influence South Korea's bilateral trade as well as presents trade relationship between countries still follows political flags.

To find an academic basis of this topic and make discussion in depth, this thesis refers to previous research on this topic. This study introduces two bodies of literature that are closely relevant to this topic: (1) the argument that trade affects political relations; (2) the argument that political relations affect trade. In addition, this thesis seeks how previous research measures political relations between countries. Through an extensive literature review, this chapter finds that there is a lack of cases on the topic of South Korea, despite its

political and economic significance, and previous measures for political relations are not sophisticated enough to reflect flows of political relations between countries by relying on annual data and only certain types of political events. Thus, this study focuses on demonstrating the impacts of South Korea's political relations on its bilateral trade and measures political relations monthly, mirroring diverse political events between countries.

To show the impacts of political relations between countries on bilateral trade, this thesis selects four cases: South Korea – China, Japan, Russia, and North Korea. In selecting cases, this thesis chiefly approaches with two perspectives, economic and political perspectives. More specifically, this study considers how significantly a country affects South Korea both politically and economically as well as how the political and economic relations between South Korea and the country has altered. In revealing the importance and changes in political and economic relations between South Korea and a case country, trade and political events between them are considered. Although the U.S. is one of the most important economic and political partner to South Korea, the U.S. is excluded in this research. This is because the U.S. has always been the major market to South Korea since South Korea joined the world market as well as there are little variations in the political relationship between two countries, which makes hard to demonstrate that South Korea- US political relations can affect trade flows between the two countries.

As an empirical analysis, this research builds on two models, a vector auto-regression (VAR) model and a gravity model. The VAR model is a decent method to find the degree of the impact at different time periods, which meets one of the purposes of this study. As the most common and popular way to estimate relations between politics and trade, the gravity model assumes that the bilateral trade is proportional to the size of economy, personal

income and economic activity in both countries and, in reverse, it decreases with resistance such as physical distance between countries (Herge, Oneal and Russett, 2010; Du et al., 2017). Through this analysis, this study finds that South Korea's political relationship with China barely affects its bilateral trade with China. On the other hand, South Korea's political relations with Japan, Russia, and North Korea have certain impacts on its bilateral trade with the countries.

As a result, South Korea's political relations with China, Japan, Russia, and North Korea do affect South Korea's trade with these countries. However, the results are mixed, and it is difficult to make absolute statements about how political relations affect trade. The significance of political impacts on trade depends on the trading partner, and there are also differing results for imports and exports. In addition, the results reveal that the magnitude and duration of the impacts are also differentiated by trading partner. Consequently, South Korea's political relations with the four countries are reflected in South Korea's trade relations partially or entirely by trading partners, which means there could be other factors to affect South Korea's trade with the countries. Other potential factors include the importance of the foreign market in South Korea's exports and imports or specific features of South Korean industry. These variables could be important potential covariates along with political relations.

DEDICATION

This thesis is dedicated to my family and Seulki Ma.

ACKNOWLEDGEMENTS

First and foremost, I would like to express the deepest appreciation to my advisor Professor Kristin Vekasi, who guided this thesis with her brilliant knowledge on IPE and outstanding research skills as well as continually encouraged me not to give up in the middle of the long journey for this thesis. Without her constant support and help, this thesis would not be able to come out to the world. I will remember all your contributions to this thesis and enthusiasm for your work and teaching students forever. Thank you so much.

I also would like to thank my amazing committee members, Professor Seth Singleton who helped me to think about the topic of this thesis in depth with diverse perspectives, and Professor Muhammad Asif Nawaz who provided one of the core ideas to measure political relations. I learned deeply how to look at the world with diverse angles in political science and it was meaningful enough for me to broaden my perspective as well as insight to see the world.

In addition, a thank you to Professor Youngmi Choi who led me to study abroad for my master's degree and motivated me to study IPE. The IPE class was her first teaching class as a professor as well as it was my first class in political science. Also, I send my thank you to Professor Won-Jae Lee and Professor Mansoo Ko who taught me the mind of cooperation with people by their actual attitudes. All of their lessons and supports became a wonderful prescription to overcome difficulties while I was studying here.

With expressing my thankfulness to my professors, I also would like to send a thank you to Peter Fandel who always welcomed me into his office and made my studying in SPIA possible, and a beautiful M&M couple, Mandy Barrington and Matthew Barrington who

saved my life thousands of times and always supported my work and decision. They helped me with their true worries and supports when I was in difficult situations. I was happy to know them here in Maine and hope to see them again someday in future.

While I am studying in SPIA, the only and most effective way that I could get off my stress from the study was to play soccer, and I truly enjoyed playing soccer with one of the best teams in my lifetime, Desert Wolves and Starks. In every season and every time, I was waiting for the game day and I was happy to see them on the filed regardless of results of the games. The four hypothetical online golden trophies would disappear in future, but the time I had with them will be forever in my memory.

On top of that, I especially thank one person, my lovely girlfriend Seulki Ma, who has been waiting for me for two years and has always believed in me. Without her perseverance and trust in me, this long distance relationship would not work. Whenever I was discouraged and frustrated, she was the one who made me smile again and sent me ceaseless encouragement with her love. There are many things that we missed while I studied here. I want to spend my time with her as much as I can when I return to South Korea and become a person whom she can rely on and continue to trust in her life. Thank you again for being the most precious person and I love you.

Last but not least, I thank my family and friends for their support and encouragement throughout this endeavor. Especially, I send my thankfulness to my parents and younger brother for their constant and unconditional support. Any words would not be enough to explain their devotion to me. I sincerely thank you for understanding me and always having trust in me.

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LIST OF ABBREVIATION

ADF	Augmented Dicky-Fuller
AIC	Akaike's information criterion
COPDAB	Conflict and Peace data bank
COW	Correlates of War
FDI	Foreign Direct Investment
GDELT	Global Data on Events, Location and Tones
GDP	Gross Domestic Product
IRF	Impulse Response Function
KITA	Korea International Trade Association
Korea Eximbank	Export-Import Bank of Korea
PRI	Political Relations Index
PRS	Political Relations Score
THADD	Terminal High Altitude Air Defense
UN	United Nations
UNGA	United Nations General Assembly
VAR	Vector Auto-Regression
WITS	World Integrated Trade Solution
WTO	World Trade Organization

CHAPTER 1

INTRODUCTION

In consideration of the importance of trade to South Korea, this thesis examines impacts of South Korea's political relations with China, Japan, Russia, and North Korea on its trade with these countries. Through all chapters, this thesis is finding answers to the following questions: Why are political relations and trade important to South Korea? What are current problems that South Korea confronts in political relations and trade? How are political relations of South Korea with the trading partners and North Korea? Does South Korea's political relations with the four countries have impacts on South Korea's bilateral trade with the countries? If it does, how does it affect South Korea's trade? In answering these questions, this thesis demonstrates how South Korea's political relations influence South Korea's bilateral trade as well as presents trade relationship between countries still follows political flags.

To show the impacts of political relations between countries on bilateral trade, this thesis selects four cases: South Korea – China, Japan, Russia, and North Korea. In selecting cases, this thesis chiefly approaches with two perspectives, economic and political perspectives. More specifically, this study considers how significantly a country affects South Korea both politically and economically as well as how the political and economic relations between South Korea and the country has altered. In revealing the importance and changes in political and economic relations between South Korea and a case country, trade and political events between them are considered. Although the U.S. is one of the most important economic and political partner to South Korea, the U.S. is excluded in this

research. This is because the U.S. has always been the major market to South Korea since South Korea joined the world market as well as there are little variations in the political relationship between two countries, which makes hard to demonstrate that South Korea- US political relations can affect trade flows between the two countries. This Chapter begins with the dilemma of South Korea between political situations and trade and provides general information about South Korea's trade and its political relations with the major trading partners and North Korea. Finally, it provides an overview of this thesis as well.

1.1. Political Relations and Trade of South Korea

Trade was a core strategy for South Korea's dramatically successful economic growth. After the Korean War in 1953, South Korea lost most of its basic infrastructure and industrial bases. During the first four month of the war, 70% of textile and chemical industries, 40% of agriculture industry, and 10% of rubber industry were destroyed as well as around 80% of power plants were damaged (Lee, 2001). The destruction in the industry and infrastructure brought about critical damage to the overall Korean economy in 1950s and early 1960s. South Korea's GDP per capita in the 1950s was under $1000 and its income per capita in the early 1960 was lower than those of Haiti, Ethiopia, and Yemen (Kim, 1991). Considering the devastated social condition and economy of South Korea, nobody expected that South Korea could be rebuilt socially and economically. However, South Korean turned over all the negative anticipation about its future through political leadership, the citizen's collective efforts, and diverse aid from international communities (Frieden, 2006). Above all things, South Korea's economic policy based on trade was the engine for the rapid economic growth after the war.

1.2. Dilemma of South Korea

1.2.1. Security Dilemma between North Korea and the U.S.

Despite long time passed after the Korean War, the political tension between South Korea and North Korea has been continued and the security issue is still crucial not only to the two Koreas, but also to all of the players involved with the Korean peninsula issue. To make the situations worse, since Kim Jong-Un became the supreme leader of North Korea in 2011, his regime has continued to threaten the security of South Korea and its allies by conducting the forceful missile and nuclear tests. Nevertheless, the new South Korean administration has not provided an effective diplomatic strategies to deal with North Korea's forceful actions. The South Korean government has presented a dialogue with North Korea as the prioritized foreign policy toward North Korea, but it has not made any substantial diplomatic outcomes as North Korea has not shown any amicable reactions to the suggestion.

To protect and reinforce the national security from North Korea's forceful threats, it is a necessary choice that South Korea sustains the military alliance with the U.S. Even if the current South Korean administration emphasizes a communication with North Korea, rather than a military actions, sustaining the military alliance with the U.S. is an unavoidable choice, considering that North Korea has not given up their missile and nuclear programs. The problems is that North Korea has regarded South Korea's choice as threats against their national security. North Korea's stance is that they cannot abandon the missile and nuclear program as the U.S. is threatening the national security of North Korea. The more North Korea makes forceful provocations, the more South Korea needs to consolidate the military alliance with the U.S., but when South Korea needs to establish closer military relationship with the U.S., North Korea raises more threats against the both countries.

1.2.2. Economic Retaliation from China

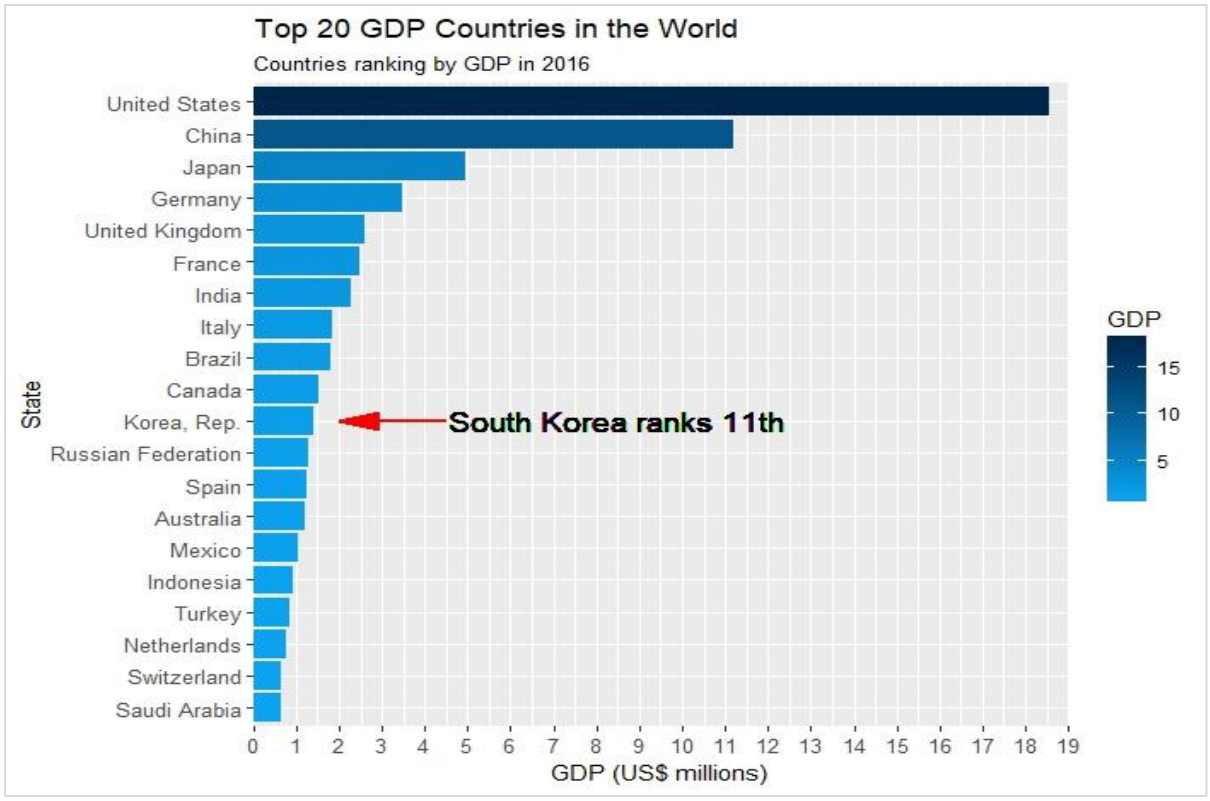
South Korea's reinforcing military alliance with the U.S. occurring disputes with China as well. Deploying the Terminal High Altitude Air Defense (THAAD) system on South Korea to prevent North Korea's missile attacks has brought about a strong dispute from the Chinese government. In the current circumstance that North Korea constantly treats the national security of South Korea and its allies, the decision to set up the THADD system could be a reasonable strategy to South Korea and even to the U.S. in order to protect each land from North Korea's missile attack. However, China heavily opposed South Korea to deploy the THAAD system. This is because the THAAD system is deployed by the U.S., therefore, Beijing claims that deploying the THAAD system "would be against China's security interests" by allowing the U.S. to monitor the main land of China through the radar of the missile system (Klingner, 2015).[1] As a result, China has used its economic stick to retaliate against South Korea after the decision to deploy THAAD. Even if the economic retaliation of China has been boycotting against South Korean companies in China and the Chinese government has not directly regulated bilateral trade with South Korea, the economic pressure has damaged South Korea's overall economy as well as must be a concern of South Korean government that has to care both enhancing the national security with the U.S. and promoting the economic ties with China.

[1] Klinger said that in spite of the incapability of THAAD intercepting the Chinese ballistic missile, the Chinese government opposes THAAD deployment in South Korea and even it has not fully "articulated" the reason of complaint.

1.3. Trade overview of South Korea

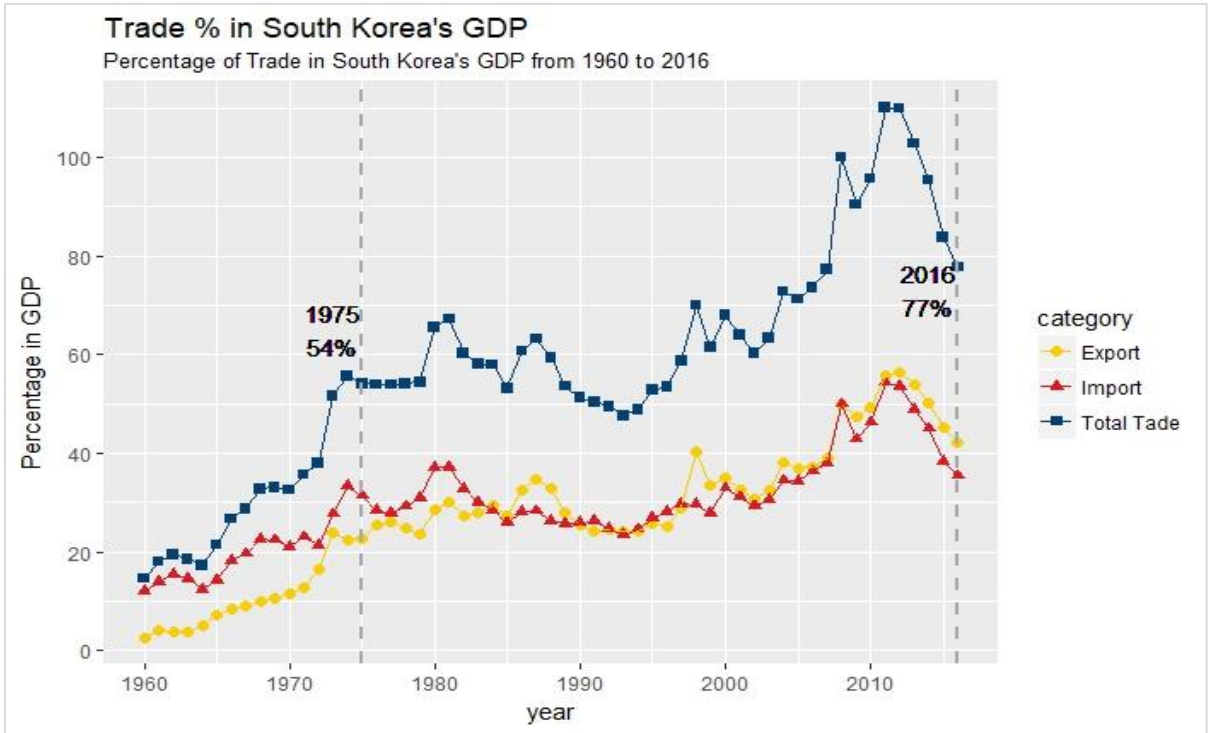
As stated earlier, trade was a necessary strategy in the South Korea's economic growth and it is still playing an important role in the South Korea's sustainable economic growth today. As Figure 1 indicates, South Korea's GDP is over US$ 1.4 million and it ranks the eleventh largest economy in the world.[2] Since South Korea joined the world economy, South Korea has had a high dependence on the world economy, which means a substantial share of South Korea's GDP has consisted of trade. As Figure 2 shows, trade was already 54% of South Korea's GDP in the middle of 1970s, and now, 77% of South Korea's GDP is comprised of trade.[3] South Korea recorded 901.6 US$ billions in 2016, and it made South Korea the seventh largest exporter and the eighth largest importer in the world.[4] As Figure 3 demonstrates, South Korea's top five exports are electrical machinery, motor vehicles & parts, industrial machinery, ships & boats, and oil & mineral fuels and its top five imports are oil & mineral fuels, electrical machinery, industrial machinery, precision instrument, and iron & steel in 2016.[5]

[2] Data for World Bank's GDP Rank is available at https://data.worldbank.org/data-catalog/GDP-ranking-table
[3] Trade (% GDP). The World Bank, available at https://data.worldbank.org/indicator/NE.TRD.GNFS.ZS?locations=KR
[4] 2016 Export and import of South Korea. Korea International Trader Association, available at http://stat.kita.net/stat/kts/sum/SumImpExpTotalList.screen; Export of goods and services. The World Bank, available at https://data.worldbank.org/indicator/NE.EXP.GNFS.CD; Import of good and services. The World Bank, available at https://data.worldbank.org/indicator/NE.IMP.GNFS.CD.
[5] South Korea: Trade Statistics. Global Edge, available at https://globaledge.msu.edu/countries/south-korea/tradestats



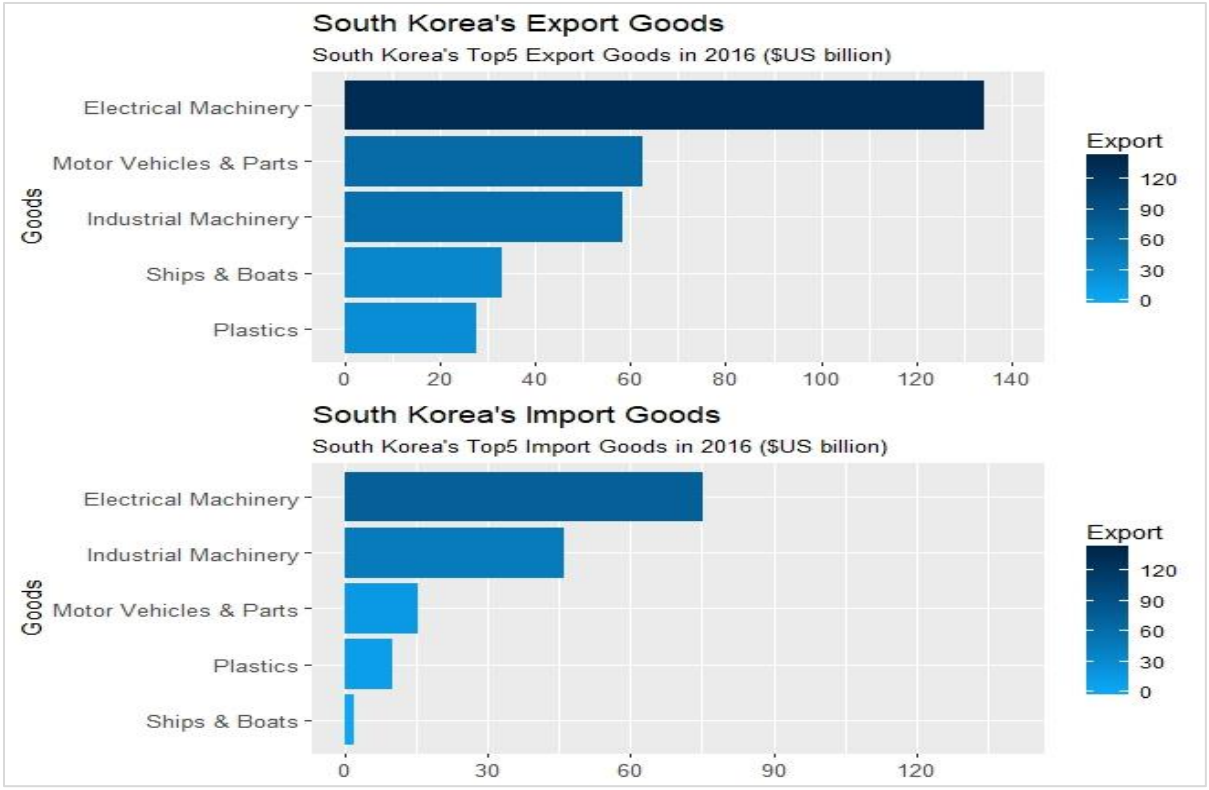
Source: World Bank (GDP Ranking, 2016)

Figure 1. GDP Ranking of South Korea in the world



Source: World Bank Trade (%GDP)

Figure 2. Percentage of trade in South Korea's total GDP from 1960 to 2016

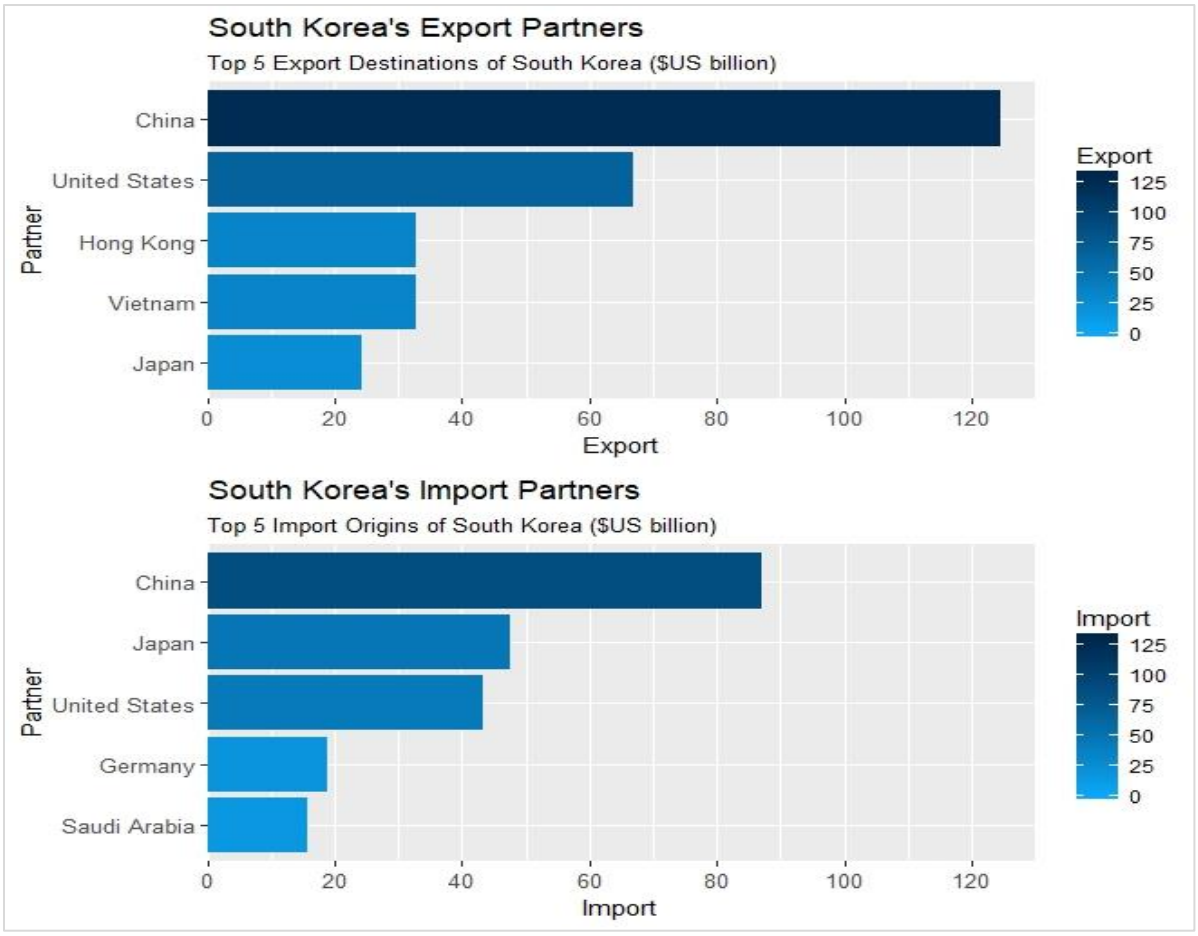


Source: Global EDGE (Trade statistics, South Korea)

Figure 3. South Korea's top 5 export and import goods

1.4. South Korea's Political and Trade relations: China, Japan, the U.S. and North Korea

From the time South Korea joined the world economy until now, the importance of political relations in trade is still evident. In South Korea's trade history, the political relations between South Korea and other countries have been taking a dominant role to encourage South Korea's bilateral trade with the countries. As Figure 4 presents, China, Japan and the U.S. are the top five trading partner of South Korea and considering that South Korea has had a deep and sophisticated historical background with the countries, South Korea's trade with the three countries would not be a discrete activity not associated with political relations with the countries.



Source: Global EDGE (Trade statistics, South Korea)

Figure 4. Top 5 export and import partners of South Korea

1.4.1. South Korea - China Relations

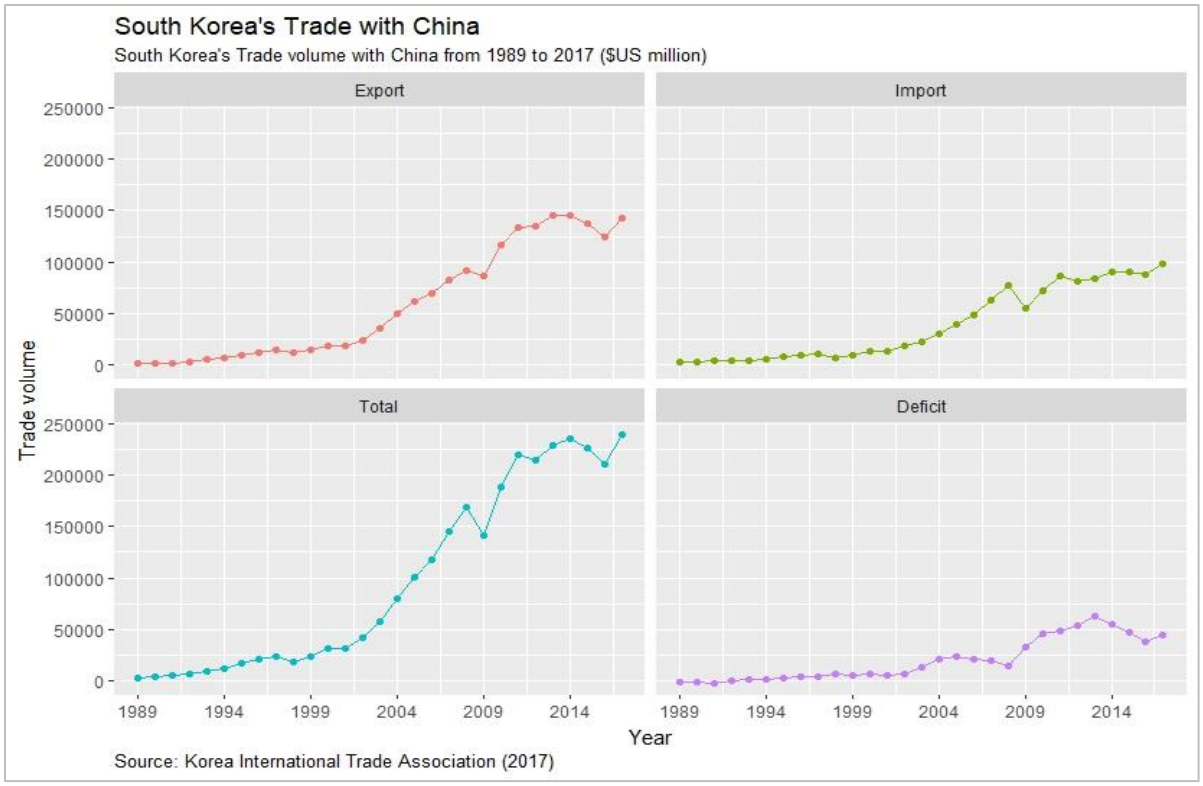
As one of the players who participated the Korean War by supporting North Korea militarily, the political relations between South Korea and China was unfriendly. Considering the shared history between the two countries, it is an undeniable fact that China greatly influenced South Korea, particularly in the politics and economy of South Korea. It would not be enough to express the relationship between South Korea and China in one word as the two countries have shared a long history, but recent relations between the two countries could be explained as “hot economics” but “cold politics” (Ye, 2016).

The frozen political relations between China and South Korea, which was worsened by China's intervention in the Korean War and during the Cold War, turned into cooperative in the early 1990s. It was not a dramatic incident, but from the early 1970s South Korea attempted to recover its relations with China. With the voice in South Korea that "any potential threat that China could pose" was declining in the 1980s (Chung, 2009), South Korea and China, along with the end of Cold War in the early of 1990s, agreed the diplomatic normalization in 1992.

In fact, after normalizing diplomatic relations, South Korea and China have had high levels of economic integration and it has deepened over time (Hwang and Lee, 2017). As Figure 5 shows, the bilateral trade between South Korea and China has increased by aournd 200 times in 30 years. Investment of South Korean companies to China also increased after the two countries normalizing diplomatic relations.[6] As Figure 6 indicates, the total number of investment by South Korean companies in China began increasing from the early 1990s and it was back to increase rapidly from 1999 until 2006.[7]

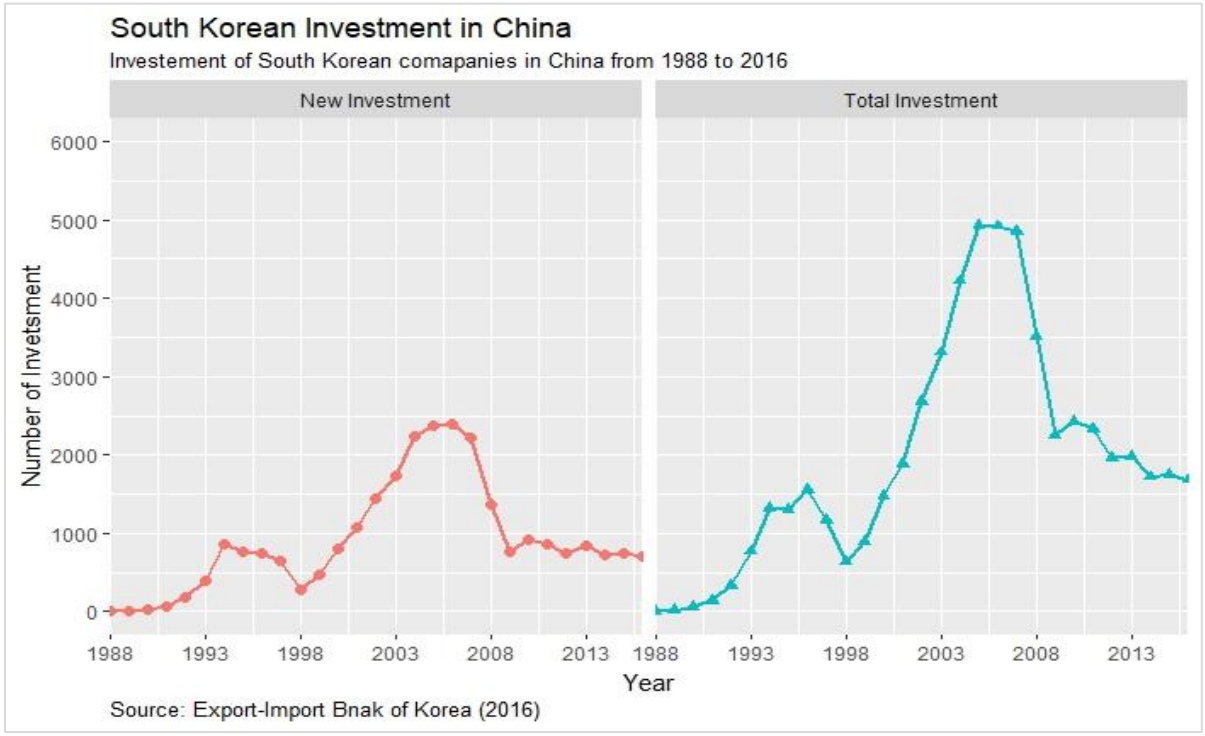
[6] Chung (2009) said that investment of South Korean companies in China was another pillar showing the close economic cooperation between the two countries. Chung, J.H. (2009), China's "Soft" Clash with South Korea: The History War and Beyond. Asian Survey, 49(3). 468-483

[7] The total number of investment decreased for a while between 1997-98 because of the financial crisis in South Korea. Since 2007, the trend of total number of investment has been decreasing. It is expected as the reasons that the labor wage and other cost for investment in China has become expensive and Vietnam is rising up as a new place to invest for Korean companies mainly due to its cheap labor wage.



Source: Korean International Trade Association (KITA, 2017)

Figure 5. South Korea's Trade with China



Source: The Export-Import Bank of Korea (2016)

Figure 6. Investment of South Korean companies in China from 1988 to 2016

Above all things, trade explicitly reflects the changed relations between South Korea and China. In 1993, right one year after the two countries' diplomatic normalization, China became the third-largest trading partner of South Korea,[8] and in 2004, China replaced the U.S. as the top trading partner of South Korea (Chung, 2009). As Table 1.1 indicates, China still has been the top trading partner of South Korea and South Korea also has been recording high ranks in the China's trade rank.

However, the current political relations between the two countries are not as favorable as the economic relations are. In particular, South Korea and China recently have been revealing different stances in handling the issue with North Korea's missile and nuclear tests and the South Korean government's decision for THAAD deployment in the territory has caused an economic retaliation from the Chinese government against South Korean companies in China.[9] Although, as stated earlier, the economic retaliation of China has not directly touch upon the bilateral trade with South Korea, it seems apparent that two countries tend to use economic relations as a tool to influence political relations.

[8] Data is from the Korea International Trade Association (KITA). Available at http://stat.kita.net/stat/kts/ctr/CtrTotalImpExpList.screen

[9] The Chinese economic retaliation was clearly revealed in the boycott against the Lotte company, which is the fifth-largest chaebol in South Korea. Lotte Group agreed to provide land to deploy THAAD system in February and the Chinese government began to put pressure on Lotte's business in China accordingly. "South Korea's Lotte Group offers golf course for THAAD missile deployment" April 22, 2017, South China Morning Post, retrieved from http://www.scmp.com/news/asia/east-asia/article/2074395/south-koreas-lotte-group-offers-golf-course-thaad-missile

Table 1.1: Trade Ranks of South Korea and China in each country

	Total Trade	Export	Import
China in South Korea Ranks	# 1	# 1	# 1
South Korea in China Ranks	# 4	# 4	# 1

Source: Data for South Korea trade ranks from Korea International Trader Association (KITA, 2016), Data for China trade ranks from World Integrated Trade Solution (WITS, 2016)

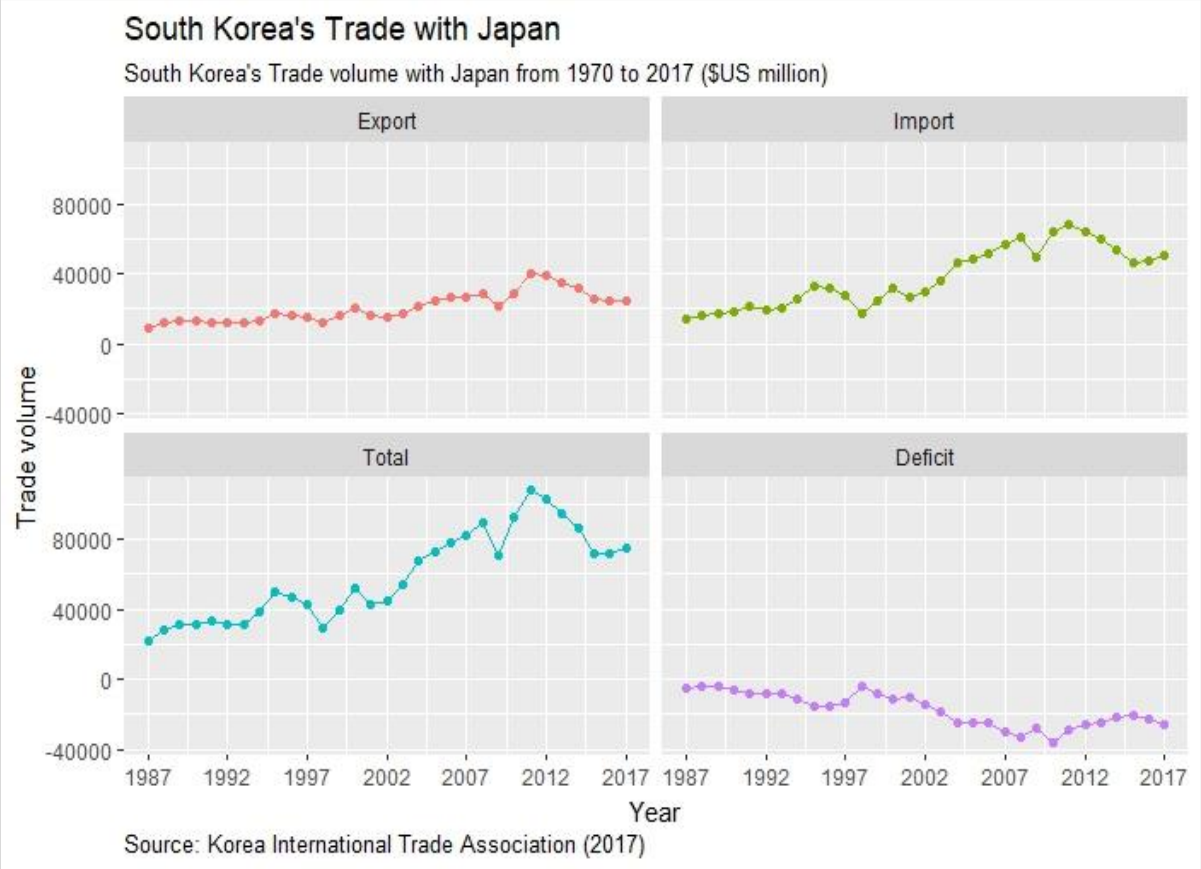
1.4.2. South Korea - Japan Relations

For the long history, the two countries have influenced each other by repeating conflicts and cooperation in political and economic relations. For example, while South Korea and Japan have sustained economic cooperation, the ownership conflict of the Dokdo/Takeshima Island, Japanese new history textbook issue, and the comfort women issue have been sensitive political disputes between the two countries. Even if South Korea and Japan normalized diplomatic relations in 1965,[10] the historical disputes have not been fully solved, but prolonged until the current administrations of the two countries.

While the political relations between South Korea and Japan have been cold in the unsolved disputes, economic relations between the two countries has been continued to make gradual progress. As Figure 7 shows, the bilateral trade flows between South Korea and Japan was drawing an uptrend until 2011, though the trade volume has been decreasing in the

[10] South Korea normalized diplomatic relations with Japan in 1965. Through the treaty, "Japan provided South Korea with a $300 million grant in economic aid and $200 million in loans with products and services" in exchange of South Korean government's renouncing "all the rights to request reparation and compensation" for property and claims. However, Japan provided the money with the reason of economic aid in South Korea, not with the reason of apology for their crimes during the colonization. Oda, S. (1967). The Normalization of Relations Japan and the Republic of Korea. The American Journal of International Law, 61(1), 35-56; Ishikida, M. Y. (2005). Toward Peace: War Responsibility, Postwar Compensation, and Peace Movement and Education in Japan. p 21.

recent few years.[11] Moreover, with South Korea's considerable economic progress, it became a significant export market for Japan taking 7.3% of total exports of Japan (Mukoyama, 2012). As Table 1.2 also shows, both countries are the third largest trading partners to each other, which indicates that South Korea and Japan have substantial impacts on one another's economies. Although South Korea has recorded a deficit in trade with Japan, the South Korean government has been trying to reduce the deficit through "the promotion of exporting to Japan by South Korean companies and efforts to attract Japanese companies" to purchase South Korean products more (Mukoyama, 2012).



Source: The Korea International Trader Association (KITA, 2017)

Figure 7. Trade Volume of South Korea with Japan

[11] The trade volume between South Korea and Japan, which was drawing a downtrend from 2012 to 2015, turned back to an uptrend since 2016.

While the former Park Geun-hye administration "refused to hold a bilateral summit with Prime Minister Shinzo Abe until the third year in the office," requiring "Abe's attitude change toward history" (Kang and Park, 2017), trade volume between the two countries for the three years decreased from US$ 94,691 million to US$ 71,431 million.[12] On the other hand, although the current Moon Jae-in administration keeps the critical stance on the historical and political issues, it is emphasizing "diplomatic, economic, and security cooperation" with Japan simultaneously (Kang and Park, 2017). With that policy stream, trade volume between South Korean and Japan has also turned back to an uptrend from the early 2017. It seems that South Korean government's foreign policy toward Japan substantially affect South Korea's bilateral trade with Japan. However, considering the impacts of Japan's economy on South Korea's market and industry, the impacts of political relations on trade in South Korea – Japan relations would be offset.

Table 1.2: Trade Ranks of South Korea and Japan in each country

	Total Trade	**Export**	**Import**
Japan in South Korea Ranks	# 3	# 5	# 2
South Korea in Japan Ranks	# 3	# 3	# 4

Source: Data for South Korea trade ranks from Korea International Trader Association (KITA, 2016), Data for Japan trade ranks from World Integrated Trade Solution (WITS, 2016)

[12] Trade data between South Korea and Japan is available at http://stat.kita.net/stat/kts/ctr/CtrTotalImpExpList.screen

1.4.3. South Korea – US Relations[13]

Since the Korean War, South Korea and the U.S. have sustained strong and reliable relations through the military and economic cooperation. South Korea signed the Mutual Defense Treaty with the U.S. in 1953 right after the Korean War so that US military could reside in South Korea, protecting the land from North Korea's additional invasion (Manyin et al., 2017). The treaty seemed one-sided advantages to South Korea, but the U.S. could obtain geopolitical advantages on the Korean peninsula by establishing a military alliance with South Korea as well.

Strengthening national security was the most essential and prioritized task to South Korea after the Korean War. Facing communist countries directly, South Korea had to enhance its national security as well as protect its ideology. It was also the U.S. that shared these concerns. Considering that it could severely damage U.S. power in Northeast Asia if South Korea became communist, South Korea was an important ally to provide geopolitical advantages and power in that region (Krieckhaus, 2017). As a result, the two countries chose the win-win game. The presence of US military in the South Korean territory gave the U.S. considerable geopolitical benefits in Northeast Asia politically and militarily, and in exchange for allowing the U.S. to have the geopolitical advantage, South Korea could consolidate the national security and be guaranteed a pathway to join the world market. The strategic relations between South Korea and the U.S. are still consolidated. Twenty-eight thousand, five hundred US military troops are residing in South Korea to defend its national

[13] Even if the South Korea - U.S. relations take a part in chapter1, the U.S. is not one of the cases in the empirical analysis of this study. The reasons is explained in chapter3.

security (Manyin et al., 2016), and it is functioning to protect the national security of the U.S. from North Korea's unpredicted attack.

Not only military cooperation, but also trade relations have also been sustained. As Table 1.3 indicates, the U.S. is the second and third largest in South Korea's exports destination and imports origin each. Given that South Korea records lower ranks in the U.S. trade ranks than the U.S. does in South Korea trade ranks, South Korea is more dependent on the US market than the U.S. is on the market of South Korea. However, considering South Korea's geographical importance in Northeast Asia and benefits that the U.S. acquires from the geopolitical advantages (Kim, 2009), the imbalanced trade would not impose significant damage on the alliance status between the two countries. As long as there exist certain benefits, the political and economic cooperation between South Korea and the U.S. will be sustained.

Table 1.3: Trade Ranks of South Korea and the U.S. in each country

	Total Trade	**Export**	**Import**
The U.S. in South Korea Ranks	# 2	# 2	# 3
South Korea in The U.S. Ranks	# 6	# 7	# 6

Source: Data for South Korea trade ranks from Korea International Trader Association (KITA, 2016), for the U.S. trade ranks from United States Census Bureau (2016).

1.4.4. South Korea – North Korea Relations

Since the end of the World War II in 1945, the Korean peninsula has been divided into North and South Korea by Soviet Union, communism and socialism, and the U.S., democracy and capitalism. This ideological division was enough to give rise to conflicts between the two Koreas and it finally caused the Korean War in 1950, which caused thousands of casualties and disastrous damages on industries and infrastructures. As big and

deep as the sore of the war between the two Koreas was, the Korean War solidified the division of the Korean peninsula. (Kim, 2009).

Conflicts and distrust between the two Koreas have continued after the Korean War until the recent era. For example, "31-man unit of heavily armed commandos" from North Korea, in 1968, intruded South Korea to assassinate South Korean president Park Chung-hee (Yoon, 2000). In 1996, a North Korean navy force submarine infiltrated on the east coast of South Korea to spy on naval installation in that area (Dies Jr, 2004) and in 2002, the Second Battle of Yeonpyeong island occurred on the west sea of South Korea, causing 24 casualties in South Korean navy force (Ryoo, 2009). In 2010, North Korea attacked again the Yeonpyeong island directly by firing "dozens of artillery shells" and it caused 36 casualties including 5 citizens residing on the island.[14] Recently, North Korea has developed mass-destructive missiles and nuclear weapons in the Kim Jong-Un regime, threatening the national security of the U.S. and its allies.

Nevertheless, South Korea has made constant efforts and engagements to improve the relations with North Korea for more than 40 years. Since the June 23 Declaration of Park Chung-hee administration in 1973[15], all the former administrations had foreign policies that

[14] "After North Korean Strike, South Korean leader threatens 'retaliation,'" November 24, 2010, CNN, retrieved from http://www.cnn.com/2010/WORLD/asiapcf/11/23/nkorea.skorea.military.fire/index.html?hpt=T1&iref=BN1; "N.K. artillery strikes S. Korean island," November 23, 2010, retrieved from http://www.koreaherald.com/view.php?ud=20101123001048

[15] On June 23 in 1973, Park Chung-hee announced the "Foreign Policy Statement for Peace and Unification" consisting of seven provisions. It underlines that the peaceful unification of Korean peninsula is a cooperative task of Korean people and both Koreas should continue to put efforts to achieve the unification of Korea. Also, it emphasizes that South Korea does not oppose North Korea to be a member of the United Nations. Tongilbu. (1999). *Tongilbu 30 Yeonsa*, 52-53, Available at http://contents.archives.go.kr/next/search/showDetailPopup.do?rc_code=1310377&rc_rfile_no=2000041003491&rc_ritem_no=000000000001#viewer

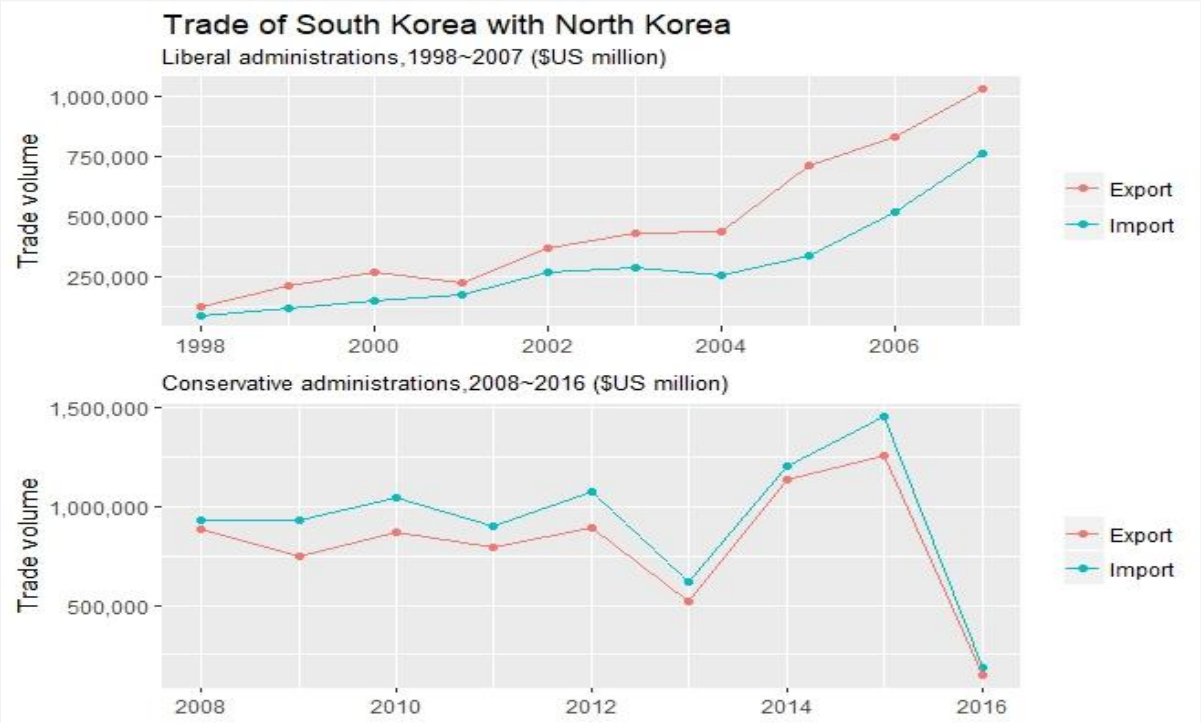
underscore “peaceful coexistence, reconciliation, and cooperation” with North Korea (Bae, 2010).[16] The constant efforts of the South Korean government could lead an actual improvement in the South – North relations in the Kim Dae-jung administration. Two leaders of each Korea finally could hold the first bilateral summit in 2000, and the Roh Moo-hyun administration also visited North Korea to have the second bilateral summit in 2007.

Unfortunately, the improved relations between South and North Korea was rapidly frozen right after the conservative party took the office in the Blue House from 2008 and 2015. During the Lee Myung-bak and Park Geun-hye administrations, the fundamental pillar of the foreign policy toward North Korea was not much switched from the policy of the former progressive administrations;[17] however, the major foreign policy of the conservative administrations, which emphasize the military alliance with the U.S., was making the South and North relations deteriorated. In addition, the death of Kim Jong-il in 2011 brought about a regime change in North Korea from Kim Jong-il regime to Kim Jong-un regime and it increased an uncertainty in the South – North relations. In fact, since Kim Jong-un was inaugurated as the supreme leader of North Korea, the relations and the national security of South Korea have been aggravated much more than before by his reckless military provocation.

As South and North Korea have experienced the upheavals, the two Koreas’ economic relations also have repeated the same pattern back and forth. Furthermore, South Korea’s trade with North Korea seems apparently follows political flags. As Figure 8 shows,

[16] The Korean National Community Unification Formula of Roh Tae-woo and Kim Young-sam administrations, Kim Dae-jung administration’s Sunshine policy, and Roh Moo-hyun administration’s Peace and Prosperity Policy are included in the case.
[17] “Mutual Benefits and Common Prosperity Policy” of Lee Myung-bak, see Bae 2010; “*Trustpolitik*” which emphasizes the process of trust-building on the Korean peninsula, see Moon & Boo 2015.

it has different flows by the political flags of the South Korean administrations. This political impacts on trade between the two Korea reveal drastically in the case of Kaesong Industrial Complex. It was established in 2004 for the purpose of economic cooperation between the two Koreas, but it has not been functioning for its purpose, being easily affected by political tensions arising between the South and North.[18] Currently, two Korea's economic exchanges have been stopped since April 2016 with the close of Kaesong Industrial Complex, in response to the nuclear and ballistic missile tests of North Korea in January and February 2016.[19] It seems that the political tension and economic disharmony between two Koreas have not been relieved, rather it has been aggravated.



Source: The Korea International Trader Association (KITA, 2017)

Figure 8. Trade Volume of South Korea with North Korea by Administrations

[18] After North Korea conducted a nuclear test in February 2013, the Kaesong industry was closed for 6 months, and Since March 2016, the industrial zone has been shut down in response for North Korea's nuclear and ballistic missile test in January and February 2016.

[19] "Trade with N. Korea Falls to Near-Zero" May 13, 2016, Chousnilbo, retrieved from http://english.chosun.com/site/data/html_dir/2016/05/13/2016051301098.html

1.5. Outline of the Thesis

Throughout the chapter, this thesis examines the impacts of South Korea's political relations with China, Japan, Russia, and North Korea on its bilateral trade with the four countries and addresses that trade still follows political flags. The second chapter finds academic backgrounds of this topic from the previous research. Even though much research has contributed to finding relationship between politics and trade, there still remains debates among scholars on this field between whether trade affects political relations or political relations have more significant impacts on trade (Kastner, 2007; Lee and Pyun, 2016). Thus, this chapter introduces relevant bodies of literature that deals with relationship between politics and trade and finds how these literatures approach the issue. Also, this study looks at how previous research measures political relations between countries as political relations are one of the most crucial variables in this empirical study.

The third chapter establishes the hypothesis of this thesis and tests them by using certain statistical models. This chapter notes that how political relations are measured in this study and what variables are considered to estimate the effects of political relations on trade. With providing reason for choosing variables and models, this chapter finds that South Korea's political relations with China, Japan, Russia, and North Korea have effects on South Korea's bilateral trade with the countries.

Following the empirical analysis in the third chapter, the fourth chapter interprets the results of the analysis. Specifically, this chapter states that what the empirical results imply in South Korea's political relations and trade with the four countries and why the results are reasonable to reflect the reality of political and trade situations of South Korea. This chapter considers both the political perspective and economic perspective in interpreting the results,

and explains how these two perspectives affect each other in South Korea's political economy.

Finally, the last chapter concludes with contribution of this thesis to existing research on this field as well as South Korea's foreign and trade policy toward the four countries. This thesis shows that South Korea's political relations affect bilateral trade with the countries, but it does not mean the effects are absolute. In other words, the significance of political relations on bilateral trade appear differently by countries and the magnitude and duration of the impacts also are not identical case by case. This chapter also provides some questions unresolved and shortcomings of this study and suggests future tasks.

CHAPTER 2

PREVIOUS LITERATURE: POLITICAL RELATIONS AND TRADE AND HOW TO MEASURE POLITICAL RELATIONS

The relationship between political relations and trade has been dealt with in many studies. Despite robust research, there is still a debate among scholars between whether trade affects political relations or political relations have more significant impacts on trade (Kastner, 2007; Lee and Pyun, 2016). Thus, this chapter introduces two bodies of literature that are closely relevant to this topic: (1) the argument that trade affects political relations; (2) the argument that political relations affect trade. Through an extensive literature review, this chapter finds that there is a lack of cases on the topic of South Korea, despite its political and economic significance. Therefore, this study focuses on demonstrating the impacts of South Korea's political relations on its trade with China, Japan, Russia, and North Korea.

While trade data is objective and easily quantifiable, measuring political relations between countries is not as simple (Davis, Fuchs and Johnson, 2017; Du et al., 2017). Despite how difficult it is, a lot of research has contributed to measuring political relations. This chapter shows three approaches to measuring political relations based on (1) negative aspects between countries, such as military conflicts or diplomatic disputes; (2) the United Nations General Assembly (UNGA) voting data; (3) political events data. Referring to the method of previous research, this study attempts to measure South Korea's political relations with four countries by using the political event data and the UNGA voting data. In addition, this study uses both yearly and monthly-based data in measuring South Korea's political relations.

2.1. Political relations and Trade

There have been numerous research studies dealing with the relationship between political relations and trade. While there has yet to be a consensus on the links between politics and trade, many scholars have contributed an extensive amount of literature on the topic. This chapter introduces two bodies of literature which are closely relevant to this topic: (1) the argument that trade has impacts on political relations; (2) the argument that political relations affect trade. Despite robust research, there is still a debate among scholars on which factor has prior and significant impacts between political relations and trade (Kastner, 2007; Lee and Pyun, 2016). Prior to conducting an empirical analysis, looking at relevant previous research on this field ishelpful to progress this study further by providing meaningful context.

The first body of work on this topic that is important to consider is about the influence of trade on political relations. In particular, this school argues that trade between countries contributes to peace between them (Polachek, 1980; Gasiorowski and Polachek, 1982; Hegre, Oneal and Russett, 2010; Lee and Pyun, 2016). In earlier studies, Arad and Hirsch (1981) provide theoretical foundation that economic cooperation through trade can force an imporvement in political relations between "belligerent" countries and derive economic advantages. Polachek (1980), in his empirical research, also notes that "the more essential and strategic the trade, the greater the deterrent effect of trade on conflict" and finds "a doubling of trade between two countries" brings about "20% of diminution of hostility" between them. Oneal and Russet (1999) and Herge, Oneal, and Russet (2010) demonstrate that economic interdependence has a clear impact on reducing conflicts among countries. Additionally, Lee and Pyun (2016) find that trade openness, "bilateral trade

interdependence," and "global trade integration" significantly diminish "the probability of conflict" between countries.

It is clear that these findings become fundamental and substantial academic ground to support the perspective that trade affects political relations, but there exists research countering this perspective as well. For example, Barbieri (1996a) and Barbieri and Peter (2003) examine various measures of liberal perspective that trade contributes to peace. They directly criticize the measure of the liberal perspective[20] and find that there is little empirical evidence to support the liberal perspective that "trade provides a path to interstate peace." Rather, they argue that "extensive economic interdependence" causes more possibility that "dyads engage in military disputes."[21] Morrow (1999) notes that trade flows are "ex ante observable" and have "indeterminate effect on the initiation and escalation of international conflicts." In contrast to Lee and Pyun (2016), Martin et al. (2008) shows that "higher trade flows may not lead to more peaceful relations," and international trade openness increases the likelihood of conflict and war between countries.[22]

The second body of work that is important to consider is research supporting the idea that political relations affect on trade. Scholars in this school argue that trade follows political flags, and it could be used as "carrot and stick" in a state's foreign policy (Pollins, 1989a, 1989b; Keshk, Reuveny and Pollins 2004; Davis, Fuchs and Johnson, 2017). In earlier

[20] In particular, she directly criticizes the measurement method used by Gartzke and Li (2003), saying that the analysis conducted by Gartzke and Li is not "truly dyadic," in spite of their presenting their work as dyadic analysis.
[21] She mentions the higher economic extensive increases the military disputes between countries, but it has little impact on "the incidence of war."
[22] Martin et al. (2008) say that bilateral trade could deter bilateral war because it increases "the opportunity cost of bilateral war," but since "multilateral trade openness" diminishes the opportunity cost of bilateral war, global trade openness does not lead to peace between countries.

studies, Pollins (1989a, 1989b) investigates the influence of "general diplomatic cooperativeness or hostility" on bilateral trade flows. In particular, he contends that import decisions of countries are influenced by "purposive attempts by the importer," "the general foreign policy," and "the recent status of relations." Consequently, he finds that state-to-state political relations, such as conflicts and cooperation between countries, fairly affect levels of bilateral trade. Reuveny and Kang (1996) also note that when "the bilateral net conflict goes up to be more cooperative, in general, the level of bilateral trade increases."[23] Dixon and Moon (1993) in their empirical research using the United Nations voting agreements in measuring political relations note that political relations have "a substantial and predictable impact" on international trade and Morrow, Siverson and Tabares (1999) demonstrate that moving from negative relations to positive relations brings about 75.2% increase in trade.

More recent studies, including Keshk, Reuveny and Pollins (2004), research what they call the "conflict equation". Formed by Oneal and Russett (1997), it is based on the the "trade equation" built off of the "gravity" model (Tinberger, 1962). The gravity model demonstrates that political relations still affect "flows of commerce between countries," directly disputing the claim that trade brings peace. Berger et al. (2013) also finds that interventions of the US government in certain countries raises "the share of total imports" of the intervened countries from the U.S.[24] Davis, Fuchs, and Johnson (2017) insist that governments tend to use "economic tools to influence international politics" by showing the impacts of negative political events on trade of state-owned companies and private

[23] Their research focuses on the causality between trade and political conflicts/cooperation. They conclude that the causal relationship between trade and political relations depends on dyad and the two aspects are substantially "reciprocal."
[24] It is an interesting finding of this research that there is no change in the export volume to the U.S. from the countries intervened.

companies in China and India. Du et al. (2017) demonstrate that "political shocks" between China and its major powers have impacts on exports to China from the major power countries, by employing Yan's political relations index (Yan et al., 2010). Of course, there are arguments that trade does not follow political flags anymore. For example, Carnegie (2014) argues that the existence of global trade institutions, such as WTO, contributes to solving "political hold-up problems" by allowing states to trade for economic benefits, rather than political reason. However, even if joining the WTO could prevent states from exploiting trade as a political , it could not explain the impacts of positive political relations on trade increases, which should be regarded as another aspect of political impacts on trade.[25]

Overall, all of the literatures mentioned above are meaningfully helpful for progressing this study. However, any single piece of research on this field does not entirely satisfy the purpose of this study. In particular, most of the research on this topic deals with cases of European countries, the U.S., China, and Japan, but it hardly finds the case of South Korea, even if South Korea's trade could have a substantial connection to political relations. Thus, this study focuses on demonstrating the impacts of South Korea's political relations on its trade with China, Japan, Russia, and North Korea.

2.2. How to Measure Political Relations

While trade data is objective and easily quantifiable, measuring political relations between countries is not a simple task (Davis, Fuchs and Johnson, 2017; Du et al., 2017). Despite how difficult it is, a lot of research focuses on measuring political relations.

[25] There is research that shows that positive political relations promote trade. For example, Gowa and Mansfield (2004) argue that alliances between countries help to "achieve an efficient level of trade." Najafi and Askari (2012) find that improvements in political relations with the U.S. lead to trade and economic activities increasing with the U.S.

Although there would be numerous ways to estimate political relations, the most common method to measure political relations, is looking at negative aspects between countries, such as military disputes or diplomatic conflicts. For example, Oneal and Russett (1999) and Herge, Oneal and Russett (2010), they argue that trade has impacts on political relations. They do this by using the data from the Correlates of War (COW) project to find "militarized disputes" and "potential military capabilities" as measurement for political relations. Morrow (1999) in his research analyzes how trade could "alter both sides' willingness to initiate disputes", as well as aggravate the disputes also uses the disputes data from COW. Kessh, Pollins and Reuveny (2004) used Militarized Interstate Dispute (MID) data to show political relations between countries.

Another way to measure political relations is to use the United Nations General Assembly (UNGA) voting data in measuring political relations (Signorino and Ritter, 1999; Bailey, Strezhnev, and Voeten, 2017). Based on countries' voting choices, it shows the affinity between countries by analyzing the voting similarities and preferences of countries (Bailey, Strezhnev, and Voeten, 2017). Dixon and Moon (1993) use the UNGA voting agreements data between exporters and importers in measuring political relations and Carnegie (2014) checks "political similarity" between countries by using the UNGA voting behavior similarity. Davis, Fuchs and Johnson (2017) measures "the distance in foreign policy orientation" as one of the measures for political relations by using the ideal point (Bailey, Strezhnev, and Voeten, 2017) based voting alignment in UNGA.

Some scholars use events data to measure political relations. Polachek (1980) employs daily and yearly-based events data sourced from 47 different newspapers in the Conflict and Peace data bank (COPDAB) in measuring "political interaction." Pollins

(1989a, 1989b) also uses events data from the COPDAB to demonstrate how the "diplomatic relationship" between importers and exporters affects trade flows. When it comes to using events data, even if there are numerous ways to weigh each event, the "Goldstein scale" (Goldstein, 1992) seems the most common and popular standard to weigh types of events in current studies. The Goldstein scale weighs each type of political events by its severity between -10, the most negative, and 10, the most positive.[26] Davis and Meunier (2011) use the "King-Lowe events data" (King and Lowe, 2003) based on the Goldstein scale in weighing each event, and Davis, Fuch and Johnson (2017) employ the Global Data on Events, Location and Tones (GDELT) events data (Leetaru and Schrodt, 2013) including the Goldstein score in the dataset. Similar to the Goldstein scale, Yan et al. (2010) provides the "Political Relations Index (PRI)" of China based on the political events from Chinese newspaper, Renmin Ribao (People's Daily), as well as information from the Ministry of Foreign Affairs of the People's Republic of China, Du et al. (2017) use the Yan's PRI (Yan et al., 2010) as a measure for political relations of China and find the effects of political relations on trade.

It is evident that a lot of research demonstrates substantial ways to measure political relations, but there are still some shrotcomings. For example, considering political relations not only have negative aspects, but also positive aspects, the method of applying negative political relations could show only one-sided impacts of political relations on trade. In addition, the voting behavior similarities and the ideal point based on the UNGA voting data could reflect general political interactions between each country, but it might not show the

[26] For example, the Goldstein scale weighs a military attack, clash, and assault in -10 and "refuse, oppose" or "turn down proposal, reject protest" in -4. As positive events, it weighs events such as "ask for policy assistance" in 3.4 and "extend military assistance" in 8.3 (Goldstein, 1992).

actual and direct bilateral political relations between countries (Polachek, 1980).[27] On top of that, most research provides yearly-based political relations data, which hardly covers up the flows of political relations in detail (Reueny and Kang, 1996; Du et al., 2017). Considering that political relations could fluctuate in diverse aspects within a year or a month, the yearly based political relations data might not show precise political relations between countries. As a result, because yearly based political relations data cannot reflect the naunces of political relations, it is most likely limitedin explaining the influence of political relations on trade.

Thus, this study uses events data primarily to measure South Korea's political relations, which mirrors both positive and negative political aspects between countries, as well as usign yearly and monthly based data together.[28] The following chapter begins with the research design, including case selection, variables, measurement and methodology. The results of this empirical analysis shows how South Korea's political relations with China, Japan, Russia, and North Korea affect trade with these countries.

[27] For example, South Korea and Japan have a strong similarity in the UNGA voting. However, in terms of two countries' having heavy political disputes such as the Japanese history textbook issue and the comfort women problem, two countries' actual political relations could be not as close as the voting similarity shows.
[28] This part will be more explained in the next chapter.

CHAPTER 3

RESEARCH DESIGN AND EMPIRICAL RESULTS: IMPACTS OF POLITICAL RELATIONS OF SOUTH KOREA ON ITS BILATERAL TRADE

3.1. Research Design

3.1.1. Case selection

In selecting cases, this thesis chiefly approaches with two perspectives, economic and political perspectives. More specifically, this study considers how significantly a country affects South Korea both politically and economically as well as how the political and economic relations between South Korea and the country has altered. To show the importance and changes in political and economic relations between South Korea and a case country, trade and political events between them are considered. Considering all the factors, four suitable countries are selected for this study: China, Japan, Russia, and North Korea. Table 3.1 presents the political and economic relations and the level of political volatility between South Korea and the four countries.

Table 3.1 South Korea's political and economic relations with the four case countries

Case	Economic importance with South Korea	Current Political Relations with South Korea
China	High	Poor
Japan	High	Mixed
Russia	Low	Normal
North Korea	Low	Very Poor

Note: The economic importance is based on trade data used in study and the current political relations are based on the current political event between countries and the results of the GDELT Goldstein scores.

3.1.1.1. South Korea – China

As stated in the previous chapter, South Korea has had close political and economic relations with China in its long history. As the two countries have experienced political upheavals influencing each other in their modern history, the economic relations between the two countries have been changing corresponding to the political relations. For example, when political relations between the two was gradually being restored in 1970s and 1980s (Chung, 2009), the economic relations which was cut off after the Korean War also began resumed slowly. In addition, after two countries' normalizing diplomatic relations in 1992, the economic cooperation between South Korea and China was rapidly rising up. The current THAAD deployment issue that has negatively affected the economic relations between the two countries is also one of cases to show that political relations between South Korea and China have impacts on their economic relations. As Figure 10 indicates, the trend of political relations between South Korea and China has not kept the even line, but had variations moving up and down as time has passed by. Thus, this thesis attempts to seek the change in trade flows between South Korea and China according to the political relations change between the two countries and sets the first hypothesis like below.

H1: Positive (negative) political relations between South Korea and China increase (decrease) South Korea's import and export in trade with China.

3.1.1.2. South Korea – Japan

Japan is another country that has affected South Korea's politics and economy, as sharing a long and complicated history with South Korea.[29] Even after South Korea normalized diplomatic relations with Japan in 1965 (Oda, 1967), sensitive political and historical issues including the comfort women issue, Japanese history textbook, and visits to Yasukuni Shrine have negatively affected South Korea- Japan relations (Hidehiko, 2014). In addition, even as South Korea and Japan's economic relations have persisted, currently the South Korea's trade to Japan has been trending down. This is because South Korea has reduced "reliance on Japan for production goods" to decrease the trade deficit in trade with Japan as well as South Korean government has shifted its focus of foreign policy more on China (Hidehiko, 2014).[30] However, although Japan's importance to South Korea's trade is currently declining and the two countries still have been struggling for the political issues, the economic relations between South Korea and Japan will not simply cease. Considering that Japan is still one of the top markets to South Korea's exports and Japan's high level technologies and machinery products imported from Japan are still taking an important role in the South Korean industry, the economic relations between the two countries will be sustained. Therefore, this thesis sets the second hypothesis like below.

H2: Positive (negative) political relations between South Korea and Japan weakly increase (decrease) South Korea's import and export in trade with Japan.

[29] Refer to Chapter 1 to see more explanation of the historical backgrounds between South Korea and Japan.
[30] Hidehiko (2014) notes that "Japan's waning importance to South Korea is apparent from the decline in its reliance on trade with Japan. This decline in Japan's importance has also weakened the motivation on repair the relationship."

3.1.1.3. South Korea – Russia

In South Korea's trade and political relations with Russia, it is likely to say, may not be a country that has significant impacts on South Korea's politics and economy. Russia is not a major country political or economic partner to South Korea, but it is evident that there are variations in political relations between South Korea and Russia as Figure 10 shows and hence provides an important source of variation. It is true that political exchanges between South Korea and Russia have been growing. While Russia concentrated on solving domestic problems in 1990s, since 2000 when Vladimir Putin took the office in Kremlin, Russia has focused on restoring foreign relations, extending its international influence. As it is reflected in South Korea – Russia relations, diplomatic exchanges between the two countries have been increasing since 2000.[31] With the improved political relations between South Korea and Russia, bilateral trade between the two countries was being activated as well. As Figure 9 indicates, South Korea's trade with Russia has been on uptrend since 2000 and Russia was one of the top 10 destinations of South Korea's export from 2007 until 2013.[32]

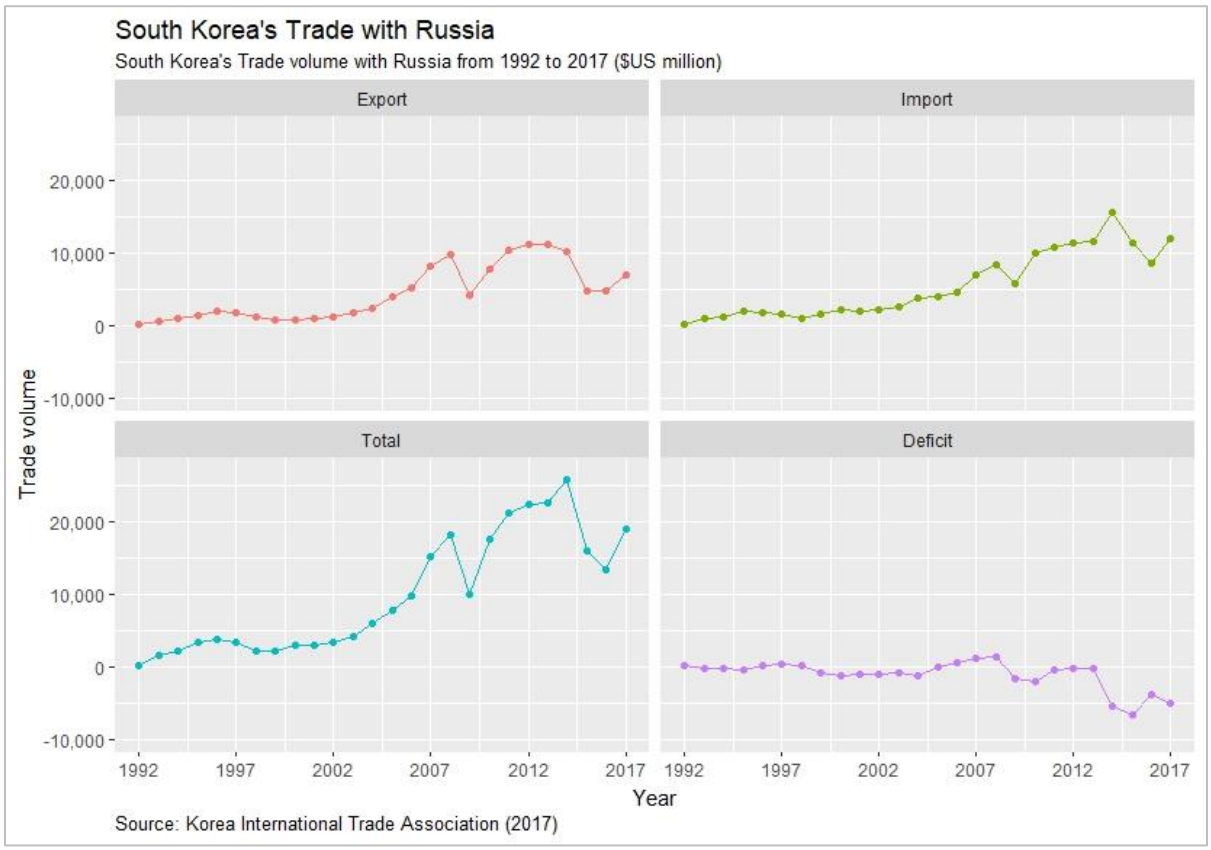
As political exchanges and trade activities between South Korea and Russia have been growing, it could uphold the idea of the impacts of South Korea's political relations on its trade. Nevertheless, the South Korea – Russia case would not fully present the point of

[31] The diplomatic relations between South Korea and Russia was established on September, 1990, and two countries' presidents had the first bilateral meeting on September, 2013 during the G20 summit in St. Petersburg. Most recently, Sergey Lavrov, the Foreign Minister of Russia, and Song Yong-gil, the head of South Korea's Norther Economic Cooperation Committee, shared the opinion to develop cooperative relations between South Korea and Russia. "Russian – South Korea Relations" July 7, 2017, Sputnic International, retrieved from https://sputniknews.com/world/201707071055333192-russian-south-korean-relations/; "Russia relations with South Korea on the rise, Lavrov says" October 13, 2017, Tass, retrieved from http://tass.com/politics/970539

[32] South Korea's trade volume with Russia decreased from 2014 to 2016, but it turned back into an uptrend again in 2017. Data is from the Korea International Trade Association (KITA). Available at http://stat.kita.net/stat/kts/ctr/CtrTotalImpExpList.screen

this thesis. This is because both political relations and economic ties between South Korea and Russia are still weak, compared to the other cases. In particular, there have not been a significant political issue directly related between the two countries. Thus, this thesis sets the third hypothesis like below.

H3: Positive (negative) political relations between South Korea and Russia weakly increase (decrease) South Korea's import and export in trade with Russia.



Source: Korean International Trade Association (KITA, 2017)

Figure 9. South Korea's Trade with Russia (1992-2017)

3.1.1.4. South Korea – North Korea

As countries that have been conflicting politically and militarily on the one peninsula for long time, South Korea and North Korea relations could be an evident case to show the

impacts of political relations on economic relations. South and North Korea had certain economic exchanges,[33] but the economic relations between the two Koreas could not be constant, repeating being stopped and resumed by fluctuating political situations between the two Koreas as Figure 10 shows. In particular, it is to meet their needs that North Korea has frequently used the economic tool with military provocations. South Korea's foreign policy including economic and political strategies toward North Korea also has been constantly switched depending on political flags of the South Korean administrations in the office.[34] As a result, this study tries to find the impacts of switching political relations between South and North Korea on trade relations between the two Koreas. The last hypothesis of this thesis is like below.

H4: Positive (negative) political relations between South Korea and North Korea increase (decrease) South Korea's import and export in trade with North Korea.

3.1.1.5. Why the United States is Excluded

Rather, as explained in Chapter 1, the U.S. is one of the major countries that remarkably affects South Korea politically and economically. However, if the U.S. is selected as one of the cases for this study, the case could not fully explain the impacts of South Korea's political relations on its trade. This is because the U.S. has always been the

[33] South Korea had economic relations through trade, investment, such as establishing Kaesong industry in North Korea. In addition, the South Korean government has sent North Korea an economic aid for the humanitarian purpose when North Korea suffered from severe droughts and natural disasters in the past. Manyin, M. E. (2005). Foreign Assistance to North Korea. CRS Report for Congress, RL31785.

[34] As it is shown in chapter 1, South Korea's trade flows with North Korea are differenced by political flags of South Korean administrations and the case of the Kaesong Industrial Complex can be a decent example that North Korea exploits economic relations as a tool fulfill their political goal.

major market to South Korea since South Korea joined the world market[35] as well as there are little variations in the political relationship between two countries. In other words, negative events, such as a war, a military clash or diplomatic conflicts are hardly found in the political relationship between the two countries,[36] thus, it is hard to demonstrate that South Korea- US political relations can affect trade flows between the two countries.

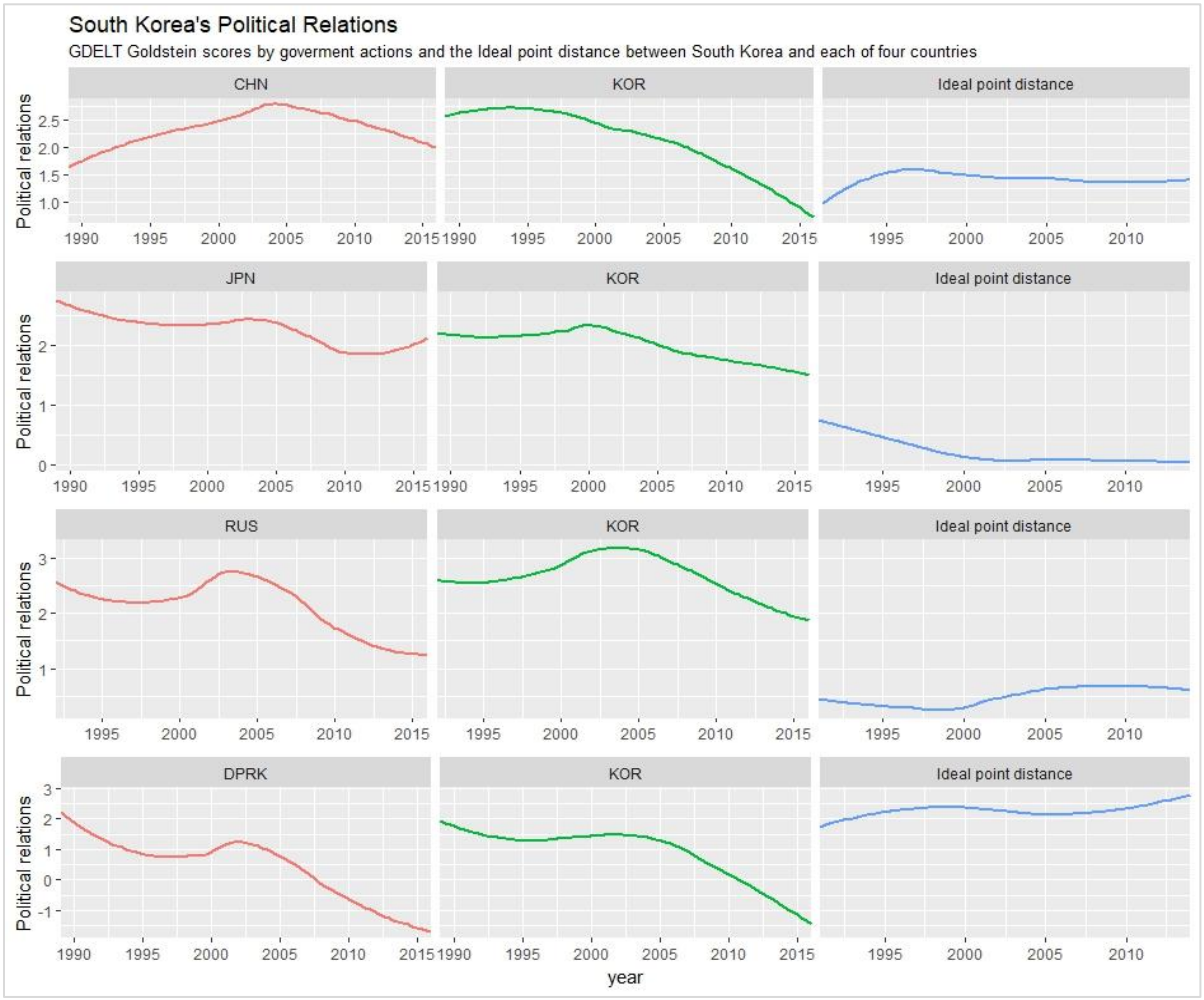


Figure 10. Actions of each Government and the ideal point distance between South Korea and the four case countries

[35] The fact that the U.S. has always been the top 3 countries in the South Korea's imports and exports ranks shows that South Korea and the U.S. has maintained the economic relations evenly without a big fluctuation. Data is from the Korea International Trade Association (KITA). Available at http://stat.kita.net/stat/kts/ctr/CtrTotalImpExpList.screen

[36] The last military conflicts between Korea and the U.S. was the Korean Expedition, the Shinmiyangyo, in 1871.

3.1.2. Dependent Variables

To test the hypotheses of this study, this thesis employ both yearly and monthly-based data on South Korea's imports from China, Japan, Russia and North Korea, and exports to the same countries provided by the Korea International Trade Association (KITA) as the dependent variable. The data begins on January in 1989 for China, Japan and North Korea, the first month and year that the KITA contains South Korea's trade data with North Korea, and on January in 1992 for Russia, which is the first year of data on South Korea's trade with Russia sourced by the KITA. All data extends through December, 2016.

3.1.3. Measuring Political Relations

This study uses both yearly and monthly-based events data in measuring political relations and focuses on government and military actions between South Korea and each of the four countries- China, Japan, Russia, and North Korea. As monthly data, it sources the events data from the Global Data on Events, Location and Tones (GDELT) data (Leetaru and Schrodt, 2013). The GDELT dataset is based on a "machine coding system to classify daily reports of event" (Davis, Fuchs, and Johnson, 2017), covering up the world's printed, broadcast, and web based news media in over 100 languages, from January 1, 1979 through the present.[37] The dataset provides daily events from the global news media with the information of actors involved in the events and each event is weighted between -10 to 10 that shows the severity of each event based on the "Goldstein scale" (Goldstein, 1992). For

[37] The GDELT introduces its database in their website saying that it is "the largest, most comprehensive, and highest resolution open database of human society ever created. Creating a platform that monitors the world's news media from every corner of every country in print, broadcast, and web formats, in over 100 languages, every moment of every day and that stretches back to January 1, 1979 through present day." More information about the GDELT is available at https://www.gdeltproject.org/

instance, use of military force would be weighed in -10 and it is more negatively regarded than a verbal condemnation of another country's actions, which would be weighed in -3.4 (Davis, Fuchs and Johnson, 2017). As an alternative measure of political relations, this study also employs United Nations General Assembly (UNGA) voting data, which is coded annually (Signorino and Ritter, 1999; Bailey, Strezhnev, and Voeten, 2017).[38]

The first political relations variable measures overall flows of political relations between South Korea and the four countries: China, Japan, Russia, and North Korea. In order to make a single monthly observation, this study makes a weighted average on the Goldstein scores – political relations score (PRS) - contained in the GDELT events data. Each Goldstein score in the dataset are multiplied by the number of source documents that mention each of events and divided by the total number of source documents in a month. This weight represents the relative importance or level of attention each event gets in a country. For example, if an event is only mentioned once in the press, it will receive a lower weight than in it is mentioned 10 or 100 times. Each month has a weighted average score to represent political relations between South Korea and each of the four countries. Plus, considering that the Goldstein scores on each event are different by an actor that takes an action to the other actor (see Goldstein, 1992), this study separates each case by the actor (actor1), which is the subject of an action, toward the other actor (actor2), which is the object of the action from actor1. For example, the weighted average Goldstein score on July, 2010, is -2.6 when South Korea is the actor1 and China is the actor2, but the score is -0.7 when China is the actor1 and South Korea is the actor2. Thus, the PRS in this study shows South Korea's perspective on

[38] The more explanation about the UNGA voting data is stated in the last political relations variable section below.

political relations toward each of the four countries, in reverse, each of the four countries' perspective on political relations toward South Korea separately.[39]

The second political relations variable quantifies tensions and conflicts between South Korea and the four countries. To measure tensions and conflicts, this study uses the Goldstein scores in the GDELT events data again, but employs another way in using the scores. Instead of averaging the scores weighted by the number of source that mentions the events, this measures tensions and conflicts between countries by summing the number of negative events by months based on the Goldstein scale (Goldstein, 1992).[40] The events below 0 score are considered "negative events". Because the Goldstein scores on each event, as noted earlier, are differenced by the subject of an action, the number of negative events are also differenced according to the subjects. Thus, this measure also constructs two different cases by the subject of actions.

The last political relations variable measures the gap in preferences of foreign policy between South Korea and the four countries. Based on UNGA votes, scholars have measured "foreign policy preference virtually" since the international institution was established (Bailey, Strezhnev, and Voeten, 2017). The most used of UNGA voting data is the "S score" constructed by Signorino and Ritter (1999). The S score reflects the affinity between two countries by capturing similarities in the vote choices of two countries in the UN. However, Bailey, Strezhnev and Voeten (2017) point out that the S score has a crucial weakness.

[39] In this study, the weighted average score does not mean that the event corresponding the Goldstein score occurs in that month. Rather, the score are regarded as an indicator to show bilateral political relations in that month.

[40] Even if Davis, Fuchs and Johnson (2017) do not measure positive political relations through using GDELT events data, they measure negative political relations by summing the number of negative events based on the Goldstein scores (Goldstein, 1992) contained in the GDELT events data.

Basically, the S score assumes “a straightforward relationship” between the frequency that two countries vote together and voting similarity. Therefore, “voting coincidence” relied on “what resolutions that states vote on,” which means if a state does not participate voting on a certain resolution that the other state takes part, it lowers the voting similarity unintentionally.

In that sense, Bailey, Strezhnev and Voeten (2017), based on the UNGA votes of each country on a given resolution, construct the yearly-based “state ideal points” in a single dimension that reflects state’s stance and preference toward the “US-led liberal order.” Their estimate is measured by using resolutions which were constant over time and it enables researchers to pull apart “shifts in the preference from changes in UN agenda,” making better comparisons of state preference available (Davis, Fuchs and Johnson, 2017; Bailey, Strezhnev and Voeten, 2017). Thus, the distance in the ideal points between two countries reflects the difference in preference of the foreign policy between the two. This study uses the gap in ideal points (Bailey, Strezhnev and Voeten, 2017) between South Korea and the four each country. The data extends from 1991 to 2014 and Figure 10 presents how the distance in the ideal points between South Korea and each country has been altered.

3.1.4. Control Variables

In order to find the impacts of South Korea’s political relations on its trade, this study includes several control variables that could affect trade flows in general with the primary variable, political relations. The first control variable is the gross domestic product of the five countries: South Korea, China, Japan, Russia and North Korea. Motivated by the standard gravity model, much research associated with trade and political relations employ GDP data as one of variables to show the general size of country’s economy (Keshk, Pollins and

Reuveny, 2004). Therefore, this study sources data from the World Bank for GDP of China, Japan and Russia, and data from the Statistics Korea for GDP of North Korea. Each GDP data is calculated in the current year US$ million and all of GDP data are logged.

Following the standard gravity model, much empirical research on this field employs population data as an indicator to reveal the size of a country's internal market and market potential (Keshk, Pollins and Reuveny, 2004; Davis, Fuchs and Johnson, 2017). This study also uses data on populations of countries in each of the cases. Keshk, Pollins and Reuveny (2004) anticipate that population has negative relations with trade as it indicates the size of a "nation's internal market," but this study tries to see the effect of populations in a different sight. As populations indicates the size of market and market potential, this study regards that a country tends to have a higher trade relation with a country having a high population than with a country having a low population. All of population data on each country are provided by the World Bank.

The third control variable of this analysis is the Foreign Direct Investment (FDI) volume between each of countries, which is closely related to political relations and trade between two countries (Anderson and van Wincoop, 2003; Dvais and Meunier, 2011). Compared to GDP and populations data, finding data on FDI flows between South Korea and each country from 1989 to 2016 is not available through other research and the data bank of international organizations, such as the World Bank and the International Monetary Fund. Thus, FDI data in this study are based on South Korean government data. Data on South Korea's outward FDI for each of the countries is sourced from the Export-Import Bank of Korea (Korea Eximbank) and data on other countries' FDI toward South Korea is provided

by the Ministry of Trade, Industry and Energy. All of the FDI data are calculated in the current year US$ million.

The fourth control of this analysis is lagged imports and exports data. In the sense that trade relations between countries contain "inertia" that tends to sustain the former trade aspects, much trade-related research in political science employ lagged trade data to see its effects on the present trade (Keshk, Pollins and Reuveny, 2004; Hegre, Oneal and Russett, 2010; Du et al., 2017). Trade inertia could be driven by various factors, such as the time that a market clears and the time tastes of consumers change (Keshk, Pollins and Reuveny, 2004). For this reason, this study also regards lagged imports and exports data as one factor to affect the current trade and set these as one of the control variables.

With the four control variables stated above, two more control variables are added in the analysis to use the annual UNGA voting data as the primary independent variable. The first additional control variable is the democracy score. Trade relations depend on regime type of each country and it has been found that democracy countries tend to trade more with other countries than autocracy countries (Dixon and Moon, 1993; Gartezke and Li, 2003; Davis, Fuchs and Johnson, 2017). To measure the degree of democracy, this analysis employs the polity2 score from the Polity IV Project (Marshall, Gurr, Davenport and Jaggers, 2002). The score extends from negative 10 (the most autocratic) to positive 10 (the most democratic).

The second additional control variable is a dummy variable to indicate the year when both countries are member of the WTO. Following the idea of the research conducted by Davis, Fuchs and Johnson (2017), this study attempts to see how joining multilateral trade association influence bilateral trade relations. Based on the information of member countries

from WTO website, the years that both countries are the member of the WTO take a value 1, and if either one of two countries does not join the WTO in that year, it takes a value 0. Table 3.2 organizes all variables, their definitions, and their original sources.

Table 3.2 Variables and Sources

Variables	Description	Source
Dependent variables		
Imports (monthly)	Monthly imports volume of South Korea (US$ million) / (log) Annual imports volume of South Korea (US$ million)	KITA (stat.kita.net)
Exports (monthly)	Monthly exports volume of South Korea (US$ million) / (log) Annual exports volume of South Korea (US$ million)	KITA (stat.kita.net)
Primary independent variables		
Political relations $\text{score}_{\text{S.Korea}}$	Weighted-average of Goldstein scores / Actions of South Korea toward trading partners, lag	GDELT (Leetaru and Schrodt, 2013)
Political relations $\text{score}_{\text{Partner}}$	Weighted-average of Goldstein scores / Actions of trading partners toward South Korea, lag	GDELT (Leetaru and Schrodt, 2013)
Negative $\text{events}_{\text{S.Korea}}$	Sum of the negative events based on Goldstein scores Actions of South Korea toward trading partners, lag	GDELT (Leetaru and Schrodt, 2013)
Negative $\text{events}_{\text{Partner}}$	Sum of the negative events based on Goldstein scores Actions of trading partners toward South Korea, lag	GDELT (Leetaru and Schrodt, 2013)
Ideal point distance (annual)	Distance between two states in foreign policy preferences based on UNGA voting, lag	Bailey, Strezhnev and Voeten (2017)

Table 3.2 Continued

Control variables		
GDP	(log) GDP of countries (US$ million), lag	The World Bank Open Data (https://data.worldbank.org/) / The Statistics Korea (http://kostat.go.kr)
Population	The number of population, lag	The World Bank Open Data (https://data.worldbank.org/)
FDI	The amount of foreign direct investment (US$ million)	the Export-Import Bank of Korea (https://www.koreaexim.go.kr) / the Ministry of Trade, Industry and Energy (http://www.motie.go.kr)
(lag) Imports	Imports volume of South Korea (monthly and annual, US$ million), lag	KITA (stat.kita.net)
(lag) Exports	Exports volume of South Korea (monthly and annual, US$ million), lag	KITA (stat.kita.net)
Polity	Polity IV score from – 10, most autocracy, to +10, most democracy, lag	Marshall, Gurr and Jaggers (2016)
Both WTO	1 if both countries are WTO members in the same year. Otherwise, 0.	WTO(https://www.wto.org/)

3.2. Empirical Analysis

3.2.1. Empirical Strategy

To demonstrate the effect of political relations between South Korea and each of the four countries on South Korea's bilateral trade with the countries, this empirical analysis builds on two models, a vector autoregression (VAR) model and a gravity model. The VAR model is a decent method to find the degree of the impact at different time periods, which meets one of the purposes of this study. As the most common and popular way to estimate relations between politics and trade, the gravity model assumes that the bilateral trade is proportional to the size of economy, personal income and economic activity in both countries and, in reverse, it decreases with resistance such as physical distance between countries (Herge, Oneal and Russett, 2010; Du et al., 2017). Through the two models, this study attempts to test the four hypotheses and seeks how South Korea's political relations with the four countries influence its bilateral trade with the countries.

3.2.1.1. Vector Autoregression Model

To test the hypotheses and find the degree to which political shocks have substantial impacts on trade over time, this study uses a vector auto-regression (VAR) model. Du et al. (2017) notes that the VAR model is designed to measure the degree of the impact at different time periods and allows "the symmetric treatment of all covariates" to be "endogenous variables" systematically. Easily to explain, the model tests at which point in time an event takes substantial effects on dependent variable as well as enables to estimate relations among all of variables, allowing each of variables in the model to be a dependent variable.

One prior and important condition for a significant analysis with the VAR model is that the time series data should be stable. This means that the time series data analyzed by the VAR model should have constant means and variances over time and do not draw a trend line.[41] Therefore, before estimating the VAR model, this study conducts diagnostic tests to check for stationarity in the time series. To investigate the stationarity of the time series data, the Augmented Dicky-Fuller (ADF) unit root test is implemented. Table 3.3 shows the result of the ADF test and the results reveal that some of data are not stationary in levels, but all of data are stationary in the first differences at lag 1. For this reason, the non-stationary variables either in the constant type or trend type are differenced once at lag 1 to have every variable analyzed in the identical condition showing stationarity.

Formally, this study estimates the following equations:

$$\Delta Imports_{sp,t} = \beta_o + \Sigma_{m=1}^{k} a_m \Delta PR_{sp,t-m} + \Sigma_{m=1}^{k} b_m \Delta GDP_{sp,t-m} + \Sigma_{m=1}^{k} c_m \Delta POP_{s,t-m} + \Sigma_{m=1}^{k} d_m \Delta FDI_{p,t-m} + \Sigma_{m=1}^{k} e_m \Delta Imports_{sp,t-m} + v_t^{\Delta Imports} \quad (1)$$

$$\Delta Exports_{sp,t} = \tilde{\beta}_0 + \Sigma_{m=1}^{k} \tilde{a}_m \Delta PR_{ps,t-m} + \Sigma_{m=1}^{k} \tilde{b}_m \Delta GDP_{sp,t-m} + \Sigma_{m=1}^{k} \tilde{c}_m \Delta POP_{p,t-m} + \Sigma_{m=1}^{k} \tilde{d}_m \Delta FDI_{s,t-m} + \Sigma_{m=1}^{k} \tilde{e}_m \Delta Exports_{sp,t-m} + \tilde{v}_t^{\Delta Exports} \quad (2)$$

[41] When a research estimate a model with non-stationary data, it leads to unsuitable test statistics. Retrieved from https://econometricswithr.wordpress.com/time-series/an-introduction-to-vector-autoregression-var/

$\Delta Imports_{sp,t}$ *and* $\Delta Exports_{sp,t}$ represent the changes of imports and exports volume of country *s* (South Korea) from its trading partner *p* (China, Japan, Russia and North Korea) each during a month *t*. ΔPR represents the changes of the first and second measure of political relations, the weighted-average of the Goldstein score and the number of negative events, between South Korea and its trading partners. To be specific, ΔPR_{sp} indicates actions of South Korea toward its trading partners, in reverse, ΔPR_{ps} represents the opposite direction. This analysis expects that the weighted-average Goldstein score should have a positive relationship with trade, on the other hand, there should be a negative relationship between the number of negative events and trade.

ΔGDP_{sp} represents the changes of the logged GDP of both countries in US$ million. ΔPOP_s and ΔPOP_p simply indicate the changes in populations of country *s* and *p*. As populations reveal the size of market and market potential, a country could tend to have a trade relation with a country having a high population. Therefore, this study matches ΔPOP_s with imports of South Korea, which can be shown as exports of trading partners to South Korea, and ΔPOP_p with exports of South Korea to trading partners. ΔFDI_s *and* ΔFDI_p denote the changes in Foreign Direct Investment volume of country *s* and *p* toward each other. Likely to the population variable, this study sees ΔFDI_s is related to exports of South Korea, in reverse, ΔFDI_p is associated with imports of South Korea.

$\Delta Imports_{sp,t-m}$*and* $\Delta Exports_{sp,t-m}$ represent the changes in $\Delta Imports_{ji,t}$ and $\Delta Exports_{ji,t}$ lagged month *m* and $v_t^{\Delta Imports}$is the trend of the VAR model. In case of GDP, it has a negative relationship with imports, on the other hand, it shows a positive

relationships with exports. The other control variables are expected to have positive relations with trade in this study.

In this analysis, all variables are differenced once at lag1 in order to have the stationarity, and the primary independent variable and all of the control variables are lagged at month *m* from time *t*. To specify the certain number of lags and support it statistically, the Akaike's information criterion (AIC) test is used to determine the lag length. The AIC compares each set of statistical models to find the best fit and the lower AIC value indicates that the variable is more suitable to explain the model.[42] As the results of the AIC test reveal that lag 12 is the most significant to explain the model, this analysis sets lagged month *m* in 12, which tests when the effects of political relations on trade appear within 12 months.

[42] Even if AIC does not provide absolute suggestion to choose a certain variable, it is one of general ways to be used as a hypothesis test. See for more explanations http://www.statisticshowto.com/akaikes-information-criterion/

Table 3.3 Results of the Stationarity test

Augmented Dickey-Fuller (ADF) Test						
South Korea – China						
Variable	**Constant**			**Trend**		
	Level	**First difference**	**Lags**	**Level**	**First difference**	**Lags**
PRS_SK	-9.106***	-21.764***	l(1)	-10.534***	-21.743***	l(1)
PRS_CH	-11.055***	-20.250***	l(1)	-11.029***	-20.221***	l(1)
NoNeg_SK	-8.434***	-19.873***	l(1)	-10.462***	-19.848***	l(1)
NoNeg_CH	-10.161***	-20.521***	l(1)	-11.332***	-20.490***	l(1)
Imports_SK	-0.385	-17.426***	l(1)	-2.945**	-17.432***	l(1)
Exports_SK	-0.368	-16.399***	l(1)	-2.865**	-16.402***	l(1)
ln(GDP_SK)	-0.288	-13.204***	l(1)	-2.470**	-13.192***	l(1)
ln(GDP_CH)	2.074*	-13.680***	l(1)	-1.096	-14.170***	l(1)
Population_SK	-1.422	-14.587***	l(1)	-2.514*	-14.652***	l(1)
Population_CH	-1.988*	-14.541***	l(1)	-2.106*	-14.711***	l(1)
FDI_SK	-4.601***	-12.849***	l(1)	-7.216***	-12.829***	l(1)
FDI_CH	-5.438***	-12.848***	l(1)	-6.951***	-12.830***	l(1)
South Korea – Japan						
PRS_SK	-11.830***	-21.583***	l(1)	-11.990***	-21.547***	l(1)
PRS_JP	-10.435***	-20.173***	l(1)	-10.562***	-20.141***	l(1)
NoNeg_SK	-8.613***	-21.974***	l(1)	-11.198***	-21.941***	l(1)
NoNeg_JP	-10.360***	-21.519***	l(1)	-12.830***	-21.486***	l(1)
Imports_SK	-1.834	-20.589***	l(1)	-3.099**	-20.554***	l(1)
Exports_SK	-1.908	-17.790***	l(1)	-3.108**	-17.764***	l(1)
ln(GDP_SK)	-0.288	-13.204***	l(1)	-2.470*	-13.192***	l(1)
ln(GDP_JP)	-2.339*	-12.884***	l(1)	-2.205*	-12.924***	l(1)
Population_SK	-1.422	-14.587***	l(1)	-2.514*	-14.652***	l(1)
Population_JP	-3.560***	-13.352***	l(1)	-0.088	-14.452***	l(1)
FDI_SK	-7.606***	-12.845***	l(1)	-9.747***	-12.826***	l(1)
FDI_JP	-5.666***	-12.846***	l(1)	-7.367***	-12.827***	l(1)

Table 3.3 Continued

South Korea – Russia						
PRS_SK	-10.936***	-18.328***	l(1)	-11.019***	-18.287***	l(1)
PRS_RS	-10.003***	-18.446***	l(1)	-10.256***	-18.413***	l(1)
NoNeg_SK	-11.514***	-20.080***	l(1)	-11.684***	-20.046***	l(1)
NoNeg_RS	-10.475***	-19.914***	l(1)	-11.320***	-19.880***	l(1)
Imports_SK	-1.836	-15.425***	l(1)	-4.163***	-15.398***	l(1)
Exports_SK	-2.411*	-16.841***	l(1)	-3.396***	-16.821***	l(1)
ln(GDP_SK)	-0.372	-12.443***	l(1)	-2.416**	-12.428***	l(1)
ln(GDP_RS)	-0.971	-12.152***	l(1)	-1.459	-12.134***	l(1)
Population_SK	-2.923**	-13.199***	l(1)	-6.328***	-13.452***	l(1)
Population_RS	-1.460	-12.516***	l(1)	0.626	-12.726***	l(1)
FDI_SK	-4.412***	-12.125***	l(1)	-4.786***	-12.105***	l(1)
FDI_RS	-8.428***	-12.124***	l(1)	-8.651***	-12.104***	l(1)
South Korea – North Korea						
PRS_SK	-9.739***	-20.682***	l(1)	-11.126***	-20.650***	l(1)
PRS_NK	-10.375***	-24.692***	l(1)	-11.894***	-24.654***	l(1)
NoNeg_SK	-6.344***	-17.743***	l(1)	-7.789***	-17.716***	l(1)
NoNeg_NK	-9.786***	-22.844***	l(1)	-11.887***	-22.810***	l(1)
Imports_SK	-2.894**	-14.346***	l(1)	-3.657***	-14.347***	l(1)
Exports_SK	-3.971***	-17.871***	l(1)	-5.715***	-18.860***	l(1)
ln(GDP_SK)	-0.288	-13.204***	l(1)	-2.470**	-13.192***	l(1)
ln(GDP_NK)	-2.514*	-11.464***	l(1)	-1.914	-11.619***	l(1)
Population_SK	-1.422	-14.587***	l(1)	-2.514*	-14.652***	l(1)
Population_NK	-2.073*	-14.516***	l(1)	-1.914	-14.712***	l(1)
FDI_SK	-	-	l(1)	-	-	l(1)
FDI_NK	-	-	l(1)	-	-	l(1)

*Note: This table presents the results of the Augmented Dickey-Fuller (ADF) test to check stationarity of data, and numbers in each cell represent values of t-statistics. In the variable column, 'PRS' means the Goldstein score according to actions of South Korean government and military and each of four countries' governments and military and 'NoNeg' mean the number of negative actions of South Korean government and military and the same actors of each of four countries. 'Imports' represents imports of South Korea from the four countries given and 'Exports' represents exports of South Korea to the same countries. 'ln(GDP)_country' indicate the logged gross domestic product and 'Population_country' represents population of each country. 'FDI_SK' represents the foreign direct investment from South Korea to the four countries, in reverse, 'FDI_CH,JP,RS,NK' represent the foreign direct investment from each of four countries to South Korea. *** significant 1%; ** significant 5%; * significant 10%*

3.2.1.2. Gravity Trade Equation Model

Much of the research that investigates the impacts of political relations on trade employs the gravity model (e.g. Anderson and van Wincoop, 2003). The gravity model assumes that the bilateral trade is proportional to the size of economy, personal income and economic activity in both countries and, in reverse, it decreases with resistance such as physical distance between countries (Herge, Oneal and Russett, 2010; Du et al., 2017). As many of studies follow the gravity model with adding other variables, such as population or exchange rates, this study also builds on the gravity model of trade.

Specifically, this study estimates the second set of following equations:

$$Imports_{sp,t} = \beta_o + \beta_1 PR_{sp,t-1} + \beta_2 GDP_{sp,t-1} + \beta_3 POP_{s,t-1} + \beta_4 FDI_{p,t-1} + \beta_5 Pol_{sp,t-1} + \beta_6 Imports_{sp,t-1} + WTO_t + \varepsilon_{spt} \quad (3)$$

$$Exports_{sp,t} = \tilde{\beta}_o + \tilde{\beta}_1 PR_{sp,t-1} + \tilde{\beta}_2 GDP_{s,t-1} + \tilde{\beta}_3 POP_{p,t-1} + \tilde{\beta}_4 FDI_{s,t-1} + \tilde{\beta}_5 Pol_{sp,t-1} + \tilde{\beta}_6 Exports_{sp,t-1} + \widetilde{WTO}_t + \tilde{\varepsilon}_{spt} \quad (4)$$

Most of variables used here are identical with the variables applied to the VAR model. However, this model uses annual data on each variable instead of employing monthly data. Plus, in this analysis, the ideal point distance based on the UNGA voting data (Bailey, Strezhnev, and Voeten, 2017) is added to measure political relations. Thus, PR represents political relations measured in the weighted average of the Goldstein score, the number of negative events and the ideal point distance, and all of them are measured yearly. This analysis anticipates that the annual Goldstein score should have a positive relations with trade, on the other hand, the number of negative events and the ideal point distance should show negative relations with trade.

GDP, POP, FDI and lagged trade denote the same stated in the VAR model, but measured yearly in this analysis. As noted earlier, two more control variables are added in the gravity model – democracy score and country's joining WTO (dummy). Pol_{sp} denotes the democracy scores both of country *s* (South Korea) and country *p* (China, Japan, Russia and North Korea) measured by the Polity IV. WTO_t represents the year when both of country *s* and *p* participated in the WTO and is measured in a dummy variable that takes a value of 1 if both countries become a member of the WTO. In terms of relations between the dependent variable and control variables, this analysis follows the identical anticipation with that of the VAR model. ε_{spt} is the error term.

Except for political relations, the democracy score, and WTO dummy variable, all of the variable are logged and lagged one year. The analysis begins in 1991 for China, Japan and North Korea, the first year for which North Korea's ideal point distance appear and begins in 1992 for Russia, the first year for which the KITA provides South Korea's trade data with Russia. Both estimations extend through 2014, the last year that the ideal point distance exists for all the countries. Even if the purpose of this research is to find the impacts of political relations on trade, it anticipates that the yearly-based gravity model in this analysis would not fully explain the effects on trade because yearly-based political relations data would not be able to reflect the flows of direct political relations between two countries.[43]

[43] For more explanations, refer to Chapter 2

3.2.2. Empirical Results

3.2.2.1. The VAR model

To show the impacts of South Korea's political relations with China, Japan, Russia and North Korea on its trade with these countries effectively, this study uses the Impulse Response Function (IRF) instead of showing the results in a table with numbers. Following the approach of Du et al. (2017), this study also shows the impulse responses that are significant at 90% or higher to ease understanding and clarify the visualization of the results. Figure 11 displays the impacts of political relations on South Korea's imports from the four countries, China, Japan, Russia, and North Korea, and Figure 12 depicts the effects on South Korea's exports to the same four countries.

As Figure 11 shows, South Korea's political relations do have certain impacts on its imports. However, the effects are short-lived, not constantly extending to the following month,[44] and it reveals irregular patterns showing the different magnitude and duration of the impacts depending on countries. The political relations score (PRS) only takes effects in South Korea's imports with China and North Korea, and one standard deviation change in PRS leads to around 3.8 percent increase in South Korea's imports from China and North Korea in a month when the PRS has an impact. On the other hand, negative political events do not affect South Korea's imports from China, Japan, and Russia, but only shows effects on South Korea's imports from North Korea. One standard deviation change in the negative

[44] As noted above, the effects are short-lived, but the impacts appear again after a few months later depending on countries. Refer to figure 11 to make better understanding.

political events between South Korea and North Korea, on average, brings about 9.4 percent decrease in South Korea's imports in the month when it takes effects.

More specifically, the effects of the PRS on South Korea's imports peaks in month 1 for China. The effects dissipate in the following month, but these appear in month 10. The PRS impacts on South Korea's imports from North Korea appear in month 3, but ends right after the month. As noted earlier, Japan and Russia do not show the statistical significance in the PRS. Negative political events only take effects on South Korea's imports from North Korea and the effects appear more frequent and irregular results than those in the PRS case. As the bottom graph of Figure 11 shows, the effects repeat resuming and disappearing from month 1 to 6 by every another month, and it peaks again in month 8 and dissipates from month 9.

As the Figure 12 indicates, South Korea's political relations also have certain effects on its exports as well. As the impacts on South Korea's imports, the influences on South Korea's exports are mostly short-lived, not beyond 2 months, expect for the case with North Korea in the impacts of negative political events. Also, it reveals irregular patterns, showing the different magnitude and duration of the impacts depending on countries. The PRS takes effects in South Korea's imports with Japan, Russia, and North Korea, and one standard deviation change in the PRS, on average, causes around 5 percent change in South Korea's exports to the three countries. Negative political events have effects on the cases with Russia and North Korea, and one standard deviation change in the negative political events leads to 18.2 percent decrease in South Korea's exports to the two countries.

In looking at the results specifically by countries, the impacts of the PRS on South Korea's exports peaks in month 5 for Japan. The effects last to month 6 and disappear in

month 7. The PRS impacts lead to 2.5 percent increase in South Korea's exports to Japan in the months. In case of Russia, the effects begin later than those of Japan. The effects peak in month 10 and last until month 11. In addition, interestingly, the direction of effects is opposite from that of the other countries. It reveals a negative relationship, causing around 6.2 percent decrease on average in South Korea's exports to Russia in the months. The PRS effects on exports to North Korea peak in month 1 and dissipate in month 2. It brings about 7.9 percent increase in South Korea's exports to North Korea in month 1. Negative political events have impacts on South Korea's exports to Russia and North Korea. The impacts of negative political events on export to Russia start in month 2 and last month 3, leading to around 7.8 percent decrease in South Korea's exports to Russia. North Korea shows the strongest impacts of the negative political events on South Korea's exports to the country. The effects appear in month 1. The impacts continue to be significant until month 6 and cause 21.7 percent decrease in South Korea's exports to North Korea on average in the months. To sum up, the results of the VAR model do not support the hypothesis that South Korea's political relations affect its trade with China, but the results support the other hypotheses related to South Korea's political and trade relations with Japan, Russia, and North Korea. These results tell us South Korea's political relations have certain impact on its bilateral trade, but the effects appear in different magnitudes and aspects by trading partners.

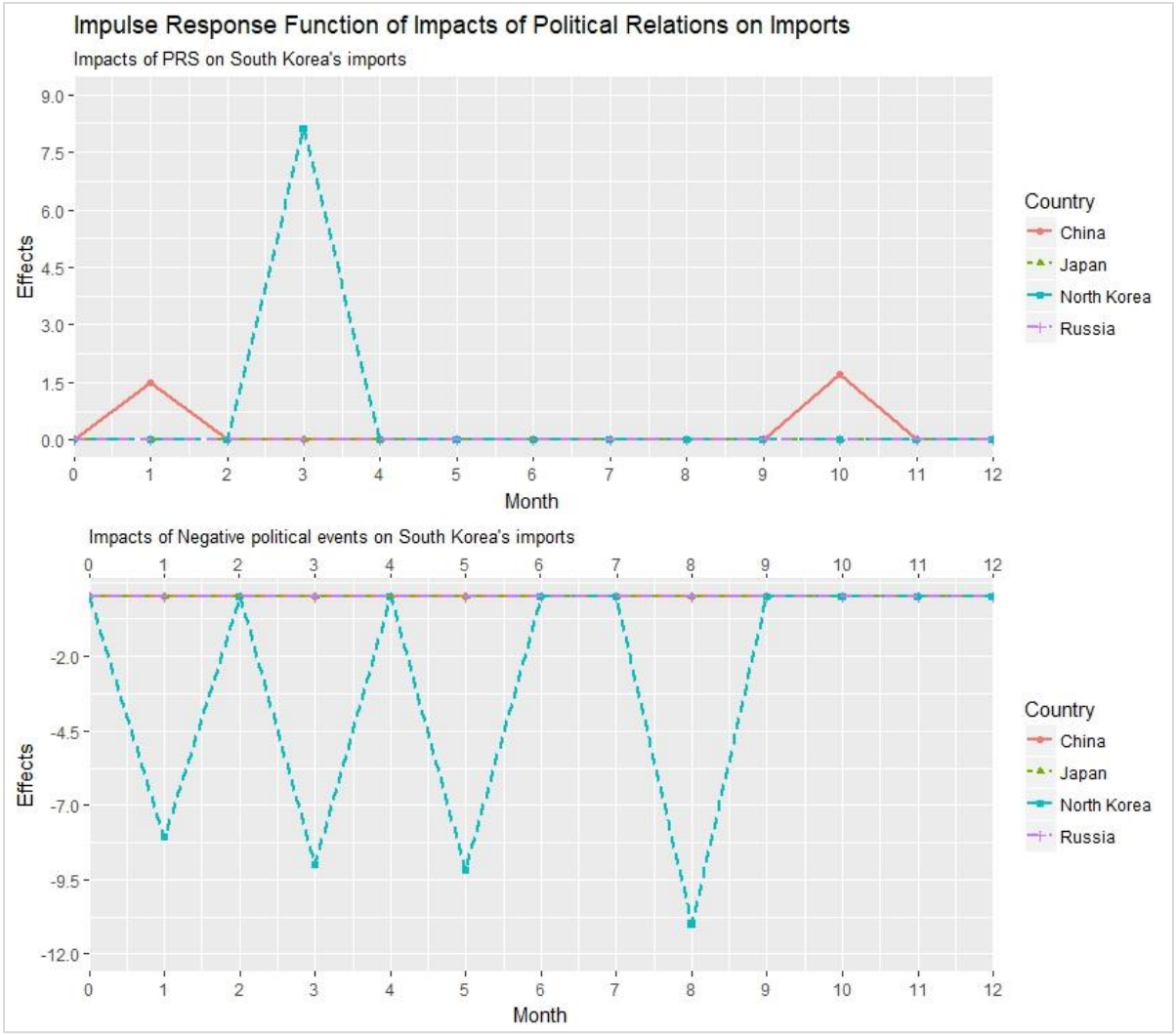


Figure 11. Impulse Response Function (IRF) of South Korea's political relations on its imports from China, Japan, Russia, and North Korea

Note: For visual clarity, the display shows only statistically significant results over the 90% level.

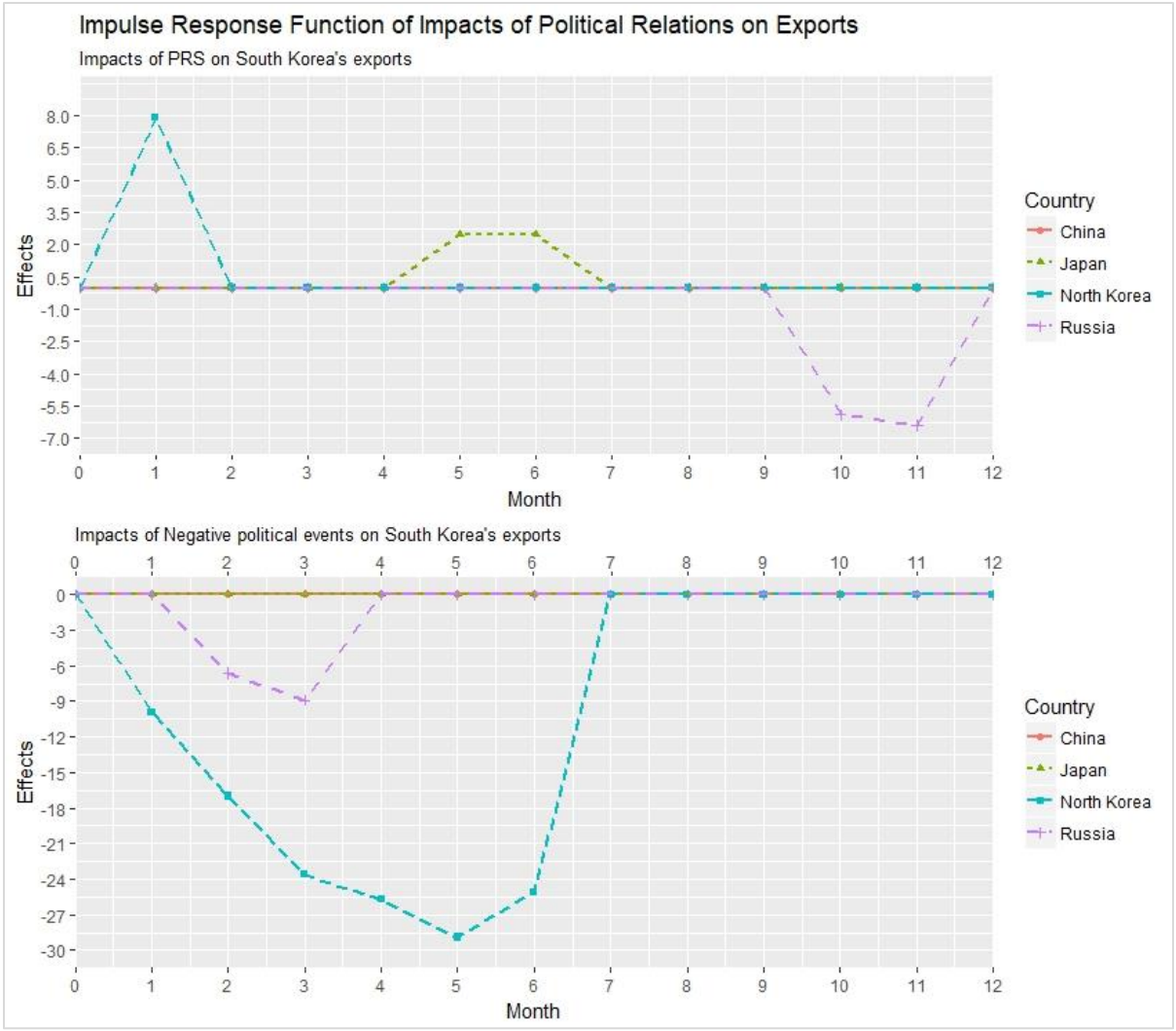


Figure 12. Impulse Response Function (IRF) of South Korea's political relations on its exports to China, Japan, Russia, and North Korea

Note: For visual clarity, the display shows only statistically significant results over the 90% level.

3.2.2.2. The Gravity model

Unlike the results of the VAR model analyzed with monthly-based variables, the statistical significance of impacts of political relations on trade is barely found in the gravity model of trade based on annual data. The statistical significance is limited to the effects of the ideal point distance on South Korea's exports to China, but the other measures do not make statistically significant effects. Consequently, the gravity model set for this analysis does not provide support for my hypotheses, but it fulfills the anticipation of this study that yearly-based data on each variable would not fully demonstrate the effects of political relations on trade. As contemporary political relations between countries are much more dynamic and changes of the relations are faster, this results imply that measuring political relations in yearly-based data could not be effective anymore. The four tables below present the results for the gravity model of this study.

Table 3.4 Results of the gravity model - South Korea's trade with China

	(1) **Imports** GDELT (Political Relations Score)	(2) **Imports** GDELT (Negative events)	(3) **Imports** UNGA voting (Ideal point distance)	(4) **Exports** GDELT (Political Relations Score)	(5) **Exports** GDELT (Negative events)	(6) **Exports** UNGA voting (Ideal point distance)
s = South Korea, p = China						
$PR_{sp-1/ps-1}$	0.10409 (0.07494)	-0.003204 (0.001576)	0.41830 (0.31631)	-0.02549 (0.05322)	0.002014 (0.001296)	-0.7772* (0.2747)
GDP_{s-1}	-0.80584 (0.56013)	-0.683295 (0.495030)	-0.31266 (0.54750)	-1.47425* (0.56807)	-0.752106 (0.701271)	-1.5518** (0.4577)
GDP_{p-1}	0.07809 (0.30597)	0.164170 (0.289736)	0.25153 (0.39087)	0.69970* (0.25371)	0.872403** (0.258150)	0.3714 (0.2093)
$POP_{s-1/p-1}$	3.29886 (10.12504)	4.267338 (9.452912)	-4.22044 (12.11652)	3.36922 (8.43689)	-1.809972 (8.489162)	22.2218* (8.8433)
$FDI_{s-1/p-1}$	-0.01143 (0.04119)	-0.021853 (0.038334)	-0.01508 (0.04119)	0.15890 (0.10882)	0.156763 (0.100818)	0.3591** (0.1134)
$Imports_{sp-1}$	1.49126*** (0.29549)	1.438375*** (0.276533)	1.27794** (0.32776)	-	-	-
$Exports_{sp-1}$	-	-	-	0.68184* (0.27046)	0.374159 (0.313484)	0.2108 (0.2698)
Pol_{s-1}	-0.12201 (0.14731)	-0.134800 (0.137607)	0.13214 (0.21376)	-0.18055 (0.15536)	0.313484 (0.166257)	-0.5207** (0.1733)
Pol_{p-1}	-	-	-	-	-	-
WTO_t	-0.47420* (0.19367)	-0.514159* (0.183469)	-0.39260 (0.19909)	0.26285 (0.16745)	0.191156 (0.163031)	0.2652 (0.1346)
Observations	24	24	24	24	24	24
R-squared	0.9893	0.9906	0.9892	0.9879	0.9895	0.9922

*Note: Results of the gravity model estimating logged imports and exports of South Korea with China. Regression for imports and exports are run separately. Polity scores for Japan do not make estimators because values do not vary. *** significant 1%; **significant 5%; *significant 10%*

Table 3.5 Results of the gravity model - South Korea's trade with Japan

	(1) **Imports** GDELT (Political Relations Score)	(2) **Imports** GDELT (Negative events)	(3) **Imports** UNGA voting (Ideal point distance)	(4) **Exports** GDELT (Political Relations Score)	(5) **Exports** GDELT (Negative events)	(6) **Exports** UNGA voting (Ideal point distance)
s = South Korea *p* = Japan						
$PR_{sp-1/ps-1}$	-0.05861 (0.06452)	0.00044 (0.00137)	-0.89153 (0.64823)	-0.10497 (0.0510)	0.00284 (0.00154)	-0.9412 (0.53323)
GDP_{s-1}	-0.64207 (0.84528)	-0.3223 (0.7889)	0.31569 (0.79143)	0.52191 (0.33411)	0.35655 (0.37247)	0.81073 (0.34934)
GDP_{p-1}	-0.5780 (0.79353)	-0.2940 (0.7377)	-0.0836 (0.69706)	-0.05691 (0.52510)	-0.47931 (0.56231)	-0.15004 (0.53963)
$POP_{s-1/p-1}$	13.22587 (7.16492)	9.668 (6.864)	6.34447 (6.82131)	-16.0296 (14.4912)	-7.88686 (16.8005)	-30.5985 (14.7873)
$FDI_{s-1/p-1}$	-0.05282 (0.10912)	-0.00701 (0.1101)	-0.05234 (0.10407)	0.04254 (0.05644)	0.06204 (0.058042)	0.00963 (0.06239)
$Imports_{sp-1}$	0.79952 (0.55184)	0.6722 (0.5993)	0.15545 (0.56013)	-	-	-
$Exports_{sp-1}$	-	-	-	0.22613 (0.42723)	0.29833 (0.43854)	0.12764 (0.44509)
Pol_{s-1}	-0.25543 (0.19940)	-0.1663 (0.1779)	-0.20036 (0.1694)	0.13156 (0.10793)	0.01872 (0.12275)	0.06177 (0.11576)
Pol_{p-1}	-	-	-	-	-	-
WTO_t	0.06958 (0.17631)	0.05645 (0.1915)	0.06412 (0.16723)	0.08664 (0.17709)	0.12652 (0.17519)	0.28133 (0.16387)
Observations	24	24	24	24	24	24
R-squared	0.9001	0.895	0.9068	0.9107	0.9065	0.9048

*Note: Results of the gravity model estimating logged imports and exports of South Korea with Japan. Regression for imports and exports are run separately. Polity scores for Japan do not make estimators because values do not vary.*** significant 1%; **significant 5%; *significant 10%*

Table 3.6 Results of the gravity model - South Korea's trade with Russia

	(1) **Imports** GDELT (Political Relations Score)	(2) **Imports** GDELT (Negative events)	(3) **Imports** UNGA voting (Ideal point distance)	(4) **Exports** GDELT (Political Relations Score)	(5) **Exports** GDELT (Negative events)	(6) **Exports** UNGA voting (Ideal point distance)
s = South Korea, p = Russia						
$PR_{sp-1/ps-1}$	-0.19795 (0.15598)	0.03215 (0.02893)	-1.65216 (1.51614)	-0.1041 (0.1101)	-0.0047 (0.0073)	-1.28702 (0.73442)
GDP_{s-1}	1.52498 (1.80749)	1.6764 (1.8488)	0.79495 (1.90916)	1.4536 (1.2624)	1.540 (1.283)	1.40262 (1.16702)
GDP_{p-1}	-0.57487 (0.60134)	-0.5955 (0.6113)	-0.87772 (0.58572)	-1.0823 (0.6534)	-1.015 (0.6670)	-0.6614 (0.64238)
$POP_{s-1/p-1}$	43.7615* (19.2915)	35.0897 (18.6103)	21.6979 (22.8458)	2.6795 (44.1158)	4.622 (45.10)	25.0406 (42.7896)
$FDI_{s-1/p-1}$	-0.06996 (0.16085)	-0.0299 (0.15434)	0.1012 (0.17218)	0.2590 (0.1233)	0.2674 (0.1275)	0.2514 (0.11395)
$Imports_{sp-1}$	-0.5505 (1.0274)	-0.31655 (0.99006)	0.31145 (1.01046)	-	-	-
$Exports_{sp-1}$	-	-	-	0.8785 (0.5116)	0.8223 (0.5203)	0.6625 (0.48206)
Pol_{s-1}	-0.47105 (0.46191)	-0.37767 (0.46906)	-0.58229 (0.48937)	0.4632 (0.3330)	0.5559 (0.3485)	0.33596 (0.31991)
Pol_{p-1}	-0.1149 (0.15704)	-0.08948 (0.16181)	-0.16093 (0.16341)	-0.2921 (0.1034)	-0.3534** (0.0979)	-0.36561 (0.08707)
WTO_t	-0.58188 (0.49923)	-0.42534 (0.49962)	0.07166 (0.70337)	0.2035 (0.4982)	0.2734 (0.5172)	0.26601 (0.46184)
Observations	24	24	24	24	24	24
R-squared	0.8809	0.8776	0.8771	0.9566	0.9549	0.9629

*Note: Results of the gravity model estimating logged imports and exports of South Korea with Russia. Regression for imports and exports are run separately. *** significant 1%; **significant 5%; *significant 10%*

Table 3.7 Results of the gravity model - South Korea's trade with North Korea

	(1) **Imports** GDELT (Political Relations Score)	(2) **Imports** GDELT (Negative events)	(3) **Imports** UNGA voting (Ideal point distance)	(4) **Exports** GDELT (Political Relations Score)	(5) **Exports** GDELT (Negative events)	(6) **Exports** UNGA voting (Ideal point distance)
s = South Korea, p = North Korea						
$PR_{sp-1/ps-1}$	0.03099 (0.07615)	0.0001 (0.0002)	-0.1516 (0.6684)	-0.02969 (0.0565)	0.0005 (0.0013)	0.4651 (0.5350)
GDP_{s-1}	-0.92587 (0.69029)	-0.7646 (0.7247)	-0.7727 (0.8017)	-0.40909 (0.90091)	-0.1742 (1.106)	-0.7446 (0.9674)
GDP_{p-1}	2.37194 (1.39707)	2.176 (1.373)	2.0896 (1.53)	-4.07784* (1.57781)	-4.240* (1.653)	-3.9314* (1.5612)
$POP_{s-1/p-1}$	-0.01777 (14.1664)	-1.120 (14.14)	-1.7889 (15.027)	59.0819** (17.927)	58.67** (18.34)	64.8751** (18.3518)
$FDI_{s-1/p-1}$	-	-	-	-	-	-
$Imports_{sp-1}$	0.43354 (0.27078)	0.4162 (0.2798)	0.4965 (0.3447)	-	-	-
$Exports_{sp-1}$	-	-	-	0.25346 (0.29258)	0.204 (0.2911)	0.1369 (0.2979)
Pol_{s-1}	-0.3716 (0.2132)	-0.3167 (0.1939)	-0.2748 (0.3169)	-0.05097 (0.29457)	0.0194 (0.3653)	-0.1638 (0.3132)
Pol_{p-1}	-0.4707 (0.42457)	-0.4590 (0.4269)	-0.4422 (0.4545)	1.04062* (0.45814)	1.016 (0.4563)	0.8070 (0.5022)
WTO_t	-	-	-	-	-	-
Observations	24	24	24	24	24	24
R-squared	0.9087	0.9087	0.908	0.9761	0.9759	0.9768

*Note: Results of the gravity model estimating logged imports and exports of South Korea with North Korea. There are not available data on FDI between South and North Korea. North Korea has not joined WTO, thus the variable has a singularity problem. Regression for imports and exports are run separately. *** significant 1%; **significant 5%; *significant*

CHAPTER 4

DISCUSSION: EXPLAINING VARIATIONS IN SOUTH KOREA'S POLITICAL AND TRADE RELATIONSHIP

4.1. Overall interpretation

As the empirical results show in the previous chapter, South Korea's political relations with China, Japan, Russia, and North Korea do affect South Korea's trade with these countries. However, the results are mixed, and it is difficult to make absolute statements about how political relations affect trade. The significance of political impacts on trade depends on the trading partner, and there are also differing results for imports and exports. In addition, the results reveal that the magnitude and duration of the impacts are also differentiated by trading partner. Consequently, South Korea's political relations with the four countries are reflected in South Korea's trade relations partially or entirely by trading partners, which means there could be other factors to affect South Korea's trade with the countries. Other potential factors include the importance of the foreign market in South Korea's exports and imports or specific features of South Korean industry. These variables could be important potential covariates along with political relations.

Plus, while this study can argue that South Korea's trade is affected by its political relations, the findings do not directly address whether the South Korean government or the four countries' governments control or intervene in trade directly. There could be a possibility that each government tends to impose certain pressure on trade or enterprises reflect the political relations in their business activities regardless of the influence of the

governments. However, these possibility are not provable only with the findings of this study. This study leaves this limit as a task for the future research. Table 4.1 summarizes the results of the analysis and Figure 13 display South Korea's political economy relations with the four countries based on data used in and the results of the analysis.

Table 4.1 South Korea' political and economic relations with the four case countries

Case	Economic importance with South Korea	Current Political Relations with South Korea	Level of Political Volatility	Effects of Political Relations on Trade
China	High	Poor	High	Mostly Insignificant
Japan	High	Mixed	High	Weakly Significant
Russia	Low	Normal	Low	Weakly Significant
North Korea	Low	Very Poor	Low	Strongly Significant

Note: The economic importance is based on trade data used in study and the current political relations and political volatility are based on the current political event between countries and the results of the GDELT Goldstein scores. The effects of political relations on trade are based on the result of the analysis of this study.

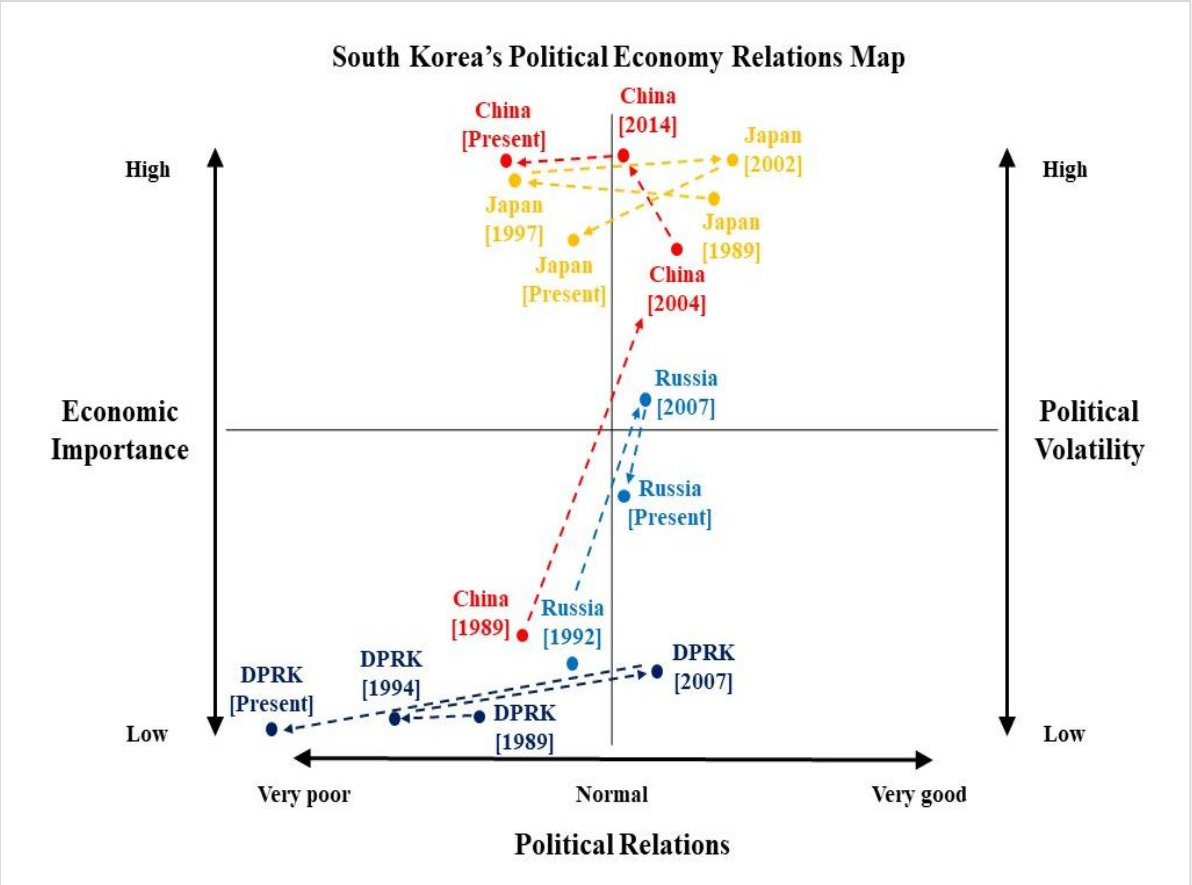


Figure 13. South Korea's Political Economy Relations Map

Note: The economic importance is based on trade data used in study and the current political relations and political volatility are based on the current political event between countries and the results of the GDELT Goldstein scores.

4.2 Interpretation by each case

4.2.1. South Korea – China

The empirical results show that South Korea's imports from China are affected by political relations, but the effects are only restricted in the estimation with the PRS. On the other hand, South Korea's political relations with China do not have certain impacts on South Korea's exports to China. Even if the estimation measured with the ideal point distance makes a statistically significant result in South Korea's exports to China, this study doubts whether the ideal point gap could reflect direct relations between South Korea and China

because it is based on UNGA voting. This means that the voting results would not necessarily mirror the specific actions of a country toward another country.[45] Therefore, this study provides two interpretations on the results of the South Korea – China case: (1) China is an important market both in South Korea's trade, so is South Korea in China's trade. Thus, political relations between South Korea and China would have restricted impacts on trade between them; (2) It seems evident that the Chinese government uses economic relations with South Korea as a tool of foreign policy toward South Korea, but the Chinese government as well as the South Korean government have not directly touched trade relations between each other.

Considering the importance of China in South Korea's trade, it would be said that South Korea's economic benefits from trade with China dominate the impact of political relationship between the two countries. As noted in Chapter 1, China is South Korea's biggest trading partner for both exports and imports. 77% of South Korea's GDP is comprised of trade and 26% of South Korea's exports go to China. This indicates that around 20% of South Korea's GDP relies on Chinese market,[46] which means both South Korea's overall economy and South Korean enterprises could be damaged if exports with China deteriorated. As the Chinese market is important to South Korea's trade, South Korea is an important trade partner to China as well. South Korea is fourth largest exports destination of China following the U.S., Hong Kong, and Japan. South Korea is also a crucial market for Chinese imports. Regarding that 77% of China's imports from South Korea are intermediate

[45] As noted earlier chapters, the fact that the ideal point distance is annual data could be pointed as a drawback in measuring political relations with the data.
[46] Data is based on the World Bank and the Observatory of Economic Complexity (OEC). The World Bank data is available at https://data.worldbank.org/; OEC data is available at https://atlas.media.mit.edu/en/

materials (Korea Trade-Investment Promotion Agency, 2017), South Korea is an important supplying market to the Chinese industry. Consequently, unless South Korea and China threat the national security against each other or lose the market value, both countries have very strong economic incentives to sustain trade relations. The level of political conflict has arguably not risen to the threshold needed to overcome these economic incentives.

The most recent political issue, THAAD deployment in South Korea, have resulted in economic retaliation from China against South Korean service industries and companies in China. It seems evident that the economic retaliation caused by a political issue led to economic losses in South Korea. In particular, South Korean tourism industry and companies in China were mainly targeted by the economic retaliation,[47] and total trade between two countries was also decreasing during the time. However, while there existed explicit restrictions on the South Korean tourism industry and boycott against South Korean companies led by the Chinese government, there were no direct regulations from the Chinese government on trade with South Korea for the time. In short, this case shows that the Chinese government could exploit economic tools as carrot and stick for political purpose, but the actions could not easily lead to a direct regulation on trade with South Korea. As a result, the political relationship between South Korea and China could affect economic activities of South Korea as well as China, but in the situation that the economic ties through trade are as

[47] For example, the Korean airline was refused increasing the number of flights to China by Chinese authorities, and the Chinese government ordered Chinese travel agency to stop touring to South Korea. The South Korean Lotte company suffered from cyber-attacks since the land approval for the THAAD system, and some of its stores in China were fined or closed by Chinese authorities. Specific stories are available at http://www.reuters.com/article/us-southkorea-china-lotte-idUSKBN16G1FR and http://www.reuters.com/article/us-southkorea-china-lotte-idUSKBN16G1FR

important as the political relationship between the two countries, the impacts of political relations on trade could be offset by economic preferences.

4.2.2. South Korea – Japan

While South Korea political relations have restricted impacts on South Korea's imports, the empirical results show that South Korea's political relations with Japan have restricted impacts only on export of South Korea. As the results on South Korean imports from China, this case also shows short-term effects of political relations on trade and does not have statistically significant impacts estimated by negative political events. Based on the results, this study provides two interpretations on the impacts of political relations between South Korea and Japan on South Korea's trade: (1) South Korea's Imports from Japan take significant role in South Korea's industry comparing to the influence of South Korea's exports on Japanese industry; (2) South Korea's political relationship with Japan has not been altered as much as it affects South Korea's trade with Japan.

Unlike trade with China, South Korea has been recording a deficit in trade with Japan. It could be seen as an aspect that the Japanese market would be not as beneficial as the Chinese market is, or Japanese companies and citizens less purchase Korean products than Koreans companies and citizens prefer Japanese products. However, in another perspective, Japanese imports could have an important role that influence South Korea's economy. In fact, based on research from the Korea Small Business Institute (2010), South Korean industry has had a strong dependency on intermediate materials imported from Japan. While the intermediate material supply from the South Korean domestic market has been declining, it has continued to increase importing intermediate materials from the Japanese market,

especially in electronics, machines, and chemical products. In contrast, the Japanese industry has reduced its dependency on the intermediate materials imported from South Korea. This means that the production of Japanese industry has caused the production of South Korean industry more than South Korean industry does. Consequently, considering that South Korean industry comprises 39% of the GDP of South Korea and Japan is the largest and the second biggest origins of South Korea's imports in chemical products and machines each, South Korea's imports from Japan could offset the impacts of political relations due to the economic preference.

In general, South Korea and Japan have shown a sensitive political relations with several political and historical-related issues such as the Dokdo/Takeshima ownership dispute, Japanese history textbook issue, and South Korean comfort women issue. It seems obvious that these issues bring about altering the two countries' political relations, but based on the findings, the magnitude of the change is modest. Even if negative political events have driven the flows of political relations in a negative direction, political scores between the two states have been over 1.5 score on average, which indicates positive relations, and it has not made abrupt and dominating changes as much as it affects trade between the two countries significantly. As a result, the mild changes in South Korea – Japan political relationship, with the influence of industry's dependency, lead to partial impacts on South Korea's exports, but it could not be said that the political relations between the two countries have dominating impacts on their trade relations.

4.2.3. South Korea – Russia

Similarly to the results of South Korea – Japan case, the empirical results show that South Korea's political relations with Russia have restricted impacts only on export of South Korea as well as have short-term effects. However, the South Korea – Russia case reveals that negative political events between South Korea and Russia have certain impacts on South Korea's exports to Russia. In addition, the PRS between the two states, interestingly, is negatively associated with South Koreas exports to Russia. Based on the results, this study finds two features in trade relations between the two countries, which could attribute to these results: (1) South Korea's Imports from Russia have been biased toward natural resources imports; (2) The Russian government has imposed restrictions on imports from other countries.

In general, the economic relationship between South Korea and Russia has improved in positive way (Lee et al., 2015). Since 1990, the year when South Korea and Russia formed diplomatic relations, trade between two countries has increased more than 130 times. However, it is apparent that there are several challenges in trade between the two countries, such as two countries' strong dependency on certain products in exports and imports, complicated customs procedure in Russia, and high trade tariffs of Russia. Such challenges has become obstacles that prevent the economic relationship from being progressed, and these challenges could be related to the results of the impacts of South Korea – Russia political relations on trade between them.

South Korea's imports from Russia have steadily increased without certain rapid changes. As the trade relationship between the two countries was built in 1990s, the increase

in South Korea's imports from Russia would be considered as natural effects. However, the constant increase in South Korea's imports from Russia is based on a fact: South Korea has a severe scarcity in natural resources. Based on the report from Koreas Institute for International Economic Policy (Lee et al., 2015), mineral and energy products, such as crude petroleum and petroleum gas, comprise 82% of the South Korea's imports from Russia. Considering the importance of natural resource to South Korea and South Korea's policy to find various routes to import natural resources, Russia is one of valuable natural resource provider to South Korea. Consequently, the scarcity on and need for natural resources could have made South Korea's constant imports from Russia regardless of the impacts of political relations.

In contrast, South Korea's exports to Russia are unstable comparing to South Korea's imports to Russia, and political relations between the two countries affect South Korea's exports to Russia. This could be closely associated with the trade policy of Russia. Comparing to the customs procedure in South Korea, the process in Russia is more complicated, and the time to import in Russia from other countries is 2.8 times longer than that of South Korea (Lee et al., 2015). Above all things, the Russian government's restrictions on their imports, such as imposing tariffs and safeguards, are higher and occur more frequently than the South Korean government does. For example, the Russian government, on July 2014, imposed a ban on importing certain type of machine products manufactured abroad, and South Korean products were included in the ban (Lee et al., 2015).[48] As a result, based on the fact that the Russian government frequently intervenes and

[48] Lee et al. say that the Russian government's regulation is one of the reasons that South Korea has recorded trade deficits constantly in trade with Russia

changes trade policy, South Korea's exports to Russia, highly possibly, could be affected by its political relations with Russia.

4.2.4. South Korea – North Korea

Unlike the other three cases, the empirical results show that South Korea's political relations with North Korea clearly affect both South Korea's exports and imports with North Korea. While the PRS shows short-term effects, negative political events reveal long and strong effects on trade. In addition, in the sense that the impacts of political relation on trade occur at least in two months, the results indicate that trade between two Koreas react to political relations sensitively. Based on the results, this study provides two interpretations on South – North Korea trade aspects according to political relations between the two Koreas: (1) South and North Korea political relations dominate trade relations between the two Koreas; (2) South and North Korea use the trade bridge not for economic preferences, but for political leverage strategically.

While other cases in this study have partial impacts of political relations trade, South and North Korea case shows a dominant effects of political relations on trade. In reality, it is apparent that trade between South and North Korea has followed political flags. Aggravated or relived political relations between the two Koreas have led to certain changes in South – North Korea trade negatively or positively. As stated in the previous chapter, depending on political flags of the South Korean administration, whether progressive or conservative, political atmosphere between the two Koreas was altered and it was mirrored in trade aspects between the two Koreas. Moreover, whenever North Korea conducted military provocations, such as ballistic missile tests and nuclear bomb tests, economic regulations were considered

as punitive actions against North Korea. As a result, South – North Korea case demonstrates that political conditions are antecedent to forming trade relations.

In case of South Korea, trade with North Korea could not bring a lot of economic benefits. North Korea does not take any important role in South Korea's economy and could not damage South Korea's economy even if trade with North Korea is cut off. The same is true for North Korea. Considering North Korea's largest economic partner is China, from which 83% of North Korea's exports and 85% of North Korea's imports happen, South Korea's economic influence through trade on North Korea's economy is not significant. This means that two Koreas choose and use the trade option not for economic preferences, but for political purpose strategically. Even if economic cooperation with North Korea would not guarantee peace in the Korean peninsula, the South Korean government would attempt to use and keep the trade relationship with North Korea as a link to talk. North Korea also would use the trade relationship to have better political leverage in the relationship, constantly repeating stop and resuming trade with South Korea. Consequently, South and North Korea exploit the trade relationship strategically as a tool for political purpose, not for economic purpose.

CHAPTER 5

CONCLUSION

5.1. Overview of the thesis

The first chapter of this thesis looks at challenges that South Korea faces in the current political situation and trade, and provides general information on political and bilateral trade relations of South Korea with its major trading partners and also North Korea. In general, South Korea's trade relations with the major trading partners, the U.S., Japan, and China, were developed as political relations with the countries improved. South Korea's trade with North Korea. The current situations on the Korean peninsula reflect this fact, China's economic retaliation against South Korea when it deployed the THAAD system to prevent North Korea's missile attacks, reveals that South Korea's economic relations with other countries are still closely related to political relations.

Following the real case of South Korea introduced in the first chapter, the second chapter looks through previous academic literature relevant to this topic: (1) the argument that trade affects political relations; (2) the argument that political relations affect trade. Looking through the argument of each school, this thesis also finds how previous research measures political relations. This is one of the core variables in this empirical research. Considerable research has used negative events, such as military and diplomatic disputes between countries, in measuring political relations, but the UNGA voting data and events data based on news articles are also commonly used to measure political relations. However, the fact that most of research has used yearly-based data on political relations could make

shortcomings not to mirror frequent changes in political relations between countries within a year. Therefore, this study measures political relations both yearly and monthly by using the GDELT events data (Leetaru and Schrodt, 2013) and the UNGA voting data (Bailey, Strezhnev, and Voeten, 2017).

Considering South Korea's features in political and trade relations and based on academic grounds from previous research, this study examines the impacts of South Korea's political relations on South Korea's bilateral trade with these countries. This study considers how significantly a country affects South Korea both politically and economically as well as how the political and economic relations between South Korea and the country has altered, thus, selects four cases: South Korea – China, Japan, Russia, and North Korea. As an empirical analysis, this study builds on both the VAR model and the gravity model to test the hypothesis by each case. The findings show that South Korea's political relations with China, Japan, Russia, and North Korea do affect South Korea's trade with these countries, however, the results are mixed, and the impacts of South Korea's political relations on its bilateral trade with the four countries have different magnitude and duration by each of the trading partners. South Korea's political relations with the four countries are partially or entirely reflected in South Korea's trade relations by trading partners and it means there could be other factors to affect South Korea's trade with the countries, such as the importance of the foreign market in South Korea's exports and imports or specific features of South Korean industry.

From the findings, the fourth chapter finds the reasons that different results appear depending on the country. This study addresses that each of the countries in this case have different importance in South Korea's trade. According to the market potential and role of

exported and imported goods in the industry of each country, South Korea has different trade relations with the four countries. This study finds that the fact that South Korea has different political relations by country, functions one of the reasons for the different results by countries. As a result, the findings imply that political relations between two countries have certain impacts on the bilateral trade and the impacts could occur in different aspects by a country's political and economic relations with another country.

5.2. Contribution to existing research and South Korea's Foreign and Trade Policy

Whether trade is prior to politics or politics is prior to trade has been of considerable interest amongst scholars and this discussion is still underway. In that sense, this thesis contributes to supporting the argument that politics has impacts on trade. Not only derived from the empirical results of this study the argument, but also the fact that South Korea formed or normalized diplomatic relations before establishing trade relationship shows that political relations are to trade.[49] Even if this research is estimating the impacts of political relations on trade with restricted cases, it is evident that the cases in this research support the argument with empirical evidences.

Another contribution of this thesis is that the empirical findings show different impacts of political relations on trade dependent on the country. As mentioned earlier, the former research found general impacts of political relations on trade by using the large number of sample countries. In particular, the results of formal studies, in many cases, do not demonstrate how a country's political relations affect trade with a certain specific country

[49] South Korea normalized diplomatic relations with Japan and China in 1965 and 1992 each. After the diplomatic normalization, South Korea's trade and overall economic cooperation accelerated. South Korea's beginning trade with Russia was also a following result of normalizing diplomatic relations between South Korea and Russia in 1990.

although there exist an extensive possibility that a county has different political and trade relations with each of different countries, thus effects of political relations on trade could appear different on a case by case basis. Consequently, this study shows that analyzing the effects of political relations on trade case by case could be more precise than seeing the general effects This could help to suggest a particular direction in establishing foreign and trade policy with a country.

To take the micro-approach that analyzes the impacts of political relations on trade between specific countries, measuring detailed political relations between the two countries should be possible. However, most of previous research does not suggest a meticulous method to measure political relations, but provides a simple dimension not to reflect how political relations between two countries change as time passes by. In that sense, this study implies that estimating detailed political relations and trade flows between countries will be available more and more as the use of machine learning technology and big data analysis becomes more developed and commonplace. For example, the GDELT data used in this study is one of big data source based on the machine learning system. As a machine operates by translating each language of news articles from all around the world in English and analyzes the source, locations, sorts of events, and other information of the articles automatically; it enables to get what political events occur between certain actors, such as countries, businesses or NGOs. Therefore, this study expects that the more big data technology is developed and becomes common in political science, the more detailed analysis on political relations between specific countries will be possible, and it will lead to progress in this topic to make more accurate data and analysis enabled.

Lastly, this thesis contributes to South Korea's foreign policy toward the four countries mentioned above. Forming and sustaining political relations with these four countries becomes a fundamental condition so that South Korea keeps and develops trade relations with the partners. This is especially important when regarding that the empirical results firmly show the prior impacts of political relations on trade with North Korea, focusing on and preparing for a political approach in solving the issue with North Korea is needed to be prior to an economic approach. Trade with North Korea could be a catalyst to improve political relations, but it should not be a major policy lead to achieving peace on the Korean peninsula unless the political relations between the two Koreas is resolved or North Korea's economy relies upon South Korea's economy enormously.

5.3. Questions unresolved

Despite the contribution of this thesis to addressing the effects of political relation on trade, this research cannot find a specific threshold from which political relations begin influencing trade flows between countries. However, finding an explicit line empirically would be impossible with data and models in this study. It is apparent that that work requires more specified and a longer span of data on political relations, trade, as well as other relevant factors. In addition, the effective level found empirically in future research will provide more substantial policy advice with precise effects and anticipated results of political relations on trade.

As noted earlier, whether governments control trade according to political relations or business sectors reflect political relations in their trade activities is not measurable through the findings. This remains another task in future research. In other words, there would need

another test to see whether negative or positive political relations between countries cause either regulating or supporting trade toward each other. As stated in an example, the Russian government frequently controlled trade with other countries by imposing tariffs and safeguards, but it is unclear, through this study, that these regulations from the government are led by political collisions with other countries. Consequently, this thesis can address the effects of political relations on trade, but more evidences and empirical tests are required to find whether political relations bring about government's certain actions on trade or not.

Measuring political relations and choosing a proper model is the most important and challenge in conducting the empirical analysis of this this thesis. Through extensive research, this thesis determines to use the GDELT events data measure South Korea's political relations with the four countries, but it is short of employing the GDELT events data more sophisticatedly in measuring political relations. Specifically, political relations would be measured more accurately if actors were specified in detail and events that could not be seen as political actions were filtered out. In addition, this study leaves a question on the model used in the analysis. It is likely to say that the VAR model employed for the analysis does not reveal particular problems in testing the hypothesis. All of the data in this thesis has stationarity when they are once and that makes them meet the condition for using the VAR model in the analysis. However, in the stationarity test, while some of data should be differenced once to have the stationarity, it turns out that some of them are stationary at the current level. This means that another model, such as the autoregressive distributed lag (ARDL) model that can test variables having the stationarity at different levels, could be a suitable model employed for this study as well. To sum up, this study contributes to existing academic research and trade policies, but all the questions and shortcomings pointed here

have to be examined in the future research so as to estimate more exact effects of political relations on trade.

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APPENDICES

Appendix A. Tables of South Korea's Political Relations Score (PRS)

Table A.1 PRS - South Korea's actions toward China (1989-2016)

1989-2016 South Korea - China relations												
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec
1989	-	-	-	-	-	-	2.8	2.8	2.8	2	3.4	3.4
1990	-	-	-	-	-	-0.5	5.2	-	0.8	3.5	-	-
1991	-	-	1	-	-	4	3.5	-	-	1	4.6	4
1992	2.3	-	-	2.8	-	1	-	3.8	1.9	1.9	-	-
1993	-	0	3.1	6	0	-	-	1.9	1	2.9	2.5	-
1994	2.6	4.5	2.7	-	1.3	3.1	-	-	4	3.5	1.5	-
1995	-	-	4	3.9	-0.2	-	0.5	3.5	2.5	-	4	-
1996	-1.4	5.5	2.4	5.8	-	1.9	4.3	1.4	3.6	3.5	3.5	0.1
1997	4.1	2.6	3.6	3.6	3.7	2.6	4	3.2	4.8	-	2.2	3
1998	-	3.6	2.1	3.6	4	2.5	3.1	6	3.5	2.1	2.5	3.2
1999	2	3.2	1.9	0.3	1.3	6.2	1.4	2.8	2.1	-	1.9	4
2000	-0.8	-	3.3	3.2	-2.6	4	1.9	2.8	1	1.2	-0.4	2
2001	1.4	2.8	3.7	2.2	2.7	2.4	4	0.2	3.3	2.3	0.5	1.9
2002	4	2.4	2.8	2	1.1	0.6	4	1	1	4	2.7	3.4
2003	3.4	2.7	2.1	2.7	2.4	2.4	2.9	0.5	1.4	3.4	3.8	4
2004	3.3	0.9	2.6	1.9	4.9	1.5	-3.7	2.1	-0.1	-1.2	3.8	2.4
2005	0.5	3.4	0.9	2.7	2	3.3	1.9	2.8	2.2	1.3	4.6	-
2006	2.2	-0.3	2.7	2.1	1	2.8	3.9	3	3.1	3.7	2.9	2.4
2007	3	2.4	4.1	3.9	3.1	1.1	2.7	1.9	3.2	-0.9	3	3.1
2008	-1.9	2.4	3.1	1.5	3.3	3.4	2.3	3.6	-4.9	3.4	-	1.6
2009	-1.7	4.3	0.1	-0.6	1.4	2.6	-0.8	4.2	3.5	3.2	-3.4	6.4
2010	2.6	1.3	-0.1	2.8	1.6	2.2	-2.6	0.9	1	4.2	2.4	-1.1
2011	2.9	3.3	1.7	3.7	-0.5	2.1	3.5	2.2	-0.8	-0.9	-2.5	-2.9
2012	2.4	1	-0.2	0.8	0.4	2.4	2	-3	3.2	-3.1	4.4	0.2
2013	2.7	2.9	0.9	0.1	2.7	3.4	2.8	0.4	1.6	-3.6	0.6	-2
2014	2.6	2.3	2.8	3.2	2.4	4.8	3.1	5.8	1.7	-3.4	3.5	2
2015	2.7	-0.4	3.1	1.1	3.5	-1.5	0.4	2.4	3	1.8	4.1	-1.6
2016	2.8	2	1.9	-0.5	1	1.2	2.1	2	-6.1	-1.2	-8.3	-1.4

Table A.2 PRS - China's actions toward South Korea (1989-2016)

1989-2016 China - South Korea relations												
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec
1989	-	-	-	-	-	-	-	0	-1.3	-	-	1.9
1990	-	-	1.7	1.9	-	-	-	-	2.8	6	-	-
1991	-0.8	-	4	1	-1.7	-	-	1.3	-0.4	1	3.6	1.9
1992	1.9	-	-	3.4	-	-	-	2	2.5	-	-	-
1993	-	-	-	-	2.2	-	4.5	-	1.9	4	2.8	2.7
1994	3.4	-	3.7	-	1.9	4.8	4	-	3.6	3	3.6	-
1995	-1.6	-	5	3	2.1	-5	-	2.7	0.5	3.1	2.5	1
1996	2.5	3.4	5.6	2	2.9	1	2.9	-	1.8	-3.4	1.9	2.6
1997	0.5	1.4	2.9	2.6	-0.3	2.8	1.8	1.7	4	3.4	2.1	3.2
1998	-	-1	0.6	4	-	1.9	1	1.7	2.7	3.5	2.8	4
1999	3	3.1	3.1	-	2.7	0.1	1.4	0.7	3	2.7	3.1	2.4
2000	2.1	4	4.2	4.5	1	3.4	3.5	3.9	3.4	2.8	2.1	2.4
2001	3	0.3	4	3.5	3.9	2.4	2	2.7	2	1.4	-2.8	4.5
2002	0.9	3.8	0.3	2.7	3.4	1.5	2.1	2.4	2.3	7	3.3	0.6
2003	2.8	2.1	4.1	1.1	6.5	4.2	3.4	4	2.8	3	2.6	-0.1
2004	4.6	4.1	3.5	2.8	3.4	1.7	2.5	1.7	-1.9	3	3.7	2.2
2005	2.6	3	2.6	2.9	1	3.9	4	1.6	3.8	2.3	2.5	-0.6
2006	-0.4	1	5.9	2.8	1.9	4.2	4.2	5.4	0.8	3	3.3	2.8
2007	2	5.3	4	2.4	3.7	3.9	2.6	5.7	2.6	1.1	3.3	5
2008	2.9	1.1	3	1.2	4.2	1.3	0.7	2.2	4.8	0	1.9	2.6
2009	4.7	2.4	2.9	4.5	1.9	-0.3	3.8	1.3	4	2	4.8	1
2010	2.4	2.9	2.2	3.3	3.8	0.5	-0.7	0.6	2.3	4.6	0.8	1.5
2011	3.4	2.8	2.1	2.3	1.5	3.4	2.8	-0.5	-4.4	3.4	4.1	2.5
2012	2.8	4.1	2.5	2.8	2.8	1.7	3.6	0.5	2.2	1.8	3.2	1
2013	2.4	1.6	3.1	1.5	2.4	3.1	4.2	4.5	4.1	3.4	2.8	-0.3
2014	4.5	2.3	2.4	3.3	3	2.7	2.2	3.1	2.8	-1.2	1.7	-4.1
2015	1.2	-0.3	2.6	2.1	2.8	1.1	2.5	4.9	2.2	3.9	3.8	3.6
2016	5.1	0.1	1.4	4.7	1.9	3.1	3	1.7	-2.5	0.3	1.4	0.7

Table A.3 PRS - South Korea's actions toward Japan (1989-2016)

1989-2016 South Korea - Japan relations												
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec
1989	2.2	0.6	2.6	3.1	2.8	0.1	5.1	1.9	0.8	3.3	6.8	3.1
1990	1.9	-	-	2.8	2.8	2.5	-2	-	0.1	0	3.1	2.8
1991	-	-	-	4.1	1.9	-	2.4	-4.8	-	7	3	1
1992	2.3	-	7	1.9	-	-	-	-	1.9	3.7	-	-
1993	2.4	-	1.4	-	2.8	2.3	2.8	-0.9	-1.6	1.7	3.9	3.4
1994	4	2.8	2.6	2	-6.5	-	4.5	3.6	-	3.4	3	1.9
1995	-	2.9	-2	3.2	1.7	-0.7	1.9	2	-	-6.5	0.5	0
1996	1.9	2.6	-0.9	2.7	-	2.2	0.7	2.6	3.9	3.3	3.9	2.9
1997	3.2	3.6	3.2	3.5	1.8	7	1.6	4.6	2	-	-0.2	4.8
1998	-1.1	3.4	3.4	1.9	2	0.4	2.4	2.1	3	2.8	3.1	-1.8
1999	2.9	3.8	1.9	1.7	3.5	2.8	0.3	2.1	3.2	2.1	2	0.5
2000	3.3	-3.4	3.5	4.2	3.3	3.5	3.3	3.6	3	5.6	3.3	2.9
2001	2.7	3.3	0.4	0.1	0.6	1.4	-0.2	-0.8	-1.2	1.6	-1.6	7
2002	4.7	4.3	1	7	0	-	3.2	-	2	2.4	4.9	2.9
2003	1.3	3.6	1.1	2	3.6	2.7	3.9	1.2	3.1	2.8	4.5	3.4
2004	-0.2	3.4	0.6	-	2.8	4.6	4.7	-0.8	1.7	2.3	2.8	1.5
2005	2.8	2.8	-0.2	0.6	1.1	1.4	0	1.8	2.3	1.6	2	1.3
2006	2.4	2.8	-0.2	-0.1	1.2	2.1	0.6	0.5	2.3	4.5	2.9	3
2007	1.3	3.3	2.4	1.5	3.1	0.9	-9	-	4.6	-0.6	-0.4	3.7
2008	5.7	1	-0.4	2.1	5.9	3	-0.1	-0.9	1.2	1.7	3.3	3.1
2009	5.5	2.6	-4.6	1.4	2.1	2.6	3	2.6	3.4	2.5	2.7	1.8
2010	1.6	3.2	-0.7	0.6	2.3	2.8	-0.1	1.6	1.9	2.3	2.9	2
2011	0.9	2.2	1.8	3.8	1.7	3.9	0.6	-0.7	3.2	3.8	1.2	2.1
2012	0.4	3.1	2.1	3.5	4.4	1.7	1.5	2.2	1.7	1	3.8	2.8
2013	2.2	2.2	2.2	-1.3	0	-0.5	3.1	1.5	-0.3	-0.3	1.7	-0.3
2014	0.6	-0.5	-0.2	1.8	1.4	-0.1	4.5	1.5	4.9	0	3.5	0.6
2015	1.5	1.7	3.6	0.7	3.8	2.7	0.4	2.5	1.7	1	2.1	2.3
2016	3.2	1.2	-1	-3.4	3.3	-2.4	4	1.1	1.8	2.6	4.4	0.1

Table A.4 PRS - Japan's actions toward South Korea (1989-2016)

1989-2016 Japan - South Korea relations												
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec
1989	-	3.7	2.4	2	-2	-	1.9	-	3.5	-	4	4
1990	-	-	-	2.5	4.1	5.1	3.5	-	2.1	0.3	1.9	4
1991	2.4	4	-	-	-	-	-	-	3.4	2.3	4.7	2.5
1992	2.5	3.6	-3	0.8	3.8	-	4.6	-	3.9	1.9	2.8	-2
1993	3	1.9	1.8	-	2.2	3.7	4.1	3.3	2.7	2.5	2.8	-
1994	2.8	1	3.4	3.7	-	1.9	1.9	2.1	2.2	-0.1	7	1.9
1995	-	7	8	-	2.7	0	-	3.1	-	-	1	-
1996	1.7	2.5	1.7	2.9	0	3.3	4.8	0.7	0.3	3	3	0
1997	3.2	4.1	-	3	1.9	-3.4	0.8	-4.6	-2.6	-1.4	3.4	3.9
1998	1.9	4.1	3.1	-3	2.9	5.5	2.8	4	2.1	1.2	3.7	1.3
1999	2	1.5	3	2	1.9	2.9	0.9	2.4	3.1	2.9	3	3.3
2000	4.3	1.9	2.5	1	2.2	1.9	4.4	6.4	3.3	3.2	3.8	6.2
2001	3.8	-	2.8	2.3	1.6	-1.7	2	0.7	-1.7	1.8	4.3	1.9
2002	2	1.7	1.3	6.3	3	1.4	1.8	2.9	3	2.2	3.4	3.8
2003	2.4	2.2	-1.5	2	2.9	3.2	2.2	2.8	2.8	3.5	3	4.1
2004	-0.1	3.3	4	2.5	0.8	3.4	2.2	4	4.1	3.4	1.6	4.6
2005	3.5	-0.8	2.4	1.3	1.4	1	1.7	0.3	3.2	1.3	1.9	1.4
2006	1.3	0.7	6.2	1.4	3.7	1.5	0.9	1.4	0.2	2	4.2	0.8
2007	3.9	0.5	4.4	0.1	3.8	2.7	2.9	1.8	1.2	2.2	2.8	3.6
2008	3.4	3.3	2.9	1.7	3.7	3.1	-0.3	3.2	-1.4	2.9	2.8	3.1
2009	2.7	1.8	2.8	1.5	-1.7	4.6	4.3	-0.5	3.2	2.5	2.2	1.8
2010	2	2	-0.1	-1.3	2.2	0.9	1.7	3.2	-0.1	4.6	4.1	4.7
2011	2.8	1.5	4.1	3	1.6	5.3	1.5	2	2.4	1.6	0.9	3
2012	-3.6	-3.7	0.2	-0.4	2.9	6.4	3.1	-0.6	1.2	1.2	1.9	-1.3
2013	-1.7	1	0.9	1.2	3.7	-3.5	1.4	-0.4	1.9	0.4	2.2	1.3
2014	1.3	1.3	3.2	1.7	3.5	0.9	2.1	2.8	1.2	3.3	1.4	3.9
2015	2.2	2.4	0.9	-0.4	1.1	2.2	2.6	0.3	1.9	2	4.8	5
2016	2.2	0.6	2.6	3.1	2.8	0	5.1	1.9	0.8	3.3	6.8	3.1

Table A.5 PRS - South Korea's actions toward Russia (1989-2016)

1989-2016 South Korea - Russia relations												
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec
1989	-	-	-	-	-	4	-	-	-	-	-	-
1990	-	6	4	3.2	-	5.5	4	6	-	3.7	3.9	2.3
1991	1.5	-	-	2.2	-	1.9	-	5.1	3.7	-	2.2	0.8
1992	-	5.8	-	5.2	-	1.9	-	4	2.8	4	2.9	-2.8
1993	-	1.9	3.4	5	-	3.2	-	2.9	-	1.9	-	-
1994	4	-1.9	3.3	2.7	4.4	2	2.2	-	-	4	3.5	-
1995	-	-	-4	3.9	1.4	-	-	-	2.6	3.9	-	-
1996	-	-9	4	2.8	2.1	-	2.5	_	2.5	-4.7	3.7	-
1997	-	4	-	-	-	7.2	5.2	-	2.8	-	-	-
1998	-	3	-	2.8	4.4	2	1.6	4.2	1.7	2.8	1.3	-
1999	3.4	2.4	3.4	3	2.6	2.7	5.4	1.8	3	2.8	-	-
2000	-0.3	4.5	0.7	2.6	-	2.9	4	3	2.7	2	3	3.5
2001	3.5	3.4	4	4.1	-	4	4.6	0.7	2	0.1	-	4
2002	1.9	3.5	-	2.8	1.9	4	4.6	3	-	1.9	2	3.7
2003	2.8	3.3	2.4	2.6	2.4	4.2	2.4	2.8	5.1	4.2	3.6	-
2004	-	4.5	-	6.6	2.7	4	1.3	4	2.9	-	4.1	-
2005	0.4	1	1.9	2.1	2.9	-	-	3.4	-	-	3.7	-
2006	-	4	3.4	1	7	3.7	3	-	-	3	6.3	-
2007	-	1	1	3.9	4.2	1.1	2.5	4	1.9	-	2.5	3.5
2008	2.8	-	1	3.5	4.2	-	3.8	1.9	2.7	-	-	3.3
2009	1.8	3.7	2.5	2.1	1	0.8	3.1	2.7	3.7	-	0.7	5
2010	6.1	4	1.9	4	0.7	-	-	3.7	2.9	2.2	3.1	4
2011	-2	-2	7	7	1.9	4.6	3.8	2	1.6	3.4	2	-6.7
2012	4.8	2	3.9	2.9	-	-2	-	-0.6	1.9	-	-	1
2013	-	3.2	3.2	0.3	-	0	2.8	3.3	2.1	-	5.1	0
2014	-	-2	3.4	0	2.5	-3.6	4	2	7	4.5	2.5	3.2
2015	4	5.6	0.6	-3.6	2	3.4	1.2	2.7	1	3.3	2	0.1
2016	2.5	1	1	7	3.3	2.8	2.5	1.2	1.4	-0.1	-0.9	2.3

Table A.6 PRS - Russia's actions toward South Korea (1989-2016)

1989-2016 Russia - South Korea relations												
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec
1989	2.5	1	1	7	3.3	2.8	2.5	1.2	1.4	-0.1	-0.9	2.3
1990	-	-	-	3	7	3.4	-	-	2.7	4	2.5	2.9
1991	1.7	2.8	1.9	2.9	3.4	1.7	-	3.4	1.3	3.5	2.8	-
1992	-	3	4	2.5	3.2	2.3	0.4	2.2	2.1	3.8	1.6	2.8
1993	3.4	3.5	-	1.9	-	-	1	2.1	-	-	2.9	0.4
1994	3.5	-	2.1	3.2	-1.5	4.4	7	-	-	-	4	1.9
1995	-	6.4	1.9	-	-5	3.4	2.8	-	3.1	4	5	-0.3
1996	-	0	-	7	3.5	-	1.9	1	1.7	0.2	2.8	2.6
1997	1.7	1.8	1.9	-0.3	3.5	3.2	2.4	1.9	2.7	3.3	-7.2	2.4
1998	-8.5	-	-	1.9	1.9	2.8	0.5	3.7	3.1	-	3.8	4.3
1999	2.8	0	2.6	5.3	3.6	-	1	2.7	-0.2	3.4	3.8	1.4
2000	3.2	2.2	3	2.2	3.6	3.9	2	3	4.2	2.5	-0.4	0.2
2001	3.1	1.8	2.1	1.9	4.3	1.9	2.8	0.9	2.5	2.6	3.7	-
2002	-0.4	3.6	0.9	3.1	-	1.9	3.1	3.8	-	2.8	1	3.2
2003	2.4	2.9	7	2.5	1.3	2.8	4.7	1	3.3	0	1	-
2004	4	2.7	-	2.8	3.6	3.1	3	1	4.6	-0.5	8	-
2005	-	-	2.9	1	1	-	2.7	-	2.8	-	1.9	-
2006	-	-	5.9	6.1	4	-	2.5	-	-5	2.3	1	2.5
2007	5.5	7	2.2	-	2.3	1.4	-	5.2	4.6	1.9	-	2.1
2008	-	-	7	3.1	4	1.9	-4	-	1.2	-	7	-
2009	1.9	0.1	0.6	2.4	-1.4	-	1.2	-	3.3	-4	4.9	-
2010	2	4	-4.2	1.2	-2	-1.3	2.8	-	1.4	-3.3	3.3	2.9
2011	0	3.1	-	1	-	1.5	1	2	5	3.8	4.9	0.9
2012	-	1	1.6	-1.7	-1.1	3.2	-5	1	0.1	1.5	2.2	3.3
2013	1	4.3	-5.6	-	3.7	0	5.6	2	4.2	4.4	2.1	-1.5
2014	3.9	1.5	0.9	4.3	-	-	-9.1	-0.4	-	-	3.6	2.8
2015	5	2.6	0	0.4	1	-3.4	1	2.2	1.7	-0.1	1.4	0.5
2016	1.9	-0.6	-0.4	1.2	-0.6	-2.8	6.2	1.4	2.1	1	2.9	8

Table A.7 PRS - South Korea's actions toward North Korea (1989-2016)

1989-2016 South Korea – North Korea relations												
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec
1989	0.5	4.5	2.4	2.9	7	-	2.5	-2	2.9	4.6	3.5	1
1990	-	0.7	-3.4	5	3.8	1.3	2.9	1.7	-0.1	4.4	3.2	1.8
1991	3.5	-2.1	1.3	-	2.1	1.3	2	1.7	2.4	1.7	-2.2	0.5
1992	4	1.4	-	3.8	3.5	-	-3.5	-	3.8	-1.1	-2	-2
1993	-	1.9	2.5	0.2	2.2	-0.4	5.9	2.6	1.6	0	-5.3	-0.7
1994	-0.1	2.7	0.7	1.2	-0.1	3.1	1.7	0.5	2.8	3.7	2.3	1.9
1995	-	1.4	-1.2	-0.4	0.7	0.1	2.4	1.7	-4	-7.6	7	0
1996	-3.5	2.1	2.2	2.3	2.9	-0.3	2.3	3.3	-0.4	0	0.3	1.4
1997	4.6	-0.3	1.8	1.2	3.1	1.3	3.1	-0.7	-3.8	-1.4	3.2	3.7
1998	4.5	2.1	4	2.7	-0.2	1.7	-0.9	0.8	0.8	4.9	1	-1.7
1999	0.8	3.1	0.9	1.1	1.9	0.2	-1.5	0.7	0.4	0.4	2.6	1.9
2000	2.6	3.3	3.4	3.5	3.8	3.3	4.1	0.6	2.6	2.5	1.7	2.1
2001	2.8	2.8	2.3	2.6	3.1	-1.2	2	1.1	1	0.7	1.2	1.6
2002	2.9	1.8	2	2.4	4.4	-0.9	-0.3	3.9	2.9	1.9	-1.8	1.4
2003	2.2	1.4	-0.7	1.4	0.5	-2.8	0.9	-2.1	0.8	-2	1.5	1.7
2004	3.4	1	2.6	2.6	0.9	1.3	-2	0.2	-0.7	2.9	-3	0.4
2005	1	1.2	-1.3	1.2	2.2	2.6	0.5	0.9	3.2	1.5	1.1	1.4
2006	0.4	3.1	-2	4	3	0.9	1.7	-3.3	0.4	-0.5	-0.3	3.3
2007	-0.7	1.8	3.6	1.5	1	0.8	2.5	2.9	1.4	3.4	3.8	3.9
2008	2.1	-3.2	1.6	3	3.7	3.3	1.7	2.6	2.5	1.2	2.5	1.1
2009	2.3	-1.1	-0.3	2	2.6	-0.6	-0.2	2.7	0.7	2	-3.2	3
2010	-0.3	0.7	-1.2	-2.6	-2.1	-0.6	-1	-0.6	-1.6	-2	-4.9	-2.5
2011	0.8	0.6	0.8	2.6	0.5	-0.5	2	-4.3	-1.1	-2.4	3.6	1.6
2012	0	-3.9	0	-2.3	-2.2	-2.8	-3	-2.7	-3.4	-2.7	-1.9	-0.1
2013	0.2	-1	-4.1	1.5	-2.1	2	0.7	1.5	1.7	-1.5	-1.8	-0.6
2014	-0.9	2.7	-2	-0.3	-6	-0.1	1.7	2	0.7	-0.9	-2	-1.7
2015	3.6	2.1	-1.2	-2.7	-0.9	2.4	0.3	-4.8	-1.1	-5.1	-1.5	1.2
2016	0.9	-2	-0.4	-0.8	-2.7	-3.4	-2.2	-3.7	-2.8	-0.7	0.4	-0.5

Table A.8 PRS – North Korea's actions toward South Korea (1989-2016)

1989-2016 North Korea – South Korea relations												
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec
1989	3.6	1.7	5	3.7	7	1.3	1.1	-1.1	-1.5	-	-6.8	1.5
1990	3.7	4	7	4.2	2.8	0.8	4.4	3.3	1.2	-0.1	-	3
1991	0.9	-4	7	3.2	-	-0.2	1.6	3.4	-1.7	0.8	0.4	2.1
1992	3.8	1.4	1	3.7	2.9	1.1	4	6	2.8	-2.8	-	5.3
1993	-2.3	1	3.1	-	-0.2	0.5	-2.9	4.3	-2	-5	2.9	-0.2
1994	0.5	3.6	0.3	5.6	3	3	-2	2	0.7	0.9	1.3	-2
1995	0.9	1	0.6	-3.8	-3.6	-0.5	-0.3	2	4	-0.9	-1	-1.7
1996	0.9	-1.2	-2	-0.1	-1.9	1.2	2.8	0.4	0.3	0.6	0.7	-0.5
1997	1.2	0.5	1	1.7	1.4	1.6	-1.1	-0.1	3	2.5	0.9	1.1
1998	-0.8	-2.5	-0.9	-1	-0.1	2.5	-2.5	-0.2	0.2	1.6	4.4	1.6
1999	1.4	2.1	-0.6	3.7	0.9	-2.8	-7.4	-0.4	-3.8	1.1	-0.2	0.4
2000	0.5	1.7	2.1	3.4	2.6	3.2	2.7	0.9	3.2	1.2	3.5	1.5
2001	2.4	2.9	2.7	1.1	0.7	2.4	2.1	2.8	3.8	2.4	2.7	2.6
2002	-3.7	-2	-1.6	1.7	5.4	-8.1	-1.8	3.2	-0.3	3.1	3.4	3.1
2003	3	-2.2	-1.3	1.8	2.4	-2.2	1.4	2.5	3.5	2	0.8	1.9
2004	-1	4.3	0.9	2.6	-1.6	-1	-0.6	2.1	-4.4	1.9	3.4	2.3
2005	-1.4	0.9	2.3	6.1	1	1.2	3	0.7	3.6	3	-0.9	0.9
2006	2.2	2.8	0.5	1.9	-1.3	-2.7	2.5	7	1.9	-3.3	3.1	-0.7
2007	-6.3	1.5	2.1	-0.8	2.6	-1.9	-4.9	2.2	1.7	2.3	3.7	4.5
2008	1.8	0.8	-4.8	-2.9	-1.2	-4.2	-7	-3.2	-4.5	-3.2	-0.5	-0.1
2009	-1.1	1.3	2.5	-1.8	0.2	-2.7	-1	0.6	0.1	3.4	-0.8	2
2010	0.9	1.2	-3.1	-2.2	-6.7	0.2	-0.2	-7.4	0.6	1	-0.1	-1.8
2011	1.2	2.9	-4.7	3.2	-1	-6.6	6	-0.5	3.2	2.1	-3.3	1.3
2012	3.1	2	-3.5	-1.8	2.8	-7.1	-7.2	1.6	-2	-8	-0.3	-5
2013	2.6	-1.4	-6.1	-3.1	-5.3	1.4	-1.4	-9	1.4	0.8	-6.7	-3.4
2014	-1.3	-0.3	-1.7	-0.3	-0.9	-2	-1.4	0.9	0.2	-0.1	0.8	0.6
2015	-1.5	-2	-4.4	0.1	-1.7	-0.6	0.3	-0.3	-0.7	-0.7	-4.6	3.1
2016	1.7	-5.1	-2.5	-2.7	2.2	-1	-3.7	-2.8	-2.9	-0.2	-1.5	-3.4

Appendix B. Results of the Vector Auto-Regression (VAR) Analysis

Table B.1 Results of the VAR model - South Korea's trade with China

	(1) **Imports** GDELT (Political Relations Score)	(2) **Imports** GDELT (Negative events)	(3) **Exports** GDELT (Political Relations Score)	(4) **Exports** GDELT (Negative events)
s = South Korea, p = China				
Month 1				
$PR_{sp-1/ps-1}$	22.44*	-0.2876	3.444	2.296
	(10.27)	(2.929)	(17.38)	(3.512)
GDP_{s-1}	711.7	178.7	-830.4	-529.8
	(724.1)	(478.2)	(1207)	(640.7)
GDP_{p-1}	-320.1	-2216**	-1998	-2554**
	(110.5)	(830.3)	(1466)	(969.2)
$POP_{s-1/p-1}$	-0.00172**	-0.0004	-1310	-0.00004
	(0.00056)	(0.0004)	(35620)	(0.00003)
$FDI_{s-1/p-1}$	0.2138	0.0086	0.1569	0.2069
	(0.2234)	(0.2413)	(0.1373)	(0.1141)
$Imports_{sp-1}$	-0.4898***	-0.3292***	-	-
	(0.07227)	(0.06297)		
$Exports_{sp-1}$	-	-	-0.1545*	-0.1578*
			(0.075)	(0.0613)
Month 2				
$PR_{sp-2/ps-2}$	19.76	-5.124	14.71	1.144
	(13.39)	(3.362)	(20.06)	(4.550)
GDP_{s-2}	-480.5	-170.2	-850.9	-232.1
	(726.1)	(476.9)	(1171)	(633)
GDP_{p-2}	4055***	2883***	4498**	3640***
	(1051)	(838.2)	(1475)	(999.9)
$POP_{s-2/p-2}$	-0.0006	-0.0008*	-14330	-0.0001**
	(0.0005)	(0.0004)	(35270)	(0.00003)
$FDI_{s-2/p-2}$	0.2614	-0.094	-0.1771	-0.2127
	(0.2236)	(0.2402)	(0.1366)	(0.113)
$Imports_{sp-2}$	-0.2689***	-0.0403	-	-
	(0.07925)	(0.0651)		
$Exports_{sp-2}$	-	-	-0.0908	-0.1343*
			(0.0773)	(0.062)
Month 3				
$PR_{sp-3/ps-3}$	-3.201	2.706	-9.438	10.11
	(14.60)	(3.873)	(2.053)	(5.563)
GDP_{s-3}	267.5	-152.0	508.4	20.51
	(722.4)	(477.2)	(1156)	(626.9)
GDP_{p-3}	3029**	2397**	487.3	-30.30
	(1081)	(840.9)	(1413)	(1006)

Table B.1 continued

$POP_{s-3/p-3}$	-0.0008 (0.0005)	-86400* (41210)	-16660 (31500)	-0.0001* (0.00003)
$FDI_{s-3/p-3}$	0.3643 (0.2259)	0.4738 (0.2489)	0.0552 (0.1384)	0.1298 (0.1134)
$Imports_{sp-3}$	-0.1576 (0.0799)	0.0043 (0.0637)	-	-
$Exports_{sp-3}$	-	-	-0.0083 (0.0752)	0.0878 (0.0618)
Month 4				
$PR_{sp-4/ps-4}$	0.3742 (15.62)	3.896 (4.389)	-17.26 (21.19)	1.114 (6.594)
GDP_{s-4}	254.0 (722.1)	181.1 (477.2)	74.76 (1167)	96.79 (626.1)
GDP_{p-4}	1898 (1104)	589.9 (854.3)	1143 (1433)	738.4 (1008)
$POP_{s-4/p-4}$	-0.001 (0.0005)	-0.0006 (0.0004)	-26290 (32010)	-0.0001* (0.00003)
$FDI_{s-4/p-4}$	0.3839 (0.2405)	0.188 (0.2743)	0.0476 (0.1663)	0.1051 (0.1392)
$Imports_{sp-4}$	-0.1702* (0.08085)	-0.1013 (0.0637)	-	-
$Exports_{sp-4}$	-	-	-0.1428 (0.0743)	-0.140* (0.0619)
Month 5				
$PR_{sp-5/ps-5}$	-14.16 (15.64)	4.756 (4.799)	1.283 (21.41)	5.302 (7.165)
GDP_{s-5}	-326.1 (726.8)	-10.90 (476.9)	-733.9 (1167)	-186.3 (626.4)
GDP_{p-5}	-778.7 (1114)	-1473 (858.8)	239.0 (1426)	-753.8 (1010)
$POP_{s-5/p-5}$	-0.0002 (0.0005)	-0.0003 (0.0004)	-17300 (32000)	-0.0001 (0.00003)
$FDI_{s-5/p-5}$	-0.2107 (0.2403)	-0.144 (0.2726)	0.0437 (0.1636)	-0.0204 (0.1416)
$Imports_{sp-5}$	-0.0489 (0.0814)	-0.0297 (0.0632)	-	-
$Exports_{sp-5}$	-	-	-0.0387 (0.0726)	-0.0584 (0.0609)
Month 6				
$PR_{sp-6/ps-6}$	0.0744 (14.86)	4.549 (4.914)	-15.04 (21.24)	5.187 (7.480)
GDP_{s-6}	-1244 (728.1)	-252.9 (477.2)	387.9 (1162)	497.7 (626.6)
GDP_{p-6}	1222 (1117)	304.8 (866.1)	1051 (1448)	1076 (1013)
$POP_{s-6/p-6}$	-0.0001 (0.0005)	-0.0004 (0.0004)	-2425 (31700)	-0.0001* (0.00002)

Table B.1 continued

$FDI_{s-6/p-6}$	0.1647 (0.2435)	0.1708 (0.2684)	-0.2401 (0.1663)	-0.1065 (0.1452)
$Imports_{sp-6}$	0.2215** (0.0821)	0.1821** (0.0636)	-	-
$Exports_{sp-6}$	-	-	-0.0101 (0.0728)	-0.0212 (0.0615)
Month 7				
$PR_{sp-7/ps-7}$	19.29 (13.32)	-2.449 (5.014)	-1.797 (21.16)	-0.123 (7.563)
GDP_{s-7}	-390.2 (716.1)	-184.1 (473.7)	1480 (1124)	259.4 (616.4)
GDP_{p-7}	1037 (1127)	773.7 (867.4)	544.1 (1450)	-827.6 (1010)
$POP_{s-7/p-7}$	-0.0002 (0.0005)	-0.0005 (0.0004)	-41820 (31660)	-0.0001* (0.00003)
$FDI_{s-7/p-7}$	-0.2156 (0.243)	-0.3818 (0.2538)	0.0167 (0.1673)	-0.0225 (0.1427)
$Imports_{sp-7}$	0.09056 (0.0854)	-0.0465 (0.0648)	-	-
$Exports_{sp-7}$	-	-	-0.0811 (0.0736)	-0.0795 (0.0615)
Month 8				
$PR_{sp-8/ps-8}$	9.725 (12.63)	0.3127 (4.961)	12.31 (21.08)	1.439 (7.444)
GDP_{s-8}	-285.2 (711.3)	-13.84 (472.6)	-545.7 (1129)	-105.3 (616.9)
GDP_{p-8}	-1565 (1117)	-596.4 (862.9)	-1018 (1442)	-1226 (1015)
$POP_{s-8/p-8}$	0.0004 (0.0005)	-0.0003 (0.0004)	17330 (31460)	-0.00004 (0.00003)
$FDI_{s-8/p-8}$	0.2321 (0.2419)	0.4902 (0.256)	0.1933 (0.1667)	0.2061 (0.1472)
$Imports_{sp-8}$	0.0162 (0.0854)	-0.0582 (0.0648)	-	-
$Exports_{sp-8}$	-	-	-0.1174 (0.0739)	-0.1668** (0.0618)
Month 9				
$PR_{sp-9/ps-9}$	8.846 (12.54)	-5.191 (4.766)	6.419 (21.10)	6.800 (7.193)
GDP_{s-9}	1461* (704.4)	956.5* (471.9)	1546 (1135)	696.4 (616.2)
GDP_{p-3}	-886.7 (1129)	-125.6 (864.7)	50.92 (1449)	155.8 (1026)
$POP_{s-9/p-9}$	-0.0001 (0.0005)	-0.0005 (0.0004)	-4444 (31670)	-0.0001* (0.00003)
$FDI_{s-9/p-9}$	0.0549 (0.2448)	0.1843 (0.26)	-0.3151 (0.1708)	-0.1979 (0.1492)

Table B.1 continued

$Imports_{sp-9}$	-0.0988 (0.084)	-0.0833 (0.0641)	-	-
$Exports_{sp-9}$	-	-	0.0095 (0.0734)	0.0116 (0.0621)
Month 10				
$PR_{sp-10/ps-10}$	25.32* (12.42)	-4.320 (4.611)	-18.17 (21.02)	7.704 (6.891)
GDP_{s-10}	1.677* (704.3)	1057* (472.3)	2026 (1149)	876.5 (623.2)
GDP_{p-10}	-322.3 (1147)	-945.4 (885.2)	-2096 (1484)	-1502 (1033)
$POP_{s-10/p-10}$	-0.0006 (0.0005)	-0.0004 (0.0004)	-6668 (31740)	-0.0001 (0.00002)
$FDI_{s-10/p-10}$	-0.0352 (0.2473)	-0.4513 (0.2586)	0.0909 (0.1354)	0.0611 (0.1147)
$Imports_{sp-10}$	-0.1384 (0.0815)	-0.1464* (0.0648)	-	-
$Exports_{sp-10}$	-	-	-0.2129** (0.0763)	-0.2024** (0.6308)
Month 11				
$PR_{sp-11/ps-11}$	19.30 (12.08)	-2.142 (4.221)	8.484 (20.56)	1.961 (6.430)
GDP_{s-11}	1118 (752.1)	547.8 (476.0)	800.8 (1146)	141.5 (624.6)
GDP_{p-11}	-2639* (1214)	-1222 (881.5)	-2909 (1510)	-2228* (1036)
$POP_{s-11/p-11}$	0.0009 (0.0005)	-0.0004 (0.0004)	26700 (31990)	-0.00003 (0.00003)
$FDI_{s-11/p-11}$	0.3592 (0.2451)	0.3364 (0.2602)	-0.0192 (0.1363)	0.0275 (0.1152)
$Imports_{sp-11}$	-0.2181** (0.0749)	-0.159* (0.0662)	-	-
$Exports_{sp-11}$	-	-	0.0639 (0.075)	0.1002 (0.0631)
Month 12				
$PR_{sp-12/ps-12}$	7.509 (9.877)	3.970 (3.460)	6.898 (17.69)	4.950 (5.390)
GDP_{s-12}	1312 (753.0)	759.7 (475.4)	-843.5 (1145)	-128.6 (623.6)
GDP_{p-12}	2623* (1259)	150.5 (893.6)	-1298 (1611)	-699.8 (1047)
$POP_{s-12/p-12}$	-0.0017** (0.0005)	-0.0008 (0.0004)	7936 (33410)	-0.0001* (0.00002)
$FDI_{s-12/p-12}$	-0.0689 (0.2421)	0.0251 (0.2582)	-0.042 (0.1393)	0.0025 (0.1173)
$Imports_{sp-12}$	0.0528 (0.0661)	0.1322* (0.0632)	-	-

Table B.1 continued

$Exports_{sp-12}$	-	-	0.2051** (0.0761)	0.2898*** (0.0642)
Observations	335	335	335	335
R-Squared	0.7152	0.6136	0.5272	0.5309

*Note: Results of the VAR model estimating. Each estimator for imports and exports is run separately. *** significant 1%; **significant 5%; *significant 10%*

Table B.2 Results of the VAR model - South Korea's trade with Japan

	(1) **Imports** GDELT (Political Relations Score)	(2) **Imports** GDELT (Negative events)	(3) **Exports** GDELT (Political Relations Score)	(4) **Exports** GDELT (Negative events)
s = South Korea, *p* = Japan				
Month 1				
$PR_{sp-1/ps-1}$	-8.042	0.6117	1.498	-0.0138
	(7.514)	(2.017)	(6.359)	(1.331)
GDP_{s-1}	-480.0	-541.6	-690.0*	-317.3
	(538.3)	(404.9)	(299.9)	(246.5)
GDP_{p-1}	1470*	1297*	1043*	612.8
	(736.9)	(572.0)	(500.1)	(397.4)
$POP_{s-1/p-1}$	0.0002	-0.0003	-0.0003	-0.0000
	(0.0003)	(0.0003)	(0.0002)	(0.0002)
$FDI_{s-1/p-1}$	0.0892	-0.0149	0.1262	0.0615
	(0.1237)	(0.0992)	(0.1375)	(0.1235)
$Imports_{sp-1}$	-0.3362***	-0.4053***	-	-
	(0.0707)	(0.0622)		
$Exports_{sp-1}$	-	-	-0.3291***	-0.2826***
			(0.0729)	(0.0644)
Month 2				
$PR_{sp-2/ps-2}$	-9.768	-0.2927	7.007	-0.7319
	(8.046)	(2.567)	(8.163)	(1.786)
GDP_{s-2}	-438.7	480.3	513.3	419.6
	(539.6)	(399.7)	(305.3)	(247.2)
GDP_{p-2}	723.8	728.1	543.1	291.5
	(741.6)	(574.2)	(489.8)	(399.2)
$POP_{s-2/p-2}$	0.0009**	0.0000	-0.0002	0.0003
	(0.0002)	(0.0003)	(0.0002)	(0.0002)
$FDI_{s-2/p-2}$	-0.2298	-0.2044*	0.1243	0.056
	(0.1247)	(0.0991)	(0.137)	(0.1230)
$Imports_{sp-2}$	-1.308	-0.1409*	-	-
	(0.075)	(0.0671)		
$Exports_{sp-2}$	-	-	-0.2424**	-0.1883**
			(0.0769)	(0.0670)
Month 3				
$PR_{sp-3/ps-3}$	3.347	-0.510	13.34	3.091
	(8.106)	(2.837)	(9.225)	(2.080)
GDP_{s-3}	-169.9	-37.49	-170.1	-92.58
	(492.3)	(400.0)	(307.0)	(249.3)
GDP_{p-3}	395.3	509.4	703.0	521.1
	(738.3)	(576.5)	(494.6)	(408.5)
$POP_{s-3/p-3}$	0.0004	-0.0001	-0.0002	-0.00000
	(0.0003)	(0.0003)	(0.0002)	(0.0002)

Table B.2 continued

$FDI_{s-3/p-3}$	-0.1953 (0.1253)	-0.1452 (0.099)	-0.1568 (0.1428)	-0.0852 (0.1266)
$Imports_{sp-3}$	0.0658 (0.0762)	0.0394 (0.0663)	-	-
$Exports_{sp-3}$	-	-	-0.0268 (0.0786)	-0.005 (0.068)
Month 4				
$PR_{sp-4/ps-4}$	4.084 (8.101)	-3.809 (3.003)	21.52* (9.721)	2.237 (2.321)
GDP_{s-4}	341.2 (497.0)	-58.84 (400.7)	597.8* (302.8)	343.5 (247.7)
GDP_{p-4}	371.6 (753.1)	297.1 (600.1)	-451.1 (476.0)	-323.6 (394.3)
$POP_{s-4/p-4}$	-0.0005 (0.0003)	0.0008** (0.0003)	-0.0002 (0.0002)	0.0000 (0.0002)
$FDI_{s-4/p-4}$	0.0946 (0.1492)	0.0133 (0.1162)	-0.1559 (0.1741)	-0.217 (0.1534)
$Imports_{sp-4}$	0.047 (0.0763)	-0.0099 (0.0665)	-	-
$Exports_{sp-4}$	-	-	-0.1020 (0.0775)	-0.1096 (0.067)
Month 5				
$PR_{sp-5/ps-5}$	-0.5069 (8.549)	-2.451 (3.108)	23.93* (10.15)	-0.7421 (2.466)
GDP_{s-5}	-380.2 (498.6)	162.6 (400.2)	186.1 (306.4)	80.19 (249.1)
GDP_{p-5}	1251 (750.0)	488.5 (598.1)	467.5 (474.5)	502.1 (394.1)
$POP_{s-5/p-5}$	-0.0002 (0.0003)	-0.0006* (0.0003)	-0.0002 (0.0002)	0.0001 (0.0002)
$FDI_{s-5/p-5}$	-0.2182 (0.1471)	-0.0583 (0.1163)	0.2636 (0.1744)	0.2591 (0.1531)
$Imports_{sp-5}$	0.0324 (0.078)	0.0604 (0.066)	-	-
$Exports_{sp-5}$	-	-	0.0433 (0.0768)	0.0011 (0.0675)
Month 6				
$PR_{sp-6/ps-6}$	-0.5069 (8.549)	-2.295 (3.132)	23.75* (10.51)	1.419 (2.554)
GDP_{s-6}	-380.2 (498.6)	50.78 (400.2)	308.3 (313.8)	165.4 (250.5)
GDP_{p-6}	1.251 (750.0)	619.7 (598.2)	-16.87 (485.8)	658.6 (395.1)
$POP_{s-6/p-6}$	-0.0002 (0.0003)	-0.0002 (0.0003)	-0.0002 (0.0002)	0.0002 (0.0002)
$FDI_{s-6/p-6}$	-0.2182 (0.1471)	-0.088 (0.1164)	-0.3685 (0.190)	-0.3522* (0.1663)

Table B.2 continued

$Imports_{sp-6}$	0.0324 (0.078)	0.114 (0..0665)	-	-
$Exports_{sp-6}$	-	-	0.1328 (0.0758)	0.1597* (0.6732)
Month 7				
$PR_{sp-7/ps-7}$	-2.208 (8.408)	-3.929 (3.137)	17.64 (10.73)	-0.4471 (2.611)
GDP_{s-7}	390.6 (502.6)	50.72 (406.7)	108.7 (310.6)	150.8 (247.9)
GDP_{p-7}	627.8 (746.3)	371.2 (593.7)	-429.3 (485.2)	-133.5 (392.9)
$POP_{s-7/p-7}$	-0.0004 (0.0003)	-0.0009** (0.0003)	-0.0002 (0.0002)	-0.0002 (0.0002)
$FDI_{s-7/p-7}$	0.0132 (0.1447)	-0.003 (0.1122)	0.0342 (0.1850)	0.14 (0.1623)
$Imports_{sp-7}$	-0.1532 (0.0779)	-0.0608 (0.0675)	-	-
$Exports_{sp-7}$	-	-	-1.176 (0.0756)	-0.1703* (0.0675)
Month 8				
$PR_{sp-8/ps-8}$	10.56 (8.50)	0.0831 (3.104)	20.51 (10.62)	0.1355 (2.599)
GDP_{s-8}	-132.8 (503.3)	-117.0 (403.3)	-46.58 (311.9)	-20.25 (244.2)
GDP_{p-8}	561.7 (745.8)	174.9 (591.1)	-22.82 (484.2)	310.4 (383.6)
$POP_{s-8/p-8}$	-0.0001 (0.0002)	-0.0007** (0.0003)	-0.0001 (0.0002)	0.0001 (0.0002)
$FDI_{s-8/p-8}$	-0.0499 (0.1443)	0.0649 (0.1123)	0.0643 (0.1847)	0.1669 (0.1615)
$Imports_{sp-8}$	-0.0675 (0.0797)	-0.0815 (0.0679)	-	
$Exports_{sp-8}$	-	-	0.0230 (0.0775)	0.0137 (0.069)
Month 9				
$PR_{sp-9/ps-9}$	6.109 (8.429)	-1.873 (2.959)	7.910 (10.17)	-4.290 (2.531)
GDP_{s-9}	723.3 (490.3)	909.1* (399.5)	363.4 (305.0)	317.2 (243.1)
GDP_{p-3}	321.8 (727.0)	-715.8 (583.0)	-188.3 (493.1)	-16.71 (384.1)
$POP_{s-9/p-9}$	0.0001 (0.0003)	-0.0002 (0.0003)	0.0002 (0.0002)	0.0003* (0.0002)
$FDI_{s-9/p-9}$	-0.1166 (0.1432)	-0.0645 (0.112)	-0.099 (0.2169)	-0.2202 (0.1887)
$Imports_{sp-9}$	-0.0005 (0.078)	-0.1024 (0.0682)	-	-

Table B.2 continued

$Exports_{sp-9}$	-	-	-0.1401 (0.0773)	-0.1549* (0.0682)
Month 10				
$PR_{sp-10/ps-10}$	14.55 (8.414)	-3.696 (2.788)	-5.166 (9.587)	-2.223 (2.370)
GDP_{s-10}	627.7 (500.1)	704.2 (412.3)	376.5 (310.8)	357.6 (247.4)
GDP_{p-10}	244.6 (722.9)	-123.8 (588.7)	424.0 (516.1)	-36.51 (393.8)
$POP_{s-10/p-10}$	-0.0009** (0.0003)	-0.0007* (0.0003)	-0.00004 (0.0002)	0.0001 (0.0002)
$FDI_{s-10/p-10}$	0.0165 (0.120)	0.1099 (0.0959)	0.0933 (0.1453)	0.1936 (0.1275)
$Imports_{sp-10}$	-0.2137** (0.07847)	-0.2304*** (0.0683)	-	-
$Exports_{sp-10}$	-	-	-0.0666 (0.079)	-0.0621 (0.0693)
Month 11				
$PR_{sp-11/ps-11}$	11.22 (8.450)	-1.739 (2.456)	-2.655 (8.448)	-0.849 (2.078)
GDP_{s-11}	89.02 (498.8)	352.0 (406.4)	22.71 (307.3)	54.85 (247.0)
GDP_{p-11}	634.2 (754.0)	855.3 (588.2)	329.6 (528.5)	462.7 (393.0)
$POP_{s-11/p-11}$	-0.0003 (0.0003)	-0.0005* (0.0003)	0.0001 (0.0002)	0.0002 (0.0002)
$FDI_{s-11/p-11}$	-0.0213 (0.1215)	0.0817 (0.0976)	-0.0877 (0.1463)	-0.0221 (0.1287)
$Imports_{sp-11}$	-0.1631* (0.0741)	-0.1573* (0.0686)	-	-
$Exports_{sp-11}$	-	-	0.0657 (0.0757)	0.0749 (0.0641)
Month 12				
$PR_{sp-12/ps-12}$	-15.75 (8.055)	2.30 (1.911)	3.142 (6.452)	-0.0023 (1.518)
GDP_{s-12}	395.3 (494.8)	21.67 (407.2)	43.13 (304.9)	18.95 (244.1)
GDP_{p-12}	790.3 (798.2)	1057 (611.5)	-28.13 (529.2)	-46.80 (390.8)
$POP_{s-12/p-12}$	-0.001 (0.0003)	-0.0013*** (0.0003)	0.0001 (0.0002)	-0.0003* (0.0002)
$FDI_{s-12/p-12}$	-0.0466 (0.1224)	-0.2084* (0.0982)	0.1516 (0.2101)	-0.026 (0.1831)
$Imports_{sp-12}$	0.1527* (0.0718)	0.1463* (0.0642)	-	-
$Exports_{sp-12}$	-	-	0.1271 (0.0723)	0.140* (0.0616)

Table B.2 continued

Observations	335	335	335	335
R-Squared	0.5408	0.6349	0.4068	0.4914

*Note: Results of the VAR model estimating. Each estimator for imports and exports is run separately. *** significant 1%; **significant 5%; *significant 10%*

Table B.3 Results of the VAR model - South Korea's trade with Russia

	(1) **Imports** GDELT (Political Relations Score)	(2) **Imports** GDELT (Negative events)	(3) **Exports** GDELT (Political Relations Score)	(4) **Exports** GDELT (Negative events)
s = South Korea, *p* = Russia				
Month 1				
$PR_{sp-1/ps-1}$	-1.663	-4.875	-1.559	-4.720
	(4.479)	(4.367)	(3.045)	(2.586)
GDP_{s-1}	-801.3	323.5	-249.1	8.619
	(526.1)	(188.8)	(261.2)	(198.1)
GDP_{p-1}	535.1*	-91.94	15.36	69.11
	(247.5)	(117.7)	(203.8)	(167.3)
$POP_{s-1/p-1}$	-0.0004*	-0.0002*	-0.0001	0.0000
	(0.0002)	(0.0001)	(0.0001)	(0.0001)
$FDI_{s-1/p-1}$	-0.8515	2.506*	-0.0265	0.6276
	(1.693)	(1.127)	(0.4206)	(0.3423)
$Imports_{sp-1}$	-0.2572*	-0.5121***	-	-
	(0.1083)	(0.0693)		
$Exports_{sp-1}$	-	-	-0.3580***	-0.5044***
			(0.0923)	(0.0686)
Month 2				
$PR_{sp-2/ps-2}$	0.5542	-2.080	-5.782	7.057*
	(4.858)	(5.549)	(3.363)	(3.446)
GDP_{s-2}	580.2	94.33	150.6	-54.13
	(520.3)	(188.9)	(248.9)	(198.6)
GDP_{p-2}	22.80	152.8	267.9	300.6
	(251.5)	(116.8)	(198.0)	(167.1)
$POP_{s-2/p-2}$	0.0000	0.0001	-0.0001	0.0001
	(0.0002)	(0.0001)	(0.0001)	(0.0001)
$FDI_{s-2/p-2}$	0.8033	-1.299	-0.1942	-0.6617
	(1.677)	(1.139)	(0.4278)	(0.3448)
$Imports_{sp-2}$	-0.1719	-0.1662*	-	-
	(0.1099)	(0.0771)		
$Exports_{sp-2}$	-	-	-0.1779	-0.2737***
			(0.0997)	(0.0783)
Month 3				
$PR_{sp-3/ps-3}$	4.769	8.319	1.744	-9.445*
	(4.829)	(6.451)	(3.486)	(4.145)
GDP_{s-3}	-716.1	-127.7	-204.1	2.560
	(480.9)	(188.6)	(247.6)	(198.6)
GDP_{p-3}	275.9	90.97	-168.7	108.7
	(251.5)	(117.3)	(199.5)	(168.1)
$POP_{s-3/p-3}$	-0.0001	0.0000	-0.0001	0.0000
	(0.0002)	(0.0001)	(0.0001)	(0.0001)

Table B.3 continued

$FDI_{s-3/p-3}$	1.267 (1.577)	-1.115 (1.144)	0.9023* (0.4090)	-0.2581 (0.3508)
$Imports_{sp-3}$	-0.3321** (0.1131)	-0.1676* (0.0792)	-	-
$Exports_{sp-3}$	-	-	-0.0799 (0.1030)	-0.1339 (0.0846)
Month 4				
$PR_{sp-4/ps-4}$	-1.685 (4.848)	13.81 (7.076)	-4.059 (3.588)	-7.718 (4.680)
GDP_{s-4}	338.7 (488.9)	190.1 (188.8)	12.31 (248.9)	242.3 (197.9)
GDP_{p-4}	377.8 (250.8)	69.19 (118.1)	270.9 (199.2)	376.4 (164.3)
$POP_{s-4/p-4}$	0.0001 (0.0002)	0.0001 (0.0001)	0.0000 (0.0001)	0.0001 (0.0001)
$FDI_{s-4/p-4}$	1.470 (1.508)	3.944** (1.381)	0.1591 (0.4232)	0.5297 (0.3512)
$Imports_{sp-4}$	-0.0222 (0.1172)	-0.0911 (0.0796)	-	-
$Exports_{sp-4}$	-	-	-0.0607 (0.1036)	-0.1393 (0.0853)
Month 5				
$PR_{sp-5/ps-5}$	3.711 (4.877)	8.259 (7.981)	-0.7753 (3.578)	-6.055 (4.920)
GDP_{s-5}	-546.2 (478.0)	172.3 (189.2)	337.0 (253.8)	28.09 (198.5)
GDP_{p-5}	97.37 (242.6)	-37.90 (118.1)	-178.5 (198.7)	29.10 (166.1)
$POP_{s-5/p-5}$	0.0000 (0.0002)	-0.0001 (0.0001)	-0.0000 (0.0001)	-0.0001 (0.0001)
$FDI_{s-5/p-5}$	3.020* (1.50)	2.921* (1.407)	1.451** (0.4297)	-0.0872 (0.3517)
$Imports_{sp-5}$	-0.0687 (0.1168)	-0.0936 (0.0796)	-	-
$Exports_{sp-5}$	-	-	0.0579 (0.1025)	0.1042 (0.0856)
Month 6				
$PR_{sp-6/ps-6}$	-3.253 (4.809)	7.654 (8.292)	0.1561 (3.615)	-0.7810 (4.995)
GDP_{s-6}	287.6 (537.3)	-18.01 (189.4)	-77.68 (199.9)	-72.28 (198.4)
GDP_{p-6}	-379.1 (253.6)	-28.21 (116.2)	56.0 (152.9)	37.48 (166.3)
$POP_{s-6/p-6}$	0.0002 (0.0002)	0.0001 (0.0001)	-0.0001 (0.0001)	0.0001 (0.0001)

Table B.3 continued

$FDI_{s-6/p-6}$	1.219 (1.547)	0.9201 (1.427)	1.075* (0.4578)	0.1717 (0.3476)
$Imports_{sp-6}$	0.2143 (0.118)	-0.0103 (0.079)	-	-
$Exports_{sp-6}$	-	-	-0.1359 (0.1019)	-0.059 (0.0862)
Month 7				
$PR_{sp-7/ps-7}$	-2.869 (4.847)	5.238 (8.413)	-3.090 (3.603)	-2.014 (5.023)
GDP_{s-7}	632.3 (527.0)	-300.3 (193.5)	199.5 (202.5)	-97.80 (201.7)
GDP_{p-7}	16.57 (240.6)	134.2 (114.7)	174.8 (153.2)	-50.40 (170.4)
$POP_{s-7/p-7}$	0.0002 (0.0002)	0.0001 (0.0001)	0.0000 (0.0001)	-0.0000 (0.0001)
$FDI_{s-7/p-7}$	-1.476 (1.544)	1.895 (1.417)	0.7647 (0.4605)	0.0458 (0.3573)
$Imports_{sp-7}$	0.2352* (0.1184)	-0.1124 (0.0794)	-	-
$Exports_{sp-7}$	-	-	-0.2038* (0.1006)	-0.0890 (0.0865)
Month 8				
$PR_{sp-8/ps-8}$	0.1967 (4.929)	11.35 (8.188)	1.924 (3.570)	-0.7266 (4.941)
GDP_{s-8}	-1203* (515.7)	-111.9 (184.2)	-65.02 (245.6)	145.3 (195.5)
GDP_{p-8}	-162.8 (229.3)	7.909 (113.5)	-49.51 (166.7)	31.55 (149.6)
$POP_{s-8/p-8}$	-0.0001 (-0.0002)	0.0000 (0.0001)	0.0000 (0.0001)	-0.0000 (0.0001)
$FDI_{s-8/p-8}$	2.664 (1.587)	0.2083 (1.422)	-0.1395 (0.4425)	0.3383 (0.3570)
$Imports_{sp-8}$	-0.0793 (0.1214)	-0.0812 (0.0789)	-	-
$Exports_{sp-8}$	-	-	-0.2787** (0.1001)	-0.2586 (0.0884)
Month 9				
$PR_{sp-9/ps-9}$	-1.920 (4.678)	8.999 (7.832)	-4.543 (3.731)	-0.9840 (4.698)
GDP_{s-9}	-240.4 (527.0)	338.2 (183.7)	154.5 (244.2)	9.026 (195.0)
GDP_{p-3}	-116.6 (229.8)	-32.0 (113.5)	15.46 (162.4)	-34.52 (148.8)
$POP_{s-9/p-9}$	0.0005** (0.0002)	-0.0000 (0.0001)	-0.0001 (0.0001)	-0.0000 (0.0001)
$FDI_{s-9/p-9}$	-2.167 (1.603)	0.8457 (1.421)	0.4924 (0.4492)	-0.2626 (0.3611)

Table B.3 continued

$Imports_{sp-9}$	0.0393 (0.1184)	0.0222 (0.0766)	-	-
$Exports_{sp-9}$	-	-	-0.1612 (0.1053)	-0.2210 (0.0867)
Month 10				
$PR_{sp-10/ps-10}$	8.910 (4.699)	-0.8959 (7.265)	-8.371* (3.530)	-0.9887 (4.260)
GDP_{s-10}	324.1 (528.1)	163.0 (184.6)	-61.29 (240.0)	144.9 (195.4)
GDP_{p-10}	-58.0 (232.2)	74.92 (112.2)	146.0 (160.1)	-9.425 (146.6)
$POP_{s-10/p-10}$	0.0000 (0.0002)	0.0000 (0.0001)	0.0000 (0.0001)	-0.0000 (0.0001)
$FDI_{s-10/p-10}$	3.107 (1.605)	-1.742 (1.209)	-0.297 (0.4377)	0.2453 (0.3609)
$Imports_{sp-10}$	0.1536 (0.1152)	-0.0866 (0.0755)	-	-
$Exports_{sp-10}$	-	-	-0.0676 (0.1050)	-0.1905 (0.0853)
Month 11				
$PR_{sp-11/ps-11}$	2.20 (4.722)	-0.9237 (6.181)	-9.091* (3.567)	0.6394 (3.667)
GDP_{s-11}	105.0 (531.3)	-88.31 (185.9)	-12.96 (243.9)	245.4 (195.7)
GDP_{p-11}	-277.5 (244.0)	-162.3 (110.7)	-20.62 (163.4)	48.04 (143.8)
$POP_{s-11/p-11}$	0.0002 (0.0002)	0.0000 (0.0001)	0.0000 (0.0001)	-0.0000 (0.0001)
$FDI_{s-11/p-11}$	-6.208*** (1.607)	1.999 (1.211)	0.0292 (0.4369)	-0.6885 (0.3615)
$Imports_{sp-11}$	-0.1321 (0.1272)	-0.0985 (0.0757)	-	-
$Exports_{sp-11}$	-	-	0.0515 (0.1050)	-0.0021 (0.0803)
Month 12				
$PR_{sp-12/ps-12}$	-0.7913 (4.544)	-3.574 (4.896)	-0.9909 (3.287)	1.427 (2.880)
GDP_{s-12}	-331.0 (530.5)	64.98 (184.6)	115.3 (247.3)	57.76 (197.2)
GDP_{p-12}	307.5 (242.0)	91.35 (112.1)	302.0 (165.1)	116.1 (143.1)
$POP_{s-12/p-12}$	-0.0002 (0.0002)	0.0000 (0.0001)	0.0001 (0.0001)	0.0000 (0.0001)
$FDI_{s-12/p-12}$	3.128 (1.707)	1.497 (1.226)	0.8445 (0.4456)	0.0968 (0.3664)
$Imports_{sp-12}$	-0.0096 (0.1252)	-0.0038 (0.0685)	-	-

Table B.3 continued

$Exports_{sp-12}$	-	-	0.0096 (0.0963)	0.1261 (0.0707)
Observations	335	335	335	335
R-Squared	0.6344	0.5195	0.4675	0.4576

*Note: Results of the VAR model estimating. Each estimator for imports and exports is run separately. *** significant 1%; **significant 5%; *significant 10%*

Table B.4 Results of the VAR model - South Korea's trade with North Korea

	(1) **Imports** GDELT (Political Relations Score)	(2) **Imports** GDELT (Negative events)	(3) **Exports** GDELT (Political Relations Score)	(4) **Exports** GDELT (Negative events)
s = South Korea, p = North Korea				
Month 1				
$PR_{sp-1/ps-1}$	0.1667 (0.4138)	-0.0571* (0.0247)	1.000* (0.4920)	-0.2042* (0.0904)
GDP_{s-1}	19.01 (22.59)	15.48 (20.20)	7.207 (33.61)	15.70 (32.80)
GDP_{p-1}	-77.06 (78.84)	-108.0 (71.42)	-223.6 (117.9)	-237.9* (109.3)
$POP_{s-1/p-1}$	-0.0000 (0.0000)	0.0000 (0.0000)	0.0000 (0.0000)	-0.0001 (0.0001)
$FDI_{s-1/p-1}$	-	-	-	-
$Imports_{sp-1}$	-0.1904** ()	-0.1886** (-0.0571)	-	-
$Exports_{sp-1}$	-	-	-0.5050*** (0.0647)	-0.5322*** (0.0636)
Month 2				
$PR_{sp-2/ps-2}$	0.3615 (0.5075)	-0.0351 (0.0266)	1.177 (0.610)	-0.3476* (0.1347)
GDP_{s-2}	7.920 (22.56)	2.533 (20.24)	0.7417 (33.73)	5.762 (32.88)
GDP_{p-2}	25.13 (79.11)	27.50 (71.63)	-36.57 (118.9)	-103.8 (110.7)
$POP_{s-2/p-2}$	0.0000 (0.0000)	0.0000 (0.0000)	-0.0000 (0.0000)	-0.0001 (0.0001)
$FDI_{s-2/p-2}$	-	-	-	-
$Imports_{sp-2}$	-0.028 (0.0658)	-0.1114 (0.0681)	-	-
$Exports_{sp-2}$	-	-	-0.2778*** (0.0724)	-0.3785*** (0.073)
Month 3				
$PR_{sp-3/ps-3}$	1.301* (0.5653)	-0.0638* (0.0289)	-0.1191 (0.6902)	-0.4849** (0.1759)
GDP_{s-3}	-12.71 (22.48)	-9.318 (2.019)	23.00 (33.48)	27.78 (32.87)
GDP_{p-3}	8.402 (77.59)	10.48 (71.49)	80.82 (110.0)	12.84 (110.5)
$POP_{s-3/p-3}$	-0.0000 (0.0000)	-0.0000 (0.0000)	-0.0000 (0.0000)	-0.0001* (0.0001)

Table B.4 continued

$FDI_{s-3/p-3}$	-	-	-	-
$Imports_{sp-3}$	-0.1261 (0.066)	-0.1795** (0.0683)	-	-
$Exports_{sp-3}$	-	-	-0.0658 (0.0751)	-0.1811* (0.0778)
Month 4				
$PR_{sp-4/ps-4}$	0.1901 (0.6127)	0.0236 (0.0303)	-0.4782 (0.7023)	-0.5281* (0.2096)
GDP_{s-4}	-1.720 (22.47)	3.087 (20.20)	3.770 (33.64)	7.409 (32.91)
GDP_{p-4}	81.81 (77.81)	13.58 (71.54)	163.3 (110.0)	99.70 (110.0)
$POP_{s-4/p-4}$	-0.0000 (0.0000)	-0.0000 (0.0000)	-0.0001 (0.0000)	-0.0001 (0.0001)
$FDI_{s-4/p-4}$	-	-	-	-
$Imports_{sp-4}$	-0.0006 (0.0665)	0.0334 (0.0693)	-	-
$Exports_{sp-4}$	-	-	-0.1726* (0.0748)	-0.2696*** (0.0783)
Month 5				
$PR_{sp-5/ps-5}$	0.2535 (0.6313)	-0.0647* (0.0309)	-0.0269 (0.7177)	-0.5939* (0.2328)
GDP_{s-5}	-0.0894 (22.46)	-7.371 (20.19)	38.74 (33.69)	38.35 (32.90)
GDP_{p-5}	-55.55 (78.07)	-59.32 (71.70)	-78.56 (110.3)	-95.71 (110.2)
$POP_{s-5/p-5}$	0.0000 (0.0000)	0.0000 (0.0000)	-0.0000 (0.0000)	-0.0001 (0.0001)
$FDI_{s-5/p-5}$	-	-	-	-
$Imports_{sp-5}$	0.022 (0.0662)	-0.0074 (0.0693)	-	-
$Exports_{sp-5}$	-	-	-0.2638*** (0.0749)	-0.350*** (0.0792)
Month 6				
$PR_{sp-6/ps-6}$	0.6418 (0.6379)	-0.0377 (0.0326)	0.2999 (0.7140)	-0.5160* (0.2454)
GDP_{s-6}	-6.774 (22.44)	3.231 (20.19)	-0.6760 (33.85)	-5.279 (33.28)
GDP_{p-6}	-27.62 (78.14)	0.5533 (71.49)	4.623 (112.2)	-77.03 (110.1)
$POP_{s-6/p-6}$	0.0000 (0.0000)	0.0000 (0.0000)	-0.0000 (0.0000)	-0.0001 (0.0001)
$FDI_{s-6/p-6}$	-	-	-	-
$Imports_{sp-6}$	-0.0998 (0.0662)	-0.1195 (0.0699)	-	-

Table B.4 continued

$Exports_{sp-6}$	-	-	-0.1757* (0.0768)	-0.2594** (0.0810)
Month 7				
$PR_{sp-7/ps-7}$	0.1313 (0.6436)	-0.0443 (0.0326)	0.3898 (0.7138)	-0.1435 (0.2468)
GDP_{s-7}	-9.378 (22.47)	-6.717 (20.22)	20.61 (33.88)	35.74 (33.34)
GDP_{p-7}	33.66 (78.19)	2.601 (71.47)	-29.77 (112.1)	-73.78 (110.0)
$POP_{s-7/p-7}$	0.0000 (0.0000)	0.0000 (0.0000)	-0.0000 (0.0000)	-0.0001 (0.0001)
$FDI_{s-7/p-7}$	-	-	-	-
$Imports_{sp-7}$	-0.0651 (0.0660)	-0.0627 (0.0696)	-	-
$Exports_{sp-7}$	-	-	-0.1442 (0.0769)	-0.2075* (0.0819)
Month 8				
$PR_{sp-8/ps-8}$	0.0302 (0.6419)	-0.0772* (0.0325)	0.3646 (0.7032)	-0.0528 (0.2421)
GDP_{s-8}	0.5859 (22.36)	-8.549 (20.18)	2.823 (33.91)	34.75 (33.43)
GDP_{p-8}	40.05 (78.14)	57.04 (71.42)	-183.5 (111.8)	-150.7 (110.8)
$POP_{s-8/p-8}$	0.0000 (0.0000)	-0.0000 (0.0000)	0.0000 (0.0000)	-0.0000 (0.0000)
$FDI_{s-8/p-8}$	-	-	-	-
$Imports_{sp-8}$	-0.0493 (0.066)	-0.0855 (0.0688)	-	-
$Exports_{sp-8}$	-	-	-0.1398 (0.0758)	-0.1951* (0.0804)
Month 9				
$PR_{sp-9/ps-9}$	0.4296 (0.6232)	0.0248 (0.0331)	0.3414 (0.6791)	0.0695 (0.2377)
GDP_{s-9}	16.27 (22.36)	12.08 (20.19)	-18.86 (33.70)	-5.880 (33.35)
GDP_{p-3}	37.78 (77.60)	51.30 (71.23)	-2.211 (112.3)	-49.84 (110.5)
$POP_{s-9/p-9}$	0.0000 (0.0000)	0.0000 (0.0000)	-0.0000 (0.0000)	-0.0001 (0.0001)
$FDI_{s-9/p-9}$	-	-	-	-
$Imports_{sp-9}$	0.0288 (0.0661)	0.0305 (0.0696)	-	-
$Exports_{sp-9}$	-	-	-0.1008 (0.0759)	-0.1624* (0.0801)

Table B.4 continued

Month 10				
$PR_{sp-10/ps-10}$	0.6439 (0.5855)	-0.0434 (0.033)	-0.0294 (0.6601)	-0.0954 (0.2270)
GDP_{s-10}	10.14 (22.34)	8.433 (20.23)	0.0521 (33.71)	10.54 (33.38)
GDP_{p-10}	24.47 (77.91)	31.10 (71.43)	0.7288 (112.6)	-56.98 (110.3)
$POP_{s-10/p-10}$	-0.0000 (0.0000)	-0.0000 (0.0000)	-0.0000 (0.0000)	-0.0001 (0.0001)
$FDI_{s-10/p-10}$	-	-	-	-
$Imports_{sp-10}$	-0.0285 (0.0656)	0.0232 (0.0682)	-	-
$Exports_{sp-10}$	-	-	-0.065 (0.0784)	-0.1263 (0.0812)
Month 11				
$PR_{sp-11/ps-11}$	0.5951 (0.5194)	-0.0181 (0.0313)	0.1354 (0.5842)	0.0074 (0.1945)
GDP_{s-11}	-18.31 (22.15)	-13.42 (20.16)	-17.67 (33.65)	-19.34 (33.29)
GDP_{p-11}	-91.40 (78.24)	-82.97 (71.41)	-56.18 (118.5)	-77.37 (110.5)
$POP_{s-11/p-11}$	0.0000 (0.0000)	0.0000 (0.0000)	-0.0000 (0.0000)	-0.0001 (0.0001)
$FDI_{s-11/p-11}$	-	-	-	-
$Imports_{sp-11}$	0.005 (0.066)	0.0166 (0.0673)	-	-
$Exports_{sp-11}$	-	-	-0.0783 (0.0795)	-0.1417 (0.0781)
Month 12				
$PR_{sp-12/ps-12}$	0.1474 (0.4186)	-0.0181 (0.0313)	0.1828 (0.4746)	-0.0872 (0.1462)
GDP_{s-12}	20.02 (22.10)	-13.42 (20.16)	3.365 (33.68)	5.579 (33.26)
GDP_{p-12}	126.2 (78.64)	-82.97 (71.41)	-158.8 (119.4)	-222.8* (110.1)
$POP_{s-12/p-12}$	-0.0000* (0.0000)	-0.0000 (0.0000)	-0.0000 (0.0000)	-0.0001 (0.0001)
$FDI_{s-12/p-12}$	-	-	-	-
$Imports_{sp-12}$	0.1268 (0.0824)	0.1216 (0.0782)	-	-

Table B.4 continued

$Exports_{sp-12}$	-	-	-0.0307 (0.0695)	-0.0886 (0.067)
Observations	335	335	335	335
R-Squared	0.2652	0.303	0.3253	0.3317

*Note: Results of the VAR model estimating. Each estimator for imports and exports is run separately. There are not available data on FDI between South and North Korea. *** significant 1%; **significant 5%; *significant 10%*

BIOGRAPHY OF THE AUTHOR

Mingu Lee was born and raised in South Korea. He graduated from INHA University in South Korea with a Bachelor's degree both in Communications and Political Science in 2015. Before joining the School of Global Policy and International Affairs (SPIA) at the University of Maine, he worked at the International Organization for Migration Research and Training Centre (IOM-MRTC) in South Korea as an intern. While he studied in SPIA, he concentrated on studying for the international political economy and security in Northeast Asia. During the summer in 2017, he was back to the IOM-MRTC as a research fellow, and recently he is working at UNCDF headquarter in New York as an intern. Mingu is a candidate for the Master of Arts degree in Global Policy from the University of Maine in May 2018.