The Differential Effect of Political Alliances on Trade by Regime Type: An Example from Korea

A thesis submitted by

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Abstract

The study establishes that intra-alliance trade is more salient in command economies than democratic economies using a game-theoretic model. In the command economy, the government as a social planner maximizes the national welfare, so it internalizes the security externalities from trade and may choose to trade with allies even when the firm-level payoff is lower than that from the alternative. In the democratic economy, the firm makes trade decisions based solely on firm-level payoffs and chooses to trade with non-allies as long as the payoff from such decision is higher than the other. I use the division of Korea as a quasi-experiment to empirically verify the model. The results show that ceteris paribus, intra-alliance trade is more than twice in North Korea than South Korea. Trade patterns in East and West Germany also support the model as East Germany exhibited higher intra-alliance trade volumes than its democratic counterpart.

Acknowledgements

For their support, guidance and insights, I am grateful to Professor Enrico Spolaore, Eoin Mcguirk, and Gilbert Metcalf. I am indebted to my parents and sister for their unconditional support from thousands of miles away. The thesis is dedicated to the memory of Xia who continued to show love and loyalty until his last day on earth, July 17th, 2019.

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1 Introduction

Political alliances affect the formation of trade policies. Studies show that free-trade agreements are more likely formed between allies than non-allies (Gowa and Mansfield, 1993; Haim, 2016; Spretcher, 2006). Institutions also matter in trade outcome as democratic economies commit to a free-trade agreement more often than command economies (Mansfield et al., 2000). This study shows that such effects on trade of alliances and institutions interact, theoretically and empirically.

Since alliances, institutions and trade are mutually reinforcing, I use a quasi-experiment environment to address the endogeneity problem. I find that the division of Korea is a suitable natural experiment for the study because North and South Korea, which together constituted a single country, have adopted different institutions since the separation. North Korea established a communist government under the governance of the Soviet Union, and South Korea followed the democratic and free-market system of the United States. The institutional differences, as Acemoglu el at. (2004) notes, shaped the political and economic environments of the countries. Thus, the division of Korea allows one to measure the impact of institutional differences on various economic indicators. I examine whether institutional differences or regime types affect the intensity of intra-alliance trade.

The Correlates of War Project ("COW") is the first attempt to systemize information pertaining to alliances, and it categorizes alliances into three types. Type I is Defense Pact, a written agreement between independent states to provide military support to one another in the event of a conflict. Type II is Non-Aggression or Neutrality Agreement that prohibits the parties from using military forces against one another. Type III is Entente, an agreement to provide consultation when solicited. Another source of alliance data is the Alliance Treaty Obligations and Provisions project ("ATOP"), and its definition of alliance includes Defense Pact only. The study uses the latter.

The rest of the paper is structured as follows. Section 2 presents the review of the literature that navigates connections between alliances, regime types and trade. Section 3 delineates the theoretical framework. Section 4 describes the data and justifies the identification strategy. Section 5 presents the empirical models, and Section 6 shows the empirical results and implications. Section 7 presents further empirical evidence from the reunification of Germany, and Section 8 concludes.

2 Literature Review

The section presents the foundational research of the current study. One group links alliance to trade, and the other examines interaction between institutions and trade.

2.1 Political Alliances and Trade

The past studies have established that political and economic relationships among countries go hand in hand. For example, Gowa and Mansfield (1993) show that free-trade agreements are more likely to occur within military alliances. Security externalities are the key factor contributing to the relationship: When countries engage in trade, their income goes up, and so does their political and military strength. Thus, trade with allies strengthens the military power of the alliance, while trade with non-allies or adversaries leads to the opposite result. Therefore, free trade is the optimal trade policy with allies, while tariff implementation, which is the second-best policy, yields the optimal outcome when trading with non-allies or adversaries.

Furthermore, the study theorizes that the tendency to engage in a free-trade agreement among allies is stronger in bipolar systems than multipolar systems because the risk of exiting from an alliance is lower in the former. For empirical support, the study uses a cross-country panel dataset and shows that trade

volumes are more than doubled when the international politics has a bipolar structure. However, the model does not control for the reverse causality from trade to alliances, so the results still contain the endogeneity problem.

Indeed, Morrow et al. (1998) use a data set that consists of the major powers during the twentieth century and show that the empirical results from Gowa and Mansfield (1993) are no longer supported. Specifically, the study has found that alliances exert a negative effect on trade flows under bipolar systems and have no effect under multipolar systems, which are the opposite results from Gowa and Mansfield (1993). The authors argue that the conflicting results may attribute to that Gowa and Mansfield (1993) omitted the joint democracy variable. The study, however, still suffers from the endogeneity problem and lacks theoretical justification to why domestic institutions may overpower international politics in trade policy.

Haim (2016), however, provides more support to the intra-alliance effect on trade. Specifically, the study shows that the number of shared alliances matters in trade outcome, since it represents how strong the political tie is between two countries. When introducing the shared alliance variable, the study finds evidence to neither positive nor statistical significant effect of bilateral alliances on trade. When controlling for joint democracy, which Morrow et al. (1999) considered as a more critical determinant of trade than alliances, the results remain consistent. However, the results lack strong causal interpretation, and the study fails to provide an alternative explanation to why the effect of bilateral alliances may not be as strong as shown in Gowa and Mansfield (1993).

Fordham (2010) is one of the few attempts that analyze the reverse relationship, the effect of trade on political alliances. The study argues that economic incentives motivate major power to form alliances with small countries since alliances keep trade intact against external and internal interruption. For instance, political ties prevent other major power to form a trade agreement with the small countries with whom the large countries established trade relations.

Furthermore, alliances require political commitment from the parties, so even when the larger country loses one of the allies, alliances keep the former allies to disrupt its economic relationships with the extant allies. Still, the study acknowledges that alliances and trade are mutually reinforcing.

2.2 Political Institutions and Trade Openness

Mansfield et al. (2000) is one of the rare attempts to examine connections between countries' political institutions and their trade openness. The study shows that democratic economies commit to a free-trade agreement more often than command economies.

Meanwhile, there has been active discussion on the relationship between government size and openness. Cameron (1978) and Rodrik (1998) propose that trade leads to large government expenditure or bigger governments. Rodrik (1998) reasons that trade exaggerates the volatility of consumption or income and increases demand for a stronger safety net that can mitigate potential shocks.

While Rodrik (1998) reports the consistent and significant effects of openness on government size across various specifications, more recent empirical evidence is inconsistent with the study. For instance, Van Oordt (2019) addresses auto-correlation in government expenditure and has found that the effect on government size of openness is no longer supported.

Benarroch and Pandey (2008) also argue that when tested with Granger Causality, trade openness has neither significant nor positive effect on government size. Instead, the results show that the causality goes from government size to openness, and the effect is negative. The study explains that bigger governments are likely an interventionist and tend to choose protectionism policy. The results are further supported by Benarroch and Pandey (2012) with more sophisticated datasets.

3 Theoretical Framework

3.1 Hypothesis I: Political Alliances Increase Bilateral Trade.

The past studies address the mechanisms through which political alliances affect trade (Gowa and Mansfield, 1993; Haim, 2016). In essence, alliances, whether direct or indirect, promote trade through two channels. First, the country-level mechanism is through security externalities. That is, countries gain when engaging in trade and use the gains to strengthen their military capacity. Therefore, trade with actual or potential adversaries incurs a negative externality, which makes tariff implementation the optimal policy. Firms also contribute to the intra-alliance trend of trade because potential risks from the political instability discourage firms to set up trade channels in non-allied countries.

3.2 Hypothesis II: The Effect of Alliances on Trade Is Greater in Command Economies than Democratic Economies.

I advance the existing framework and show that the effect of intra-alliance trade varies by government institutions. Specifically, I argue that intra-alliance trade is more salient in command economies than in democratic economies. What follows is a game-theoretic representation of the argument. Assume that the world has two countries, Country A and B. Country A is a democratic economy in which the government has no control over the operation of firms, and Country B has a command economy in which its government has a complete control over the firms. Otherwise, the countries are identical. It then follows that the representative firm is the sole agent of trade in Country A and is the government in Country B. Finally, the government aims to maximize the national welfare of the country, while the firm seeks to maximize its profits.

Suppose that the countries are selecting its trade partner between an allied country (“Ally") and non-allied country (“Non-Ally"). Denote as π_A and π_N the expected profit from trading with Ally and Non-Ally, respectively, where both

Table 1: Payoff Structure Facing Democratic vs. Command Economy

		Country A (Free Market)	Country B (Autocracy)
Potential Trade Partner	Ally	π_A	$\tau_A \pi_A$
	Non-Ally	$\pi_N - \theta$	$\tau_N(\pi_N - \theta)$

π_A and π_N are positive values. Trading with Non-Ally accompanies firm-level risks due to the loose or unstable political tie. The potential loss is denoted as θ, where θ is a positive value. It then follows that the expected payoff from trading with Ally and Non-Ally is π_A and $\pi_N - \theta$, respectively.

Furthermore, intra-alliance trade causes a positive externality (τ_A), while trade with Non-Ally incurs a negative externality (τ_N). Therefore, τ_A is greater than 1, and τ_N is less than 1. Table 1 summarizes the expected payoff facing Country A and B.

Country A would trade with Ally as long as π_A is greater than $\pi_N - \theta$. Similarly, Country B would prefer trading with Ally if $\tau_A \pi_A > \tau_N(\pi_N - \theta)$, or $\pi_A > \frac{\tau_N(\pi_N - \theta)}{\tau_A}$. However, the lower bound for Country A, $\pi_N - \theta$, is smaller than that for Country B, $\frac{\tau_N(\pi_N - \theta)}{\tau_A}$, because $\frac{\tau_N}{\tau_A}$ is less than 1. This implies that the command economy (Country B) has a lower threshold for switching its trade partner from Ally to Non-Ally compared to its democratic counterpart (Country A). Therefore, I conclude that intra-alliance trade is more salient in command economies than in democratic economies.

The model implies that in the presence of security externalities, it is optimal to implement protectionism policy, and such implication is consistent with Gowa (1993). As such, the social planner does yield more efficient outcome in terms of the national welfare than the firm in this scenario. However, it requires caution when applying the model to a real-world scenario. For instance, it is problematic to argue based on the model that the North Korea government is

more pareto-efficient than that of South Korea. It is firstly because the model assumes a dichotomous world in which there are only two economies, one controlled by a central-planner and the other fully operated by the market. In reality, governments intervene the market one way or another, and one cannot be sure whether communist governments have implemented the optimal level of tariffs compared to capitalist ones. As a simple illustration, North Korea has the trade flows to GDP ratio of .06 toward its non-allied countries. Even without a careful analysis, it is evident that such level of trade with most of the world leaves a large room for potential welfare gain. Therefore, while the model does show that the hypothetical social planner, who is benevolent, omniscient and omnipotent, would yield more efficient outcome than its democratic counterpart, it becomes an empirical question whether current communist countries have actually implemented the optimal level of trade policy than their free-market counterparts and maximized their national welfare.

Secondly, even when communist countries may have implemented more efficient trade policy than democratic economies, one need to consider the distributional aspect of the national welfare. It is shown that tariffs often increase the government revenue and producer surplus at the expense of the consumer surplus. Moreover, the national wealth may be heavily focused on a smaller number of populations, who often are associated with top government officials. This may well be the case in the communist system, which is more conducive to corruption than its democratic counterparts. Therefore, even when it is shown true that communist countries employ more optimal tariffs policy, it needs further empirical investigation to determine whether the welfare gains have been fairly distributed among the people.

4 Data

4.1 Background: The Division of Korea as a Quasi Experiment

As mentioned, it is critical to address the endogeneity problem when investigating the relationships between alliances, regime types and trade. Acemoglu et al. (2004) notes that the division of Korea provides a natural-experiment setting that allows one to isolate the impact of institutional differences on economic performance. Specifically, North and South Korea, who share the historical and cultural roots, once constituted a single country and exhibited a high degree of homogeneity in their ethnicity, language, culture, geography and economic performance. If anything, the North was better endowed with natural resources and had more infrastructure than the South, though Maddison (2001) estimates the income level of the two parts of Korea as almost comparable at the time of separation.

The Korean peninsula split into two countries at the end of the Korean war in 1953. The separation was influenced by the major powers during the twentieth century, the Soviet Union and the United States. The Soviet Union expanded the communist forces into North Korea, while the U.S. influenced the governance of South Korea. Since then, North Korea has purported to be a closed and self-sufficient country, while South Korea has been open up to the international market. However, a careful review of the data reveals that North Korea is more “open" toward its allies compared to South Korea, while it has hardly traded with its non-allies (Table 2). A cursory glance at their different trade patterns implies that the case of Korea may support the theory that command economies tend to exhibit stronger intra-alliance trade than their free-market counterparts.

Table 2: Intra- vs. Inter-Alliance Openness by South and North Korea

	(1) Entire Sample		(2) Allies		(3) China		(4) Non-Allies	
	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
North Korea	0.29	1.69	**4.5**	6.02	11.94	6.57	**0.06**	0.19
South Korea	0.75	2.05	**3.32**	3.81	13.48	4.29	**0.65**	1.87

* Openness is calculated as the ratio of trade flows to GDP.

4.2 The Effects of Political Factors on North Korea's Trade Outcome

Several studies report that North Korea tends to show a high level of trade dependency on its allies. For instance, Choe et al. (2006) notes that North Korea has heavily depended on a few countries for foreign trade: Until 1980s, the Soviet Union, China and Japan made up of 70% of the country's total trade volume, and after that, China, South Korea and Thailand have been its largest trading partners.

Studies also report the effects of international sanctions on North Korea trade volumes. For instance, Jung (2016) notes that unilateral sanctions imposed by South Korea and Japan in the 2000s have motivated trade between North Korea and China. The study concludes that the sanctions have little effects on damaging the North Korea economy because North Korea compensated the loss in its trade flows by expanding trade with China. The situation anecdotally confirms North Korea's high level of dependency on China in sustaining its economy.

The effects of multilateral sanctions are rather controversial. Following the consecutive nuclear tests of North Korea in 2006 and 2009, the United Nations Security Council Resolution sanctioned exports of weapons and luxury goods to North Korea. As North Korea kept continuing missile tests, the UNSC has adopted additional sanctions in 2013, 2016, and 2017. Noland (2009) has found that the UNSC sanction in 2006 has reduced the trade flows between North Korea and its main trading partners, South Korea and China (Noland, 2009).

Jeong (2019) also reports a 37.3% drop in the amounts of exports from North Korea to China following the UNSC sanction imposed in 2017.

While the studies provide some political contexts behind North Korea's trade dynamics, none of the studies attempted to isolate the effect of alliances on trade dynamics. For instance, even in the hypothetical absence of an alliance relationship between North Korea and China, trade flows between the two countries are expected to be high since China has the largest economy in the East Asian region, and the countries share borders. The current study fills this gap in the literature.

I have argued that the Korean separation provides a quasi-experiment environment to measure the interactive nature of alliances and institutions on trade flows. Admittedly, however, North and South Korea have diverged from each other in almost all aspects. Therefore, it is valid to argue that unobservable factors other than their institutional differences also drive their trade outcomes.

Still, I claim that the results are close to causality for the following reasons. First, most of the bilateral relationships for both North and South Korea were formed around the time of the separation, so there is no reverse causality. That is, it is not the case for the two Koreas that large trade volumes have led to alliance relationships, at least for bilateral ones. Second, it is plausible that there exist unobservable factors that influence both of the institutions and trade variables. However, as we shall see in the following sections, the results are robust across various specifications and sample, including the one that excludes China, which has heavily influenced North Korea's trade. This implies that omitted variables, if any, should not cause drastic changes in the results.

4.3 Data Description

The study uses a dyad-year dataset for the time period of 2000 to 2018. Specifically, the origin country is either North or South Korea, and the partner country consists of 117 countries. Initially, North and South Korea each had 1,386 and

Table 3: Description of Variables

Variable	Definition
North Korea	=1 if North Korea; and 0 if South Korea.
Trade Flows	Sum of the amount of exports and imports (Million USD)
Export	Amount of exports (Million USD)
Import	Amount of imports (Million USD)
Bilateral Alliance	=1 if countries share defense pacts, neutrality agreements and/or ententes that consist of two countries; and 0 otherwise.
Multilateral Alliance	=1 if countries share defense pacts, neutrality agreements and/or ententes that consist of three or more countries; and 0 otherwise.
GDP	GDP in the 2010 price (Billion USD)
Distance	Simple distance between the most populous cities (km)
Distance - Capital	Simple distance between capitals (km)
Distance - Weighted	Weighted distance (pop-wt, km)
Distance - WCES	Weighted distance (pop-wt, km) CES distances with theta=-1
Contiguity	=1 if sharing a border; and 0 otherwise.

2,192 observations. In order to control for the country heterogeneity, however, I matched the observations for South Korea to those for North Korea. Consequently, each sample consists of 1,386 observations, leading to the total observation number of 2,772. Table 3 presents the description of the variables.

Data on bilateral trade flows for both North and South Korea are obtained from Statistics Korea, which is part of the Korean Ministry of Strategy and Finance. The GDP data are primarily from World Bank Open Data, except that on the North Korea economy, which is supplemented from data from Statistics Korea. Statistics Korea specifies that the GDP data are adjusted using the 2010 price. Since the data are provided in KRW, I have converted it to USD by using the exchange rates provided by Federal Reserve Economic Data. Finally, data on alliance relationships were gathered as part of the Alliance Treaty Obligations and Provisions project, and “gravity" variables such as distances between two countries were from a dataset collected by Mayer and Zignago (2011).

Table 4-(a) shows summary statistics for the entire dataset. Table 4-(b) and 4-(c) summarizes the data for North and South Korea, respectively. Comparing Table 4-(b) and 4-(c) show that, on average, the total trade volume of South Ko-

rea is about 108 times greater than that of North Korea. Also, North Korea imported more than it exported, while South Korea exported more than it imported. As in alliance relationships, North Korea has had a direct alliance relationship with China, Russia, South Korea and Cuba, with the alliance with South Korea being a non-aggression treaty agreed at the end of the Korean war. South Korea is bilaterally allied with the United States, Russia and North Korea. There is only one multilateral, non-economic alliance that either South and North Korea belongs to for the period of 2000 to 2018, which is a non-aggression pact that was first signed in 1976 (ATOP ID: 3755). The alliance includes 29 countries, with North Korea joined the network later than South Korea.

Table 5 summarizes the ten largest trade partners for North and South Korea for the last twenty years, respectively. The largest trading partners for North Korea are China, South Korea and Japan. Meanwhile, South Korea had the largest trade volumes with China, US and Japan. Countries that are heavily traded both with South and North Korea include China, Japan, Hong Kong, Germany and Singapore. China is the largest trade partner both for North and South Korea, which is as expected considering that China has the largest economy in East Asia and is close to the Korean peninsula. Most importantly, the stark difference is shown in the US position in the two countries' trade dynamics: The US is the second largest trading partner for South Korea, while it is only the 19th for North Korea.

In order to demonstrate how little the trade volume is between North Korea and the US, who is an important non-ally of North Korea, Table 6 summarizes North Korea's predicted trade flows with its major trade partners. I used the standard gravity model to predict the trade flows, which is shown to have strong predictive power (Anderson, 1979). While there are variations of the gravity model, I used the one that includes the size of GDP of the countries and the distance between them. The last column compares the predicted trade flows to the actual values: If the value is less than one, it means the actual trade flows are

Table 4: Summary Statistics

(a) Summary Statistics - All (N=2772)

Variable	Mean	Standard Dev.	Min	Max
North Korea	0.5	0.5	0.0	1.0
Trade Flows (millions of $)	4104.4	17291.9	0.0	268613.7
Export (millions of $)	2281.4	10169.8	0.0	162125.1
Import (millions of $)	1823.1	7510.2	0.0	106488.6
Bilateral Alliance	0.0	0.2	0.0	1.0
Multilateral Alliance	0.2	0.4	0.0	1.0
GDP - Origin Country (billions of $)	566681.4	585869.3	15652.1	1619424.0
GDP - Partner Country (billions of $)	720753.5	2046945.0	1117.1	20500000.0
Distance (km)	8531.0	4164.4	197.9	19629.5
Distance - Capital (km)	8503.4	4125.8	197.9	19629.5
Distance - Weighted (km)	8556.1	4064.4	354.5	19564.0
Distance - WCES (km)	8529.1	4083.3	271.6	19563.0
Contiguity	0.0	0.2	0.0	1.0

(b) Summary Statistics - North Korea (N=1386)

Variable	Mean	Standard Dev.	Min	Max
Trade Flows (millions of $)	75.1	492.5	0.0	6864.0
Export (millions of $)	29.6	204.5	0.0	2913.6
Import (millions of $)	45.5	294.9	0.0	4022.5
Bilateral Alliance	0.1	0.2	0.0	1.0
Multilateral Alliance	0.2	0.4	0.0	1.0
GDP - Origin Country (billions of $)	26202.4	5336.4	15652.1	32448.6
GDP - Partner Country (billions of $)	727318.4	2046843.0	1117.1	20500000.0
Distance (km)	8475.7	4155.0	197.9	19547.5
Distance - Capital (km)	8447.8	4116.5	197.9	19547.5
Distance - Weighted (km)	8480.2	4030.9	354.5	19380.2
Distance - WCES (km)	8451.0	4052.5	271.6	19378.0
Contiguity	0.0	0.2	0.0	1.0

(c) Summary Statistics - South Korea (N=1386)

Variable	Mean	Standard Dev.	Min	Max
Trade Flows (millions of $)	8133.8	23780.2	0.0	268613.7
Export (millions of $)	4533.1	14026.2	0.0	162125.1
Import (millions of $)	3600.7	10316.8	0.0	106488.6
Bilateral Alliance	0.0	0.2	0.0	1.0
Multilateral Alliance	0.2	0.4	0.0	1.0
GDP - Origin Country (billions of $)	1107161.0	319449.4	533052.1	1619424.0
GDP - Partner Country (billions of $)	714188.5	2047764.0	1117.1	20500000.0
Distance (km)	8586.4	4174.5	197.9	19629.5
Distance - Capital (km)	8558.9	4135.8	197.9	19629.5
Distance - Weighted (km)	8631.9	4097.6	354.5	19564.0
Distance - WCES (km)	8607.1	4113.9	271.6	19563.0
Contiguity	0.0	0.1	0.0	1.0

Table 5: Average Trade Volumes between South vs. North Korea and Main Trading Partners, Million USD

North Korea			South Korea		
1	China	3,334.74	1	China	155,207.20
2	South Korea	1,262.08	2	United States	88,239.55
3	Japan	196.43	3	Japan	76,336.12
4	Thailand	137.74	4	Hong Kong	25,528.48
5	Russia	108.99	5	Taiwan	23,638.57
6	India	97.63	6	Germany	21,805.27
7	Germany	57.78	7	Australia	21,553.23
8	Singapore	54.52	8	Viet Nam	19,790.94
9	Hong Kong	36.12	9	Singapore	19,563.87
10	Brazil	24.33	10	Indonesia	15,120.63
19	United States	10.65			

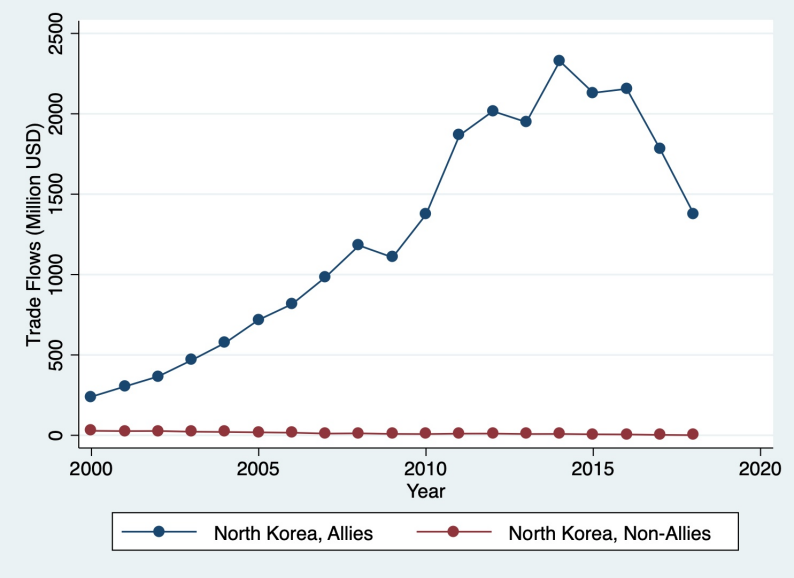
higher than the predicted, suggesting there are other factors unexplained by the standard gravity variables. Indeed, the value is less than one for all other main partners except for the US, implying that North Korea trades much less with the United States than predicted.

Figure 1 compares the amount of intra-alliance and inter-alliance trade across South and North Korea. Figure 1 and 2 imply that both for South and North Korea, the trade volume has been higher with their respective allies compared to their non-allies. Figure 3 shows that South Korea has had much more trade volumes both with its allies and non-allies compared to North Korea. Needless to say, however, this is likely due to the fact that South Korea has a much larger economy than North Korea as well as the South has implemented export-driven growth policy. Further econometric techniques are warranted in order to determine which country has the greater intra-alliance effect on trade.

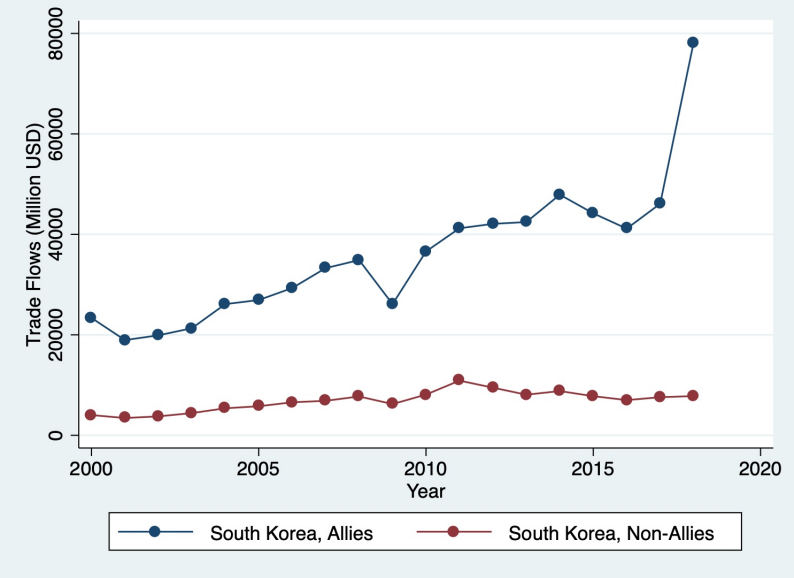
It is still possible to see, however, the difference in the alliance effect of trade across the countries. Figure 4 graphs how much either South or North Korea has traded with China relative to the US. For South Korea, which is allied with the US and not with China, the ratio is around 2, meaning South Korea has traded with China two times more than the US, on average. However, for North Korea, who is allied with China but not with the United States, the ratio

Figure 1: Comparison of Trade Volumes with Allies vs. Non-Allies

(a) North Korea



(b) South Korea



(c) All

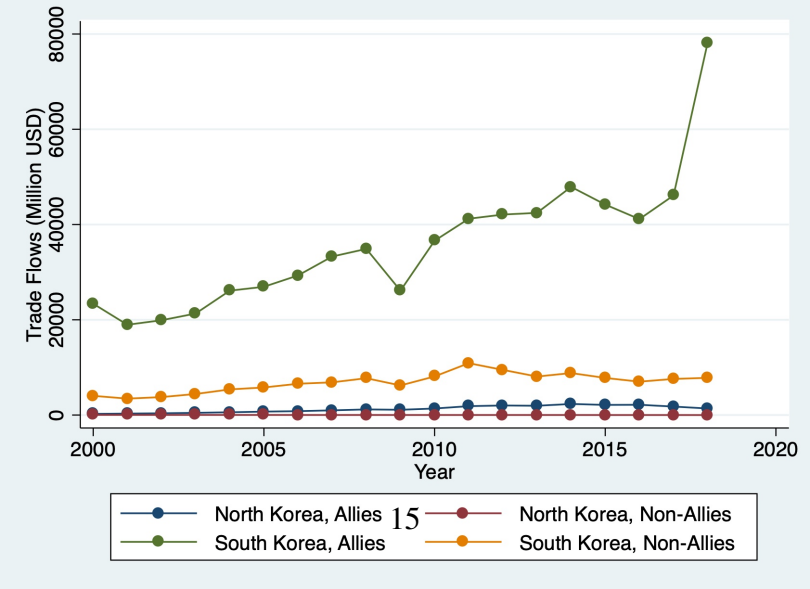


Table 6: Predicted vs. Actual Trade Volumes in North Korea, Million USD

	Partner	Predicted	Actual	Predicted/Actual
1	China	218.25	3334.74	0.07
2	South Korea	140.06	1262.08	0.11
3	Japan	80.44	196.43	0.41
4	Thailand	2.2	137.74	0.02
5	Russia	5.49	108.99	0.05
6	India	8.82	97.63	0.09
7	Germany	10.17	57.78	0.18
8	Singapore	1.26	54.52	0.02
9	Hong Kong	2.94	36.12	0.08
10	Brazil	3.15	24.33	0.13
19	United States	36.35	10.65	3.41

1. Values are predicted based on the standard gravity equation, which includes the countries' GDP and distance between them.

is very high, reaching about 1,000 on average. This shows that North Korea has disproportionately traded with its main ally, China, while having no or little exchange with its non-ally, the United States. Since the analysis is independent of the size of economy, it signals that the intra-alliance effect of trade is likely to be larger for North Korea than its South counterpart.

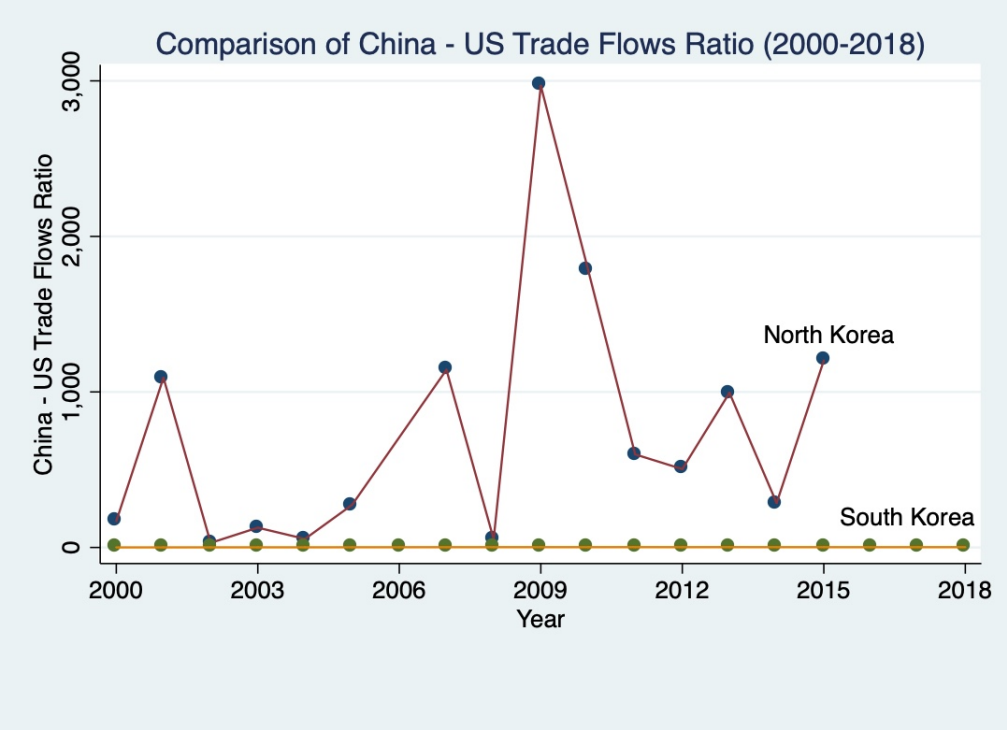
5 Identification Strategy

5.1 Quasi-Experiment Design without a Time Dimension

Meyer (1994) suggests an extension of the Difference-In-Differences method without a time dimension, which can be used when a pre-treatment dataset is not available. Assuming that South Korea is a suitable comparison group for North Korea; that is, assume that South and North Korea are identical in all aspects except their institutional differences or regime types. Then the model can be set up as follows:

$$TRADEFLOW_{it}^{j} = \beta_0 + \beta_1 NK^{j} + \beta_2 ALLY_{it}^{j} + \beta_3 NK^{j} \times ALLY_{it}^{j} + \varepsilon_{it}^{j} \qquad (1)$$

Figure 2: China-US Trade Flows by South vs. North Korea



where i represents partner country, j represents either North or South Korea and t is time.

If we assume the strict exogeneity of the model for a moment, an unbiased estimate of β_3 can be obtained by calculating the following:

$$
\begin{aligned}
&(E[TRADEFLOW_{it}^{j}|NK=1,ALLY_{it}^{j}=1]-E[TRADEFLOW_{it}^{j}|NK=1,ALLY_{it}^{j}=0]) \\
&-(E[TRADEFLOW_{it}^{j}|NK=0,ALLY_{it}^{j}=1]-E[TRADEFLOW_{it}^{j}|NK=0,ALLY_{it}^{j}=0]) \\
&=\beta_2+\beta_3-\beta_2 \\
&=\beta_3
\end{aligned}
$$

where the terms in each parenthesis imply the difference in the expected intra- and inter- alliance trade flows for North and South Korea, respectively. Then the interpretation of β_3 would be the effect of forming an alliance with North Korea on trade flows compared to its democatic counterpart, South Korea.

However, not accounting for other covariates that might also explain β_3 results in bias in the estimate. Consequently, I have added control variables in-

cluding GDP size, distance and contiguity, which are shown to be associated with trade outcome (Anderson, 1979). Then the model becomes:

$$TRADEFLOW_{it}^{j} = \beta_0 + \beta_1 NK^{j} + \beta_2 ALLY_{it}^{j} + \beta_3 NK^{j} \times ALLY_{it}^{j} + z_{it}^{j}\delta + \varepsilon_{it}^{j} \quad (2)$$

where z_{it}^{j} is a vector of control variables that account for observable differences in trade flows between North and South Korea.

5.2 Adding Treatment with Varying Effects

However, alliances are not limited to bilateral ones. Indeed, the past studies have suggested that multilateral agreements can also affect trade outcomes (Gowa and Mansfield, 1993, Morrow et al., 1998). Moreover, Haim (2016) has shown that even if countries do not share any direct bilateral or multilateral agreements, if they share an alliance, they are likely to trade more. Since the effect of each form of alliance on trade varies, the different types of alliances should be added to the model. Consequently, I have modified Equation (2) by adding the main and interaction terms for the multilateral alliance variable. However, the number of shared alliances is not included due to its multicollinearity with the other alliance variables. Due to this modification, the alliance variable is now in the vector form.

5.3 Final Specifications

Three final specifications are warranted. First, a lagged measure of the trade flows variable needs to be included since there exists autocorrelation in trade flows. Second, there are apparent time effects, which can be corrected for by including time indicator variables. For instance, trade flows between China and North Korea jumped as an aftermath of economic sanctions imposed on North

Korea (Jung, 2016), and including time effects corrects for such political events.

Finally, the dependent variable and some independent variables need to be specified in the natural logarithm. It is to follow the relationship established in the the gravity model, which is specified as follows:

$$TRADEFLOW_{ij} = A \times \frac{GDP_i \times GDP_j}{DISTANCE_{ij}}$$

where i and j each represents a country involved in trade, and A represents an exogenous parameter (Anderson, 1979). Estimating the equation requires the following log transformation:

$$lnTRADEFLOW_{ij} = \beta_1 lnGDP_i + \beta_2 lnGDP_j + \beta_3 lnDISTANCE_{ij} + \beta_4$$

With the final specifications, the model becomes as follows:

$$lnTRADE_{it}^{j} = \beta_0 + \beta_1 NK^j + ALLY_{it}^{j}\beta_2 + NK^j \times ALLY_{it}^{j}\beta_3 + z_{it}^{j}\delta + \rho TRADE_{it-1}^{j} + \varepsilon_{it}^{j}$$

where z_{it}^{j} includes time indicator variables. If North Korea has a higher intra-alliance trade volume than South Korea, then β_3 takes a positive value.

6 Empirical Results

Table 7 presents regression results. Model (1) and (2) use the natural logarithm of trade flows as the dependent variable, Model (3) and (4) use that of imports, and Model (5) and (6) use that of exports. Overall, the models explain the majority of the variations in its respective dependent variable, which is demonstrated by the high-level of Adjusted-R^2 ranging from 89.4% to 94.4%. Model (2), (4) and (6) are identical to Model (1), (3) and (5), respectively, except that the GDP of the origin country is not controlled for in the former. The reasoning behind the specification is discussed in detail in the following section.

Table 7: Regression Results

VARIABLES	(1) lnTRADE	(2) lnTRADE	(3) lnIMPORT	(4) lnIMPORT	(5) lnEXPORT	(6) lnEXPORT
North Korea	4.365***	-1.137***	2.914*	-1.478***	1.520	-1.383***
	(1.316)	(0.0797)	(1.756)	(0.0873)	(1.501)	(0.0913)
Bilateral Ally	0.0197	-0.0145	0.0709	0.0419	0.0549	0.0365
	(0.145)	(0.146)	(0.195)	(0.194)	(0.167)	(0.167)
NK × Bilateral Ally	0.795***	0.833***	1.030***	1.067***	0.825***	0.852***
	(0.198)	(0.198)	(0.263)	(0.263)	(0.227)	(0.227)
Multilateral Ally	0.107	0.142**	0.218**	0.246***	0.143*	0.163**
	(0.0701)	(0.0698)	(0.0938)	(0.0932)	(0.0807)	(0.0801)
NK × Multilateral Ally	-0.176*	-0.274***	-0.355***	-0.430***	-0.278**	-0.330***
	(0.0971)	(0.0946)	(0.130)	(0.127)	(0.112)	(0.109)
lnGDP - Partner	0.110***	0.104***	0.203***	0.199***	0.105***	0.104***
	(0.0139)	(0.0139)	(0.0186)	(0.0185)	(0.0146)	(0.0146)
lnGDP - Origin	1.499***		1.192**		0.787*	
	(0.358)		(0.476)		(0.406)	
lnDistance	-0.113***	-0.105***	-0.185***	-0.179***	-0.142***	-0.140***
	(0.0334)	(0.0334)	(0.0444)	(0.0444)	(0.0382)	(0.0382)
Contiguity	-0.415*	-0.397*	-0.528*	-0.516*	-0.554**	-0.546**
	(0.213)	(0.213)	(0.284)	(0.285)	(0.245)	(0.245)
lnTRADE at $t-1$	0.831***	0.840***				
	(0.0113)	(0.0111)				
lnIMPORT at $t-1$			0.740***	0.746***		
			(0.0132)	(0.0130)		
lnEXPORT at $t-1$					0.806***	0.808***
					(0.0122)	(0.0122)
Constant	-18.99***	0.939***	-15.06**	0.808*	-9.135*	1.340***
	(4.769)	(0.318)	(6.352)	(0.420)	(5.417)	(0.367)
Observations	2,772	2,772	2,772	2,772	2,772	2,772
R-squared	0.944	0.944	0.894	0.894	0.930	0.930

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

6.1 Test for Hypothesis I

I first examine whether the intra-alliance effect of trade holds true for our sample. If North Korea trades more within its alliance network, then the sum of the coefficients of $ALLY$ and the interaction term $NK \times ALLY$ would be positive because:

$$E[TRADEFLOW_i^j | NK = 1, ALLY_{it}^j = 1] - E[TRADEFLOW_i^j | NK = 1, ALLY_{it}^j = 0]$$
$$= \beta_2 + \beta_3$$

Similarly, the presence of the intra-alliance effect in South Korea is translated to a positive sign in β_2.

The results indicate that $\beta_2 + \beta_3$ is positive across all models. Specifically, Model (1) implies that North Korea would have a 117% higher trade volume with its allies compared to non-allies. The effect is larger on imports as the coun-

try shows a 161% increase for intra-alliance trade compared to inter-alliance trade. The effect on exports is similar to that on the trade volume. The F-tests for the joint significance of the coefficients indicate that the effects are statistically significant at the 1% significance level.

Unlike the positive and significant effect of bilateral alliances, however, $\beta_2 + \beta_3$ for multilateral alliances displays a negative sign. This shows that multilateral alliances negatively affects bilateral trade flows in North Korea. However, tests for joint significance show that none of the coefficients are significant at the 5% significance level. Putting the results together, I conclude that intra-alliance trade exists in North Korea, and such trade is more salient in bilateral alliances than in multilateral ones.

On the other hand, the coefficient of $BILATERAL \times ALLY$ is positive but not statistically significant, which indicates that bilateral alliances do not promote trade flows in South Korea. However, the coefficient of multilateral alliances is positive and significant in imports and exports. The results indicate that trade with multilateral allies outweighs that with bilateral allies, and the intra-alliance effect of trade does exist in South Korea as well.

6.2 Test for Hypothesis II

The section examines whether the data provide empirical support to the interactive effect of political alliances and regime types on trade. As addressed above, if such effect exists, the coefficient of $NK \times ALLY$ would have a positive value. In fact, it is positive and significant at the 1% significance level across all specifications. Specifically, Model (1) implies that intra-alliance trade is larger in North Korea than in South Korea by 120%. In addition, North Korea is likely to import 180% more from its allies than South Korea does. Finally, the effect on exports is smaller but still significant, with North Korea exporting to its allies 128% more compared to its democratic counterpart, South Korea. However, South Korea exhibits stronger intra-alliance effect of trade among its multilat-

eral allies compared to North Korea.

6.3 On The “Gravity" Variables

Most of the “gravity" variables exhibit the expected signs: GDP has a positive and significant effect on the trade indicators. The distance variable has a negative effect on them, no matter what measure is used. However, contiguity is shown to exert a negative effect on trade, which can be explained by the specific nature of our sample. That is, both South and North Korea do not share borders with many of their major trade partners. For instance, China and the United States are the two largest trade partners for South Korea, but both of them do not share a border with the country.

6.4 On the Positive Sign for the North Korea Indicator Variable

What remains unexplained is the sign of the North Korea variable. The first row of each model suggests that holding other factors constant, North Korea is expected to have a larger amount of trade flows compared to South Korea. Considering that North Korea has a closed economy, the sign is not as expected. In order to find the source of the disparity, I omitted the variable for the GDP of the origin country, which refers to either South or North Korea, as shown in the second column of each model. Then the sign for the variable becomes negative, meaning North Korea when not controlling for the size of its economy has less trade flows than South Korea.

One explanation to it is that North Korea trades in fact more than what its GDP size would expect. It was discussed in Table 2 that trade openness for North and South Korea varies depending on different groups of trade partners. When using the entire sample, South Korea is shown to have a higher ratio of trade flows to its GDP size than North Korea, which is as expected. However,

Table 8: Robustness Testing I: Trade Flows

	(1) Benchmark	(2) Exclude Alliances	(3) Exclude China	(4) Match Sample	(5) Military Pacts Only
North Korea	4.365***	4.995***	4.472***	4.615***	4.528***
	(1.316)	(1.283)	(1.332)	(1.287)	(1.315)
Bilateral Ally	0.0197		0.0594	0.111	0.175
	(0.145)		(0.148)	(0.212)	(0.161)
NK × Bilateral Ally	0.795***		0.690***	0.209	0.418**
	(0.198)		(0.205)	(0.381)	(0.207)
Multilateral Ally	0.107		0.108	0.120*	0.0860
	(0.0701)		(0.0711)	(0.0699)	(0.0692)
NK × Multilateral Ally	-0.176*		-0.178*	-0.152	-0.155
	(0.0971)		(0.0991)	(0.0966)	(0.0959)
lnGDP - Partner	0.110***	0.108***	0.107***	0.113***	0.108***
	(0.0139)	(0.0137)	(0.0142)	(0.0144)	(0.0140)
lnGDP - Origin	1.499***	1.654***	1.528***	1.574***	1.538***
	(0.358)	(0.348)	(0.362)	(0.350)	(0.358)
lnDistance	-0.113***	-0.0933***	-0.106***	-0.113***	-0.108***
	(0.0334)	(0.0307)	(0.0348)	(0.0362)	(0.0287)
lnTRADE at $t-1$	0.831***	0.840***	0.830***	0.826***	0.833***
	(0.0113)	(0.0111)	(0.0114)	(0.0116)	(0.0113)
Contiguity	-0.415*	0.193	-0.482**	0.184	
	(0.213)	(0.133)	(0.220)	(0.248)	
Constant	-18.99***	-21.27***	-19.41***	-19.96***	-19.54***
	(4.769)	(4.641)	(4.829)	(4.670)	(4.766)
Observations	2,772	2,772	2,734	2,646	2,772
R-squared	0.944	0.944	0.943	0.947	0.944

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

when restricting the sample to allied countries, North Korea actually showed a higher level of openness than South Korea. For trade with non-allies, North Korea exhibits a significantly low level of openness both in absolute and relative terms.

6.5 Robustness Checks

Table 8 to 10 present regression results from four additional specifications. Model 1 is the benchmark model, which implies a greater impact of alliances on trade flows in North Korea than in South Korea. Model 2 omits the alliances variables from Model 1, which leads to a slightly higher value of SSE. Coupled with the fact that the coefficients of the alliance variables are significant across the specifications, I conclude that it is warranted to include the alliance variables into the model.

Model 3 uses restricted sample that excludes China, which may heavily

Table 9: Robustness Testing II: Imports

	(1) Benchmark	(2) Exclude Alliances	(3) Exclude China	(4) Match Sample	(5) Military Pacts Only
North Korea	2.914*	4.083**	3.049*	3.455**	3.172*
	(1.756)	(1.717)	(1.778)	(1.757)	(1.755)
Bilateral Ally	0.0709		0.113	0.260	0.298
	(0.195)		(0.198)	(0.290)	(0.215)
NK × Bilateral Ally	1.030***		0.916***	0.208	0.505*
	(0.263)		(0.273)	(0.521)	(0.277)
Multilateral Ally	0.218**		0.220**	0.236**	0.187**
	(0.0938)		(0.0952)	(0.0957)	(0.0927)
NK × Multilateral Ally	-0.355***		-0.360***	-0.338**	-0.323**
	(0.130)		(0.133)	(0.133)	(0.129)
lnGDP - Partner	0.203***	0.201***	0.200***	0.214***	0.201***
	(0.0186)	(0.0183)	(0.0189)	(0.0195)	(0.0186)
lnGDP - Origin	1.192**	1.498***	1.228**	1.356***	1.258***
	(0.476)	(0.465)	(0.482)	(0.476)	(0.476)
lnDistance	-0.185***	-0.166***	-0.177***	-0.194***	-0.185***
	(0.0444)	(0.0408)	(0.0464)	(0.0495)	(0.0383)
lnTRADE at $t-1$	0.740***	0.753***	0.740***	0.728***	0.741***
	(0.0132)	(0.0130)	(0.0133)	(0.0134)	(0.0131)
Contiguity	-0.528*	0.274	-0.602**	0.333	
	(0.284)	(0.178)	(0.294)	(0.339)	
Constant	-15.06**	-19.32***	-15.57**	-17.19***	-15.92**
	(6.352)	(6.202)	(6.434)	(6.363)	(6.345)
Observations	2,772	2,772	2,734	2,646	2,772
R-squared	0.894	0.893	0.890	0.893	0.894

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 10: Robustness Testing III: Exports

	(1) Benchmark	(2) Exclude Alliances	(3) Exclude China	(4) Match Sample	(5) Military Pacts Only
North Korea	1.520	2.555*	1.521	1.860	1.689
	(1.501)	(1.462)	(1.517)	(1.517)	(1.499)
Bilateral Ally	0.0549		0.113	0.0906	0.222
	(0.167)		(0.170)	(0.252)	(0.185)
NK × Bilateral Ally	0.825***		0.674***	0.131	0.355
	(0.227)		(0.235)	(0.453)	(0.238)
Multilateral Ally	0.143*		0.145*	0.158*	0.126
	(0.0807)		(0.0817)	(0.0833)	(0.0797)
NK × Multilateral Ally	-0.278**		-0.276**	-0.298***	-0.260**
	(0.112)		(0.114)	(0.115)	(0.110)
lnGDP - Partner	0.105***	0.103***	0.101***	0.102***	0.101***
	(0.0146)	(0.0143)	(0.0148)	(0.0155)	(0.0146)
lnGDP - Origin	0.787*	1.053***	0.790*	0.884**	0.826**
	(0.406)	(0.395)	(0.411)	(0.411)	(0.406)
lnDistance	-0.142***	-0.121***	-0.132***	-0.142***	-0.126***
	(0.0382)	(0.0350)	(0.0397)	(0.0426)	(0.0327)
lnTRADE at $t-1$	0.806***	0.817***	0.804***	0.801***	0.808***
	(0.0122)	(0.0120)	(0.0123)	(0.0127)	(0.0121)
Contiguity	-0.554**	0.0948	-0.657***	0.116	
	(0.245)	(0.152)	(0.253)	(0.296)	
Constant	-9.135*	-12.90**	-9.204*	-10.35*	-9.779*
	(5.417)	(5.272)	(5.480)	(5.487)	(5.412)
Observations	2,772	2,772	2,734	2,646	2,772
R-squared	0.930	0.929	0.928	0.929	0.930

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

influence trade outcomes in North Korea. However, excluding China from the sample does not change the significance of the interaction term, though it slightly reduces the magnitude of it. However, the coefficient is still economically significant and suggests approximately a 100% higher intra-alliance trade volume in North Korea compared to South Korea.

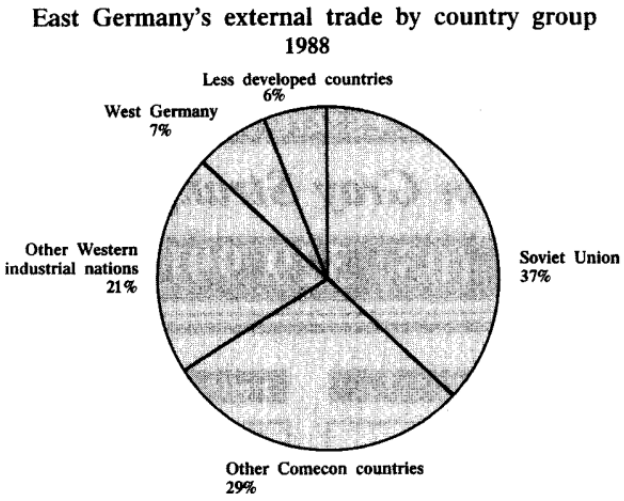
Model 4 controls for unobservable heterogeneity across the partner countries by restricting sample to the common allies and non-allies of North and South Korea. The results show that the interactive effect of alliances and institutions is positive but no longer significant. However, the model has limitations since the only common ally between the two countries is Russia. This implies that the results are not free from the political factors specific to Russia. For instance, the trade volume between North Korea and Russia has significantly decreased since the demise of the Soviet Union. Since the period of the data only covers the early 2000s, the intra-alliance effect is no longer salient in North Korea.

Finally, the alliance between North and South Korea is a non-aggression treaty, which differs from military alliances. While military alliances require a commitment for cooperation in the event of conflict, non-aggression pacts only demand neutrality. Model 5 reflects this distinction by only considering military agreements but not neutrality pacts. The results show that bilateral alliances are shown to have a positive and significant effect on trade at least at the 10% significance level.

7 Discussion

In this section, I discuss whether the case of Germany fits the framework and speculate the effect of hypothetical reunification on trade Korea's trade flows. I first investigate whether German Democratic Republic ("East Germany") and the Federal Republic of Germany ("West Germany") had overall higher trade flows with their respective allies than with non-allies. Next, I check whether the

Figure 3: East Germany's External Trade by Country Group



Source: The Commerzbank report on German business and finance (1999)

intra-alliance trade effect is more salient in East Germany than in West Germany and how the trend has changed after the reunification. Finally, I use the analysis to draw implications on the potential reunification of Korea.

7.1 The German Reunification

Intra-Alliance Trade in East Germany

Pre-reunification trade data are not available in the major data sources such as UN Comtrade and the World Trade Organization database. Therefore, I use the existing literature to navigate the pre-reunification trade flows of East Germany. The Commerzbank report in 1990 summarizes that in 1988, the Soviet Union and other Comecon countries make up 66% of the total trade volume in East Germany. In comparison, other Western industrial nations including West Germany comprises the other 28%. The report does not specify what countries belong to the Western industrial nations, but it is clear that most of them are not allied with East Germany. The data support clear intra-alliance trade patterns in East Germany.

Figure 4: West Germany's Percentage of Total Exports with Major Trading Partners

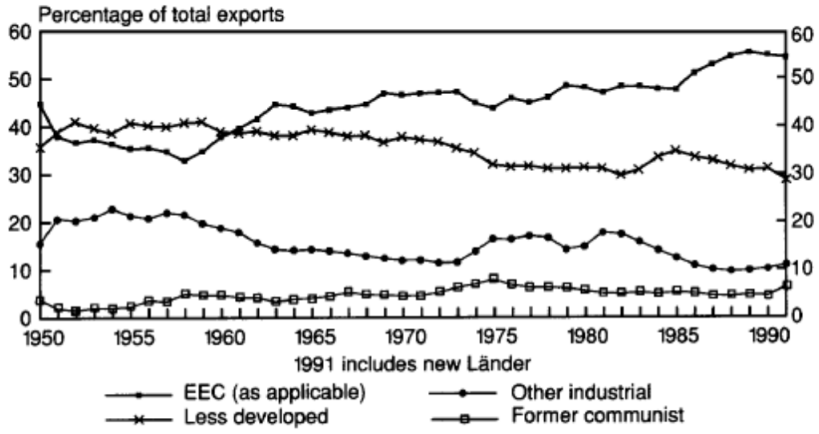


Figure 8.10 Major trading partners

Source: As Figure 8.3

Source: Owen Smith (1994)

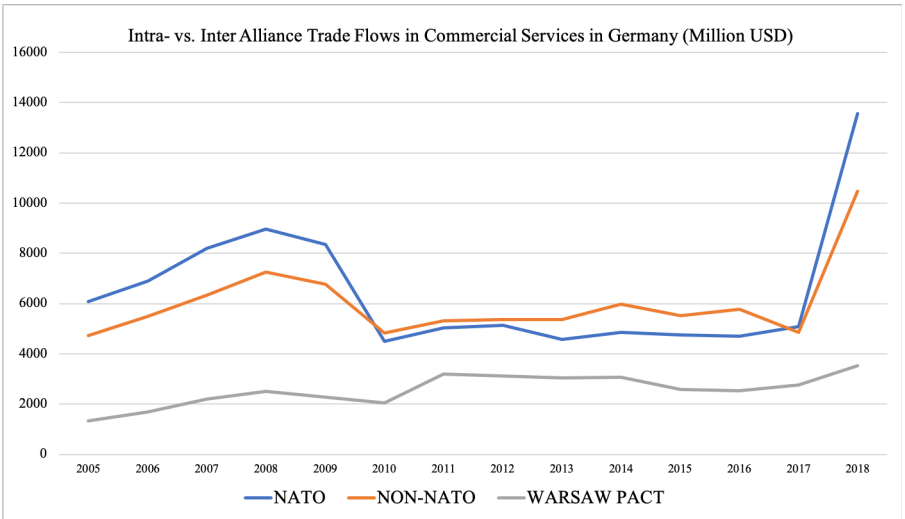
Intra-Alliance Trade in West Germany

Figure 4 presents the percentage of total exports in Germany by country group from the time period of 1950 to 1990. In 1988, the country's exports with European Economic Community ("EEC") comprise 55% of the country's total exports. The EEC member countries include Belgium, France, Italy, Luxembourg, and the Netherlands, which are also the founding members of NATO. On the other hand, the country traded less than 10% with the former communist countries. Overall, the tendency to trade within an alliance is shown in the West Germany case as well.

Intra-Alliance Trade in the Reunified Germany

The reunified Germany is an enlargement of the former West Germany, and Germany withdrew from the Warsaw Pact in 1991, a year after East Germany collapsed into West Germany. Figure 5 shows the average trade flows in Germany for the time period of 2005 to 2018. In order to match with the pre-reunification data, I separated the countries into three groups: The current member countries

Figure 5: Intra- vs. Inter-Alliance Trade Flows in Commercial Services in Germany



Source: Author's calculations based on data from UN Comtrade.

of NATO, current non-member countries of NATO ("NON-NATO") and the former member countries of the Warsaw Pact ("WARSAW PACT"). Since most of the Warsaw Pact members later jointed NATO, (NON-) NATO and WARSAW PACT are not mutually exclusive. Thus, I further separated the WARSAW PACT group into two, one currently in NATO ("WARSAW PACT-NATO") versus in NON-NATO ("WARSAW PACT-NON-NATO").

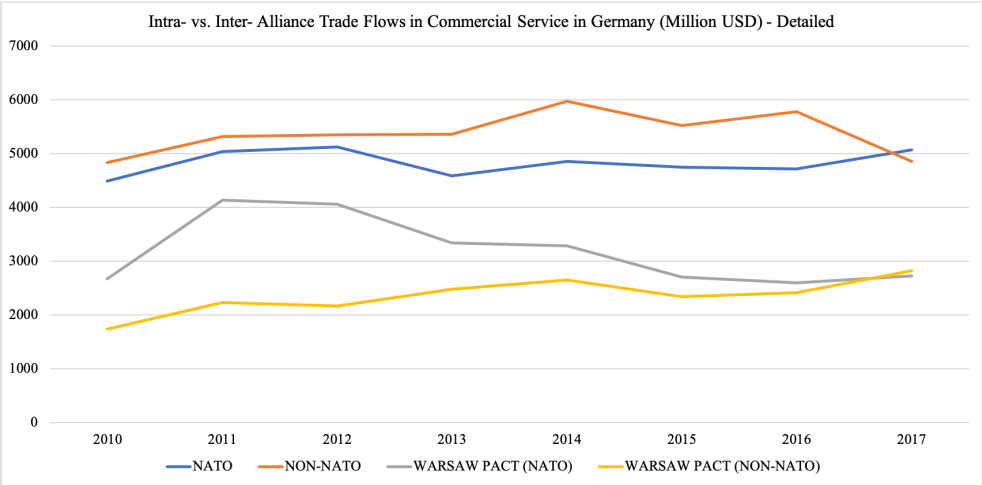
The figure shows that trade flows between Germany and NATO were greater than those with the other groups until 2010. Soon after, NON-NATO started catching up and exceeded the amount of intra-alliance trade volume. Trade with the former Warsaw Pact members remained low for the time period.

When separating WARSAW PACT into two groups, one with the current NATO members and the other with non-NATO members (Russia and Poland), Germany is shown to have traded more with the former on average, but the gap diminishes over time.

Implications of the German Reunification on Intra-Alliance Effect of Trade

Due to the data limitations, the analysis is only descriptive. Also, it only navigates trade patterns surrounding NATO and the Warsaw Pact but not bilateral

Figure 6: Intra- vs. Inter-Alliance Trade Flows in Commercial Services in Germany, Detailed



Source: Author's calculations based on data from UN Comtrade.

alliances. Still, the German case supports the study in two ways. First, East Germany exhibits stronger tendency to intra-alliance trade than West Germany, though West Germany shows lower openness toward its non-allies compared to East Germany. However, given the fact that the data are from the late 1990s when the communist forces were failing economically, the lower openness may be attributable to the overall smaller economy of East Germany or the Warsaw Pact member countries.

Second, the intra-alliance effect of trade becomes less salient since the countries became reunified, and the Cold War legacy diminishes. This descriptively supports that intra-alliance tendency is a function of security externalities. That is, the higher security externalities trade incur, the likely countries tend to trade with allies. Overall, the findings suggest that the integrated Germany with a democratic and free-market system shows less intra-alliance trade compared to East Germany.

7.2 Hypothetical Effects of the Korean Reunification

Can we predict trade patterns in the reunified Korea, if the reunification happens? If we assume that the reunification would follow the German scenario,

where the smaller communist economy collapses into the larger democratic economy, the German scenario is a good starting point to speculate the alliance effect on trade patterns in the reunified Korea.

The first observation in the integrated Germany is that the intra-alliance effect of trade becomes less salient than in East Germany. This means that the overall trade openness toward North Korea's allies, which majority of them are a communist country, would decrease. In addition, openness toward non-allies would increase, and the United States may see new trade opportunities in the North part of Korea.

In addition, Germany has seen its trade volumes with the non-NATO members catching up those within the alliance. If we assume that the reunified Korea would maintain the current alliance relationships, it implies that the current non-allies of South Korea may find trade opportunities in the Korean peninsula. Thus, even though North Korea's current allies may lose at first, the loss would likely be compensated by the increase in openness toward non-allies in the South part of Korea.

The results imply that the Korean reunification would benefit both current allies and non-allies of South Korea with the former untapped trade opportunities in North Korea and the latter with an increase openness toward non-allies. China would likely remain the largest trading partner of Korea, which is consistent with some past studies that speculate that China would benefit the most from the Korean reunification under such scenario (Fukao et al., 2017). The United States would also likely benefit as well, as it would be able to take advantage of North Korea's untapped markets.

8 Conclusion

The study provides a game-theoretic representation that justifies greater intra-alliance trade in command economies than in democratic economies. The mech-

anism works through security externalities: That is, the central planner internalizes security externalities from trade, while the firm, which controls trade decisions in democratic economies, aims to maximize the firm-level profit. I find empirical evidence to the model in the division of Korea, which allows the study to isolate the effect of institutional differences on the country's trade outcome. The results show that intra-alliance trade is more than two-fold in North Korea than in South Korea.

The German case adds support to the argument. Historically, the communist part of Germany tended to exhibit higher intra-alliance trade flows compared to their democratic counterpart. As they reunified into a single democratic country, the intra-alliance trade effect persisted but diminished with time. The structural resemblance between Germany and Korea allows one to speculate hypothetical changes in alliance relationships and trade outcomes in the reunified Korea. In summary, the Korean reunification would benefit the current allies of South Korea as the partner countries would have an opportunity to exploit untapped resources and markets in the North. Their non-allies would gain as well from South Korea's enhanced willingness to trade more with its non-allies.

The study contributes to the field in three ways. First, it synthesizes and advances the existing theoretical framework on the alliance-trade relationship by introducing government types as a variable. Secondly, it controls for the endogeneity problem by using a quasi-experiment, which is the first in the literature. Finally, it reveals some of the trade patterns in North Korea, the country that frequently initiates political dialogues in international politics despite its small size of economy. The analysis is more informative due to the data limitations on North Korea in the major Western data sources.

Future research may advance the study as follows. First, the theoretical model assumes a dichotomous world in which countries have either a perfect autocratic or free-market economy. In reality, all governments intervene the market one way or another. Thus, one can consider using a continuous function

for regime types depending on degrees of government intervention. In addition, bipolar systems are shown to strengthen security externalities as alliances tend to be more stable in such systems. Reflecting this fact, security externalities can be expressed in a continuous function of systemic factors that may affect their magnitudes.

Regarding the empirical aspect of the study, one can sophisticate the study's aggregate-level results by using industrial or sectoral-level analyses since alliance relationships affect trade volumes differently by industries. For instance, food and fuels are two of the main importing goods from China to North Korea, and change in the alliance relationship between two countries would disproportionately affect these industries. Addressing such heterogeneities would allow distributional effects of trade to be estimated.

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