

## **The likelihood of War and Economic Interactions: The Case of Korea, 1980-2000**

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### ***Abstract***

*This study investigates the effect of bilateral political relations on trade using South Korea as a case study. I use bilateral cross-country data to quantify the likelihood of a conflict between any two countries. My empirical results show that the volume of exports and imports is negatively affected by conflicting international political interests even when there is little potential for worsening political relations that can escalate into bilateral conflict.*

**Keywords:** international political relations, likelihood of bilateral conflict, trade, trade volume, export, import,

### ***1. Introduction***

Many scholars have studied the effect of interstate political conflict on international trade. Some studies have focused on the negative effect of conflicting political interests on international trade flow (Pollins 1989a,b; Li and Sacko 2002; Long 2003a; Simmons 2005). On the other hand, Morrow, Siverson, and Taberes (1998) found that similar political interests are positively associated with international trade. In yet another study, Davis (1999) argued that cold war–era West Germany sought enhanced economic interactions with political rivals in Eastern Europe. Although there are a growing body of research that highlights the association between international political relations and international trades, the existing literature does not convincingly present the exact analysis of the effect of international political relations on trade. This is most likely due to the fact that measuring international political relations between countries is not a simple or clear-cut matter. For an accurate analysis, a precise and reasonable way to measure international political relations between countries must be defined, and based on those measures, the effect of political relations on trade ought to be analyzed.

This study contributes to the existing literature on international political relations and trade by investigating the effect of political relations on bilateral trade through the case study of South Korea. There are two key issues that need to be considered to properly assess the effect of international political relations on commerce through a case study. First, the measure of international political relations used is very important because the effect of political relations on trade is likely to be estimated differently depending on the measured value of political relations. In this study, I utilize measures of international relations which result from the likelihood of an armed conflict between any two countries. I use a probit model to estimate the likelihood of bilateral conflict based on political, geographic and cultural factors (Yamarik, Johnson and Compton 2010). For the probit model, I constructed bilateral and cross-country datasets of 158 countries from 1960 to 2000. The dataset includes all country pairs in existence for each year.

I can capture long-run political relations from the probit model. The predicted likelihood of bilateral conflict from the probit model is not expected to be directly correlated to economic outcomes such as trade and production. So, it can be used as an independent variable for estimating the effect of political relations on trade. Second, selection of the proper case is also important. Historically and geographically, Korea has been surrounded by larger and more powerful neighbors and frequently victimized at their hand. Even today, Korea is the focus of rival interests from neighboring China, Japan and Russia, as well as the more distant United States. Consequently, to maintain national identity and protect culture and tradition, Korea is and always has been inevitably forced to make sensitive and complicated choices of international political relations for survival.

Furthermore, Korea remains divided into South and North, with nearly two million men under arms on the peninsula and a high state of military tension. Conclusively, South Korea geopolitically occupies a highly strategic position on the world political map and maintains highly dynamic political relations with other countries. South Korea's diplomatic initiatives with the U.S., China, Japan, Europe, Eastern Europe, Africa, and South America have helped drive South Korea to become one of the leading exporting nations in the world. High tech industries, including the production of electronics, cell phones, computer chips, automobiles, and ships, which require a highly educated work force, have been the leading export ideas. With a lack in natural resources, South Korea also has a high dependence on the import of capital goods, raw materials and industrial supplies. Moreover, confidence in Korean products has risen since the 1988 Seoul Olympics (S. Korea). In the late 1980s, South Korea became one of the world's top ten trading nations.<sup>1</sup> For these reasons, South Korea is considered to be an ideal case for analyzing the relationship between political relations and trade. However, the existing literature does not adequately use South Korea as the case study for the analysis of political relations and commerce. Therefore, in this study, I explore the evident relationship between international political relations and trade through a South Korean case study. My empirical results show that exports and imports of South Korea are negatively affected by conflicting bilateral political interests, even when there is little potential for worsening political relations.

The rest of the paper unfolds as follows. The next section provides a brief literature review, including that work which directly addresses the relationship between political relations and commerce. In Section 3, I focus on detailing my empirical approach and describe the estimation strategy I used. Section 4 outlines my estimation results and section 5 concludes.

## **2. Existing Literature**

### **2.1 War and commerce**

Polachek (1978) was the first to analyze the relationship between trade and political distance with a cross-section study of the effect of trade on conflict. He found that increased trade reduced political distance. Polachek (1980) constructed a model from microeconomic foundations in an important paper showing the negative relationship between conflict and trade. His work generated a proliferation of empirical papers testing the trade-conflict relationship. Since then, a number of scholars have explored the relationship between international political conflict and trade for a long time but their conclusions still remain arguable. Much of the existing literature on trade and conflict investigates whether trade is correlated with peace between nations (Barbieri & Schneider 1999; Polachek, Robst & Chang, 1999). Oneal, Russett, and Berbaum (2003); Keshk, Pollins, and Reuveny (2004) suggest that militarized interstate disputes (MIDs) have a negative impact on trade. However, Morrow, Siverson, and Tabares (1998) argue that MIDs have an insignificant impact on trade flows in a study limited to the great powers. Li and Sacko (2002) indicated that unexpected MIDs have a negative effect on trade, while expected ones do not.

Barbieri and Levy (1999) considered whether war is associated with reduced trade between the warring societies. Based upon their empirical analysis of seven dyads, they found that “in most cases, war does not have a significant impact on trading relationships” but as the authors themselves acknowledge, the small sample of their analysis made making generalization hard. In contrast to Barbieri & Levy (1999), Anderton and Carter (2001) found reasonably strong evidence that major power war is associated with a decline in trade relative to pre- and post-war periods with a larger number of cases. Glick and Taylor (2005) found empirical support for the conclusion that wars not only have a substantial negative impact on trade, but that this effect can persist for many years following the end of war. Simmons (2005) also found that territorial disputes have a negative impact on trade. Overall, the arguments on the relationship between war and trade still have not come together to draw clear conclusions.

### **2.2 Political relations and commerce**

Existing literature indicates that conflicting interests can have a detrimental effect on trade because firms recognize that conflicting interests can become a threat to trade. Fearon (1994), Morrow (1999) and Schultz (2001) have argued that when states have disagreements, they sometimes signal resolve by demonstrating a willingness to accept costs to achieve a favorable outcome.

Sometimes, states impose trade sanctions, close borders, or enact embargoes to signal commitment to issues that are important to them. For example, Mastanduno (1992) argued that political leaders sometimes block certain trade to countries with which they are in conflict. Gowa (1994) also indicated that the income gains produced by trade can be converted to the military strength of potential adversaries, so political leaders are unwilling to permit trade with potential adversaries. Armstrong (2010) found empirical support for the conclusion that an increase in positive political news and a decrease in negative political news promote trade to some degree.

To summarize, existing studies have shown empirically that conflicting political interests at the international level tend to be associated with reduced levels of trade in a variety of ways. However, variation in the relationship between political relations and trade still needs to be explored. The South Korean case study of the relationship between political relations and trade helps to find evident relations between political relations and trade more effectively and conclusively.

### 3. Empirical Approach

In this study, I construct a two-step empirical estimation to examine the effect of bilateral political relations on trade between two countries through the case study of South Korea. In the first step, I model political relations which result from the likelihood of bilateral conflict, as a jointly-determined outcome between two nations. Yamarik, Johnson and Comton (2010)'s probit model is used to estimate the predicted likelihood of a conflict between any two countries based on geographic, historical and political factors. For the probit model, I construct bilateral and cross-country datasets for 158 countries from 1960 to 2000. In the second step, I pick the predicted measures of South Korean political relations from the first step and then include the predicted measures of South Korean political relations in my panel approach model for the estimation of the relationship between South Korean political relations and trade. For this second step, I set up cross-country datasets for South Korean trade which include 158 countries as South Korean trade partners from 1980 to 2000.

#### 3.1 Bilateral political relation model.

The conventional understanding of war and peace in international relations is that nation A is either at "war" or at "peace" with nation B. So, if political relations between nation A and B are good, the probability those two countries will be engaged in an international war would naturally be low, and if political relations between nation A and B are not good, the probability of war outbreak between two countries would be certainly high. In other words, the political relations between two countries can be measured by the probability of international war outbreak between the two countries. For the measure of political relations between two countries, I construct a probit model for international conflict between two countries as the outcome of a joint decision.

Let  $U$  represent the unobservable difference in joint utility levels for countries  $i$  and  $j$  engaging in a conflict relative to the state of peace at time  $t$ :

$$U_{ijt} = b_0 + b_1 P_{ijt} + b_2 G_{ijt} + b_3 C_{ijt} + e_{ijt} \quad (1)$$

where  $P$  are political measures (i.e. relative values of Political instability, number of communist countries);  $G$  are geography variables (i.e. bilateral distance, common border, common language);  $C$  are cultural factors (i.e. common language, common colonizer); and  $e$  is an error term which is uncorrelated with  $P$ ,  $G$  and  $C$ . With  $u^*$  unobservable, I define an indicator variable  $W$ , which is 1, if the two countries are engaged in an international war ( $U > 0$ ), and 0 otherwise ( $U \leq 0$ ). The response probability for a conflict then is,

$$P(W_{ijt} = 1 | P, G, H) = P(U_{ijt} > 0 | P, G, C) = \Phi (b_0 + b_1 P_{ijt} + b_2 G_{ijt} + b_3 C_{ijt}) \quad (2)$$

where  $\Phi$  is the standard normal cumulative distribution function and the standard errors of the estimates of  $b_0$ ,  $b_1$ ,  $b_2$  and  $b_3$  are asymptotically standard normal.

In this model, it is noteworthy that political, geographical and cultural factors are evidently exogenous to an individual country's trade. Therefore, the predicted measure from this model can be treated as an exogenous variable in the cross-country trade regression.

### 3.2 Country-pair fixed effects trade regression

I construct the panel dataset for South Korean trade including 158 countries as South Korean trade partners from 1980 to 2000. As panel data are available, I set up panel country fixed effects (within) model which can control time-constant unobserved heterogeneity. The panel country-pair fixed effects (within) model can also capture a substantial proportion of the cross-country differences in trade and focus most notably on the determinants of the effect of South Korean political relations within-country variation. I include the lagged predicted values for South Korea from the probit model in this panel country-pair fixed effects model. Using the predicted values for South Korea, I examine the relationship between South Korean political relations with its trade partners and South Korean trade. I add some control variables which represent South Korea and the trade partner of South Korea's lagged level of economic development (GDP per capita) and the size of economy (Population). Polachek (1980) pointed out the importance of causality both ways between trade (or interdependence) and political relations. Since Polachek (1980), many scholars have become aware of potential endogeneity problems in estimating the relationship between political factors and economic outcomes. In particular, Collier and Hoeffler (2002); Fearon and Laitin (2003) suggest using lagged values as explanatory variables to resolve this potential endogeneity problem. I subscribe to their methodology so I use the lagged predicted values of political relations, lagged per capital GDP in my trade regression. I thus estimate the following model:

$$Y_{it} = \beta_0 + \alpha_i + Political\ relations_{it-1}\beta_1 + X_{it-1}\beta_2 + Z_{it}\beta_3 + u_{it} \quad (3)$$

where  $Y_{it}$  are dependent variables (South Korean trade volume, amount of import and amount of export); and  $\alpha_i$  is the individual country-pair's effect between South Korea and South Korea's trade partner; and *political relations*<sub>it-1</sub> is a matrix of the lagged predicted values of South Korean political relations with trade partners. The predicted values are based on the predicted probabilities of a probit analysis; and  $X_{it-1}$  is a matrix of lagged covariates (South Korean GDP pc and South Korean trade partner's GDP pc) that influence trade.;  $Z_{it}$  is a matrix of other covariates (South Korean population and trade partner of South Korea's population); and  $u_{it}$  is the unobservable error term for country  $i$  in period  $t$ . The selection of countries in the political relations is uncorrelated with the country- and year-specific shock  $u_{it}$  by the identifying assumption of the model. The coefficient of interest is  $\beta_1$ , which captures the effects of political relations on trade.

### 3.3 Data

#### 3.3.1 Data on international conflicts

For the probit model, I set up bilateral and cross-country datasets for 158 countries from 1960 to 2000 to ensure that I capture a long-run relationship. I use Major Episodes of Political Violence (MEPV) and Conflict Regions (1946-2008) which were recently developed by Monty G. Marshall from the Center for Systemic Peace as my source for bilateral conflicts. Major Episodes of Political Violence (MEPV) are defined by the systematic and sustained use of lethal violence by organized groups that result in at least 500 directly-related deaths over the course of the episode. I have conducted this analysis primarily upon the cases coded as wars, because "the designation of 'war' carries with it a stronger institutional, or institutionalized, component and more definite objectives" (Marshall 2008). MEPV considers two types of conflict: interstate (international) conflicts (or, conflicts between or among two or more states), intrastate (civil) conflicts (or, conflicts within the state primarily over *political* identity attributes and conflicts within the state primarily over *social* identity attributes). For my purpose, I focus on international conflicts. On the basis of MEPV, international war is coded 1 if the two countries are engaged in an international conflict in the year, and coded 0 if otherwise in my dataset.

#### 3.3.2 Determinants of international conflicts

I refer to Martin, Mayer and Thoenig (2007) in selecting the political, geographical and cultural determinants of bilateral conflict. For political factors, I use the number of GATT/WTO members, the number of communist states, the dummy of a lagged defense alliance, the difference in Polity, the sum of Polity, the log sum of military personnel, and the lagged difference in military personnel. The defense alliance dataset comes from the COWS Project. The data for democracy are from the Polity IV project, which provides a measure of a state's regime type in the form of its autocracy score subtracted from its democracy score to produce a variable that ranges from -10 (very autocratic) to 10 (very democratic) (Marshall & Jaggers, 2010).

The data for military personnel is from the National Material Capabilities (v3.02) dataset. For geographical factors, I include years since the last conflict, a log of bilateral distance, a log of the sum of surface area, and dummies for international conflict in the previous year and common border. For cultural factors, I include dummies for common language, common legal system, common colonizer, and colonizer-colonist pair. The data for geographical and cultural factors are from the CIA World Factbook (2007) and CEPR (2006). Table 1 shows the summary descriptive statistics for the data set of the probit model.

Table 1  
Descriptive statistics for Probit model

Variable	obs	Mean	Std. Dev.	Min	Max
International conflict	456484	.04	.2	0	1
<u>Political factors</u>					
number of GATT/WTO	456484	1.2	.7	0	2
number of Communist states	456484	.19	.41	0	2
Defence alliance	456484	.04	.2	0	1
sum of Polity	391141	-.74	10.94	-20	20
difference in Polity	391141	7.97	6.57	0	20
log Sum of Military personnel	392420	7.22	2.59	0	16.73
log Difference in Military personnel	392420	2.11	1.54	0	8.47
<u>Geographical factors</u>					
Years since last conflict	456484	191.59	37.75	1	200
log Bilateral distance	456484	8.71	0.77	2.35	9.9
log sum of Surface area	456484	24.03	3.12	9	33.03
Common border	456484	.02	.15	0	1
<u>Cultural factors</u>					
Common language	456484	.14	.35	0	1
Common colonizer post-1945	456484	.09	.29	0	1
Colonizer-colonist post-1945	456484	.007	0.09	0	1
Common legal system	456484	.34	.47	0	1

### 3.3.3 Data on trade.

The data for my country fixed effects model includes annual observations for the trade between South Korea and individual trade partner of South Korea (158 countries) for the time period 1980-2000. This data set includes trade volume, the amount of export and the amount of import between South Korea and the individual trade partner of South Korea on an annual basis. I obtained the trade data from Korea International Trade Association (trade statistics).

### 3.3.4 Control variables

The size of a nation's economy and the level of economic development are universally known to be significantly associated with trade. Therefore, I included South Korea's and the trade partner of South Korea's populations and per capita GDPs as control variables that influence trade in the country fixed effects model. The data on GDP per capita and population are from World Development Indicator (WDI). Table 2 shows the summary descriptive statistics for the data set for the country fixed effects model.

Table 2 Descriptive statistics for Country fixed effects trade regression (South Korean case)

Variable	obs	Mean	Std. Dev.	Min	Max
<u>Trade variables(1M in USD)</u>					
Trade Volume	2707	1150.52	4581.02	0.001	66852.26
Export	2991	523.33	2122.86	0	37610.63
Import	2723	569.34	2486.63	0	33305.38
Probability of bilateral international war outbreak for South Korea(%)	2966	.9	7.33	.002	91.26
South Korean GDP pc	3187	6433.09	3638.63	1674.39	12249.2
South Korean Population	3187	4.30e+07	2691028	3.80e+07	4.70e+07
Trade partner's GDP pc	2770	4709	7811	69	55634
Trade partner's population	2922	3.63e+07	1.23e+08	220351	1.30e+09

## 4. Estimation results

### 4.1 Probit results

I use a probit estimator to generate the predicted bilateral conflict probabilities in (1). The results are similar to those of Yamarik, Johnson and Comton (2010). Although the magnitudes of coefficients are different from those used in Yamarik, Johnson and Comton (2010), the coefficient signs closely match those found in other existing literature (Martin, Mayer and Thoenig 2008 and Yamarik, Johnson and Comton 2010). Table 3 shows the probit results.

Table 3: Probit analysis of determinants of international war outbreak, 1960-2000

Dep. Var.=1 1 if the two countries are engaged in an international war	
	-.14*** (.02)
Number of GATT/WTO	
	-.16*** (.03)
Number of Communist states	
	-.18*** (.05)
Defense alliance	
	-.001 (.001)
Sum of Polity	
	.01*** (.002)
Difference in Polity	
	.07*** (.006)
log Sum of Military personnel	
	.01 (.01)
log Difference in Military personnel	
	-.005*** (.0001)
Years since last conflict	
	-.28*** (.02)
log Bilateral distance	
	.05*** (.01)
log Sum of Surface area	
	.33*** (.04)
Common border	
	.13*** (.03)
Common language	
	.09** (.04)
Common colonizer post-1945	
	.25*** (.07)
colonizer-colonist post-1945	
	-.09*** (.03)
Common legal system	
	-1.68*** (.15)
Constant	
obs	366999
R <sup>2</sup>	0.5165

\*  $p < .10$ , \*\*  $p < .05$ , \*\*\*  $p < .01$  Estimations performed using Stata 11.2.

### Trade regression results

The relationship between international political conflicts and trade has long been an interesting subject of scholarly debate and is still vigorously argued. Some existing studies have shown empirically that conflicting political interests at the international level tend to be associated with reduced levels of trade (Pollins 1989a,b; Li and Sacko 2002; Long 2003a; Simmons 2005), but Barbieri and Levy (1999, 2003) have argued conflicting political interests are not necessarily associated with trade. My empirical results evidently show that the likelihood of bilateral conflict is negatively associated with trade. Table 4 presents the results for the effect of South Korean political relations on South Korean trade. All regressions were estimated using panel country-pair fixed effects model with Stata 11. The control variables (GDP pc and population) of South Korean trade partners are significant in a positive direction, while South Korean GDP pc and population were insignificant at standard levels. Of particular interest here is that the coefficient on the predicted likelihood of bilateral conflict is both negative and highly significant. Regressions (1)-(3) present the results for the effect of political relations on bilateral trade volume, the amount of export and the amount of import in sequence. Our variable of interest is the likelihood of bilateral conflict.

Table 4

Panel country fixed effects model results for the effect of political relations on trade  
1980-2000 (South Korean case)

	Trade volume (1)	Export (2)	Import (3)
<b>lagged Probability of bilateral conflict (%)</b>	<b>-86.36*** (17.73)</b>	<b>-35.64*** (8.15)</b>	<b>-50.66*** (0.5)</b>
lagged South Korean GDP pc	-.006 (.03)	-.02 (.01)	.01 (02)
South Korean Population	.00003 (.00004)	.00003* (.00002)	-8.72e-06 (00002)
lagged Trade partner's GDP pc	.32*** (.02)	.14*** (.007)	.18*** (009)
Trade partner's population	.00006*** (3.28e-06)	.00003*** (1.50e-06)	.00003*** (.94e-06)
Constant	-3934.32** (1586.22)	-2574.63*** (699.25)	-1040.67 (937.67)
	N=2273	N=2469	N=2285
	R <sup>2</sup> =0.315	R <sup>2</sup> =0.3183	R <sup>2</sup> =0.2624

\*  $p < .10$ , \*\*  $p < .05$ , \*\*\*  $p < .01$ . Panel fixed effect standard errors are in parentheses. Estimations performed using Stata 11.2.

According to Table 4, the predicted likelihood of bilateral conflict between South Korea and South Korean trade partners is negatively associated with the level of total trade volume. The result for regression (1) shows that the bilateral trade volume is significantly reduced by about 86,360,000 in U.S. Dollars (USD) as one percent in the predicted likelihood of bilateral conflict increases. The regression (2) demonstrates that the likelihood of bilateral conflict between South Korea and South Korean trade partners is significantly and negatively associated with South Korean exports. The result for regression (2) indicates that the amount of export is reduced by about 35,640,000 in USD as one percent of increases in the predicted likelihood of bilateral conflict. The amount of South Korean import is also negatively affected by the likelihood of bilateral conflict between South Korea and South Korean trade partners. The result for regression (3) indicates that the amount of import is reduced by about 50,660,000 in USD as one percent in the predicted likelihood of bilateral conflict increases. Conclusively, my empirical results clearly show that conflicting international political interests have negative influences on trade, even when there is only a small potential for worsening political relations or escalating into bilateral conflict.

### **5. Conclusion**

This study makes two key contributions to the existing literature on the international political relations and trade. First, I utilize an innovative measure for calculating international political relations that result from the likelihood of a bilateral conflict. I compute the predicted likelihood of international political conflicts using a probit model. The probit model does not include economic factors, so the predicted probability from the probit model can be considered to be orthogonal to possible economic outcomes. Consequently, the predicted probability can be utilized efficiently for estimating the effect of political relations on trade in this study. Second, I use of South Korea as the model nation for this case study, which has not yet been done in previous studies. For this case study, the selection of a proper case is important because drawing results from an improper case would produce data that would not be universally reliable and generalizable.

There are two reasons why South Korea was selected for this case study. First, there is no doubt that South Korea is a hot spot on the world political map as the only divided country in the world so South Korea inevitably maintains high dynamic political relations with the rest of the world. Second, the proportion of trade (% of GDP) in South Korea is more than 95 and moreover, South Korea is one of the world's top ten trading nations. Conclusively, South Korea has strategic importance in analyzing the relationship between international political relations and trade. Therefore, South Korea is an ideal case for this study.

My empirical results clearly show that exports and imports of South Korea are negatively affected by conflicting bilateral political interests even when there is only a small potential for worsening political relations that can escalate into bilateral conflict.

This study confirms the importance of understanding international political relations and their effects on trade through the examination of the South Korean case. In addition to the immediate impact of conflicting political interests on bilateral trade, the adverse effects may linger. Usually, exports lost today may mean lower exports in the future because markets are lost for replacement and follow-up technologies. Therefore, international political environment cannot be ignored for states' foreign commercial policies

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<sup>1</sup>The Trade (% of GDP) in South Korea was last reported at 101.99 in 2010. (World Bank Report 2011)

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