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# Dyadic power shifts and alliance credibility: analysis of gap of the threat perception

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**Dyadic power shifts and alliance credibility:**
**analysis of gap of the threat perception**


by


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A thesis submitted to the graduate faculty

In partial fulfillment of the requirements for the degree of

MASTER OF ARTS


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Program of Study Committee:
Robert B. Urbatsch, Major Professor
David E. Cunningham
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# Dedication

I would like to dedicate my thesis to my family, Eunyoung and Aiden, and my parents for their unrelenting love and support.

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# List of Abbreviations

ATOP: *Alliance Treaty Organization and Provisions*

COW: *Correlates of War*

DPRK: *Democratic People's Republic of Korea (also known as North Korea)*

IAEA: *International Atomic Energy Agency*

ICBM*: Intercontinental Ballistic Missile*

NATO: *North Atlantic Treaty Organization*

NMC: *National Material Capabilities*

NPT: *Non-Proliferation Treaty*

MID: *Militarized Interstate Disputes*

ROK: *Republic of Korea*

UK: *United Kingdom*

WMD: *Weapons of Mass Destruction*

MIDATOP: *Militarized Interstate Disputes and Alliance Treaty Organization and Provisions*

# Acknowledgements

For the most part, I appreciate the Korean army headquarters offered a special opportunity that I am able to make contributions to a security policy in the military by completing the Master of Arts in the U.S. Even though most of my military friends as well as myself were considerably concerned with studying the area of liberal arts in the U.S. where English is a mother tongue, the committee members and American friends helped me overcome the language barrier and lack of background knowledge of political science.

First, academically, I appreciate the full assistance and support by Dr. Robert Urbatsch as a major professor, Dr. David Cunningham, and Dr. Mack Shelley. First, all these professors helped me develop my thinking and understand their exact intent even though there was a communicative limitation. Second, Dr. Urbatsch has always inspired me by a creative thinking that I could not imagine, so that I can guarantee I had an opportunity to realize what research could be of great worth. Whenever I met him with questions regarding the statistics, he encouraged me to understand and led me to a right answer and further thinking. Especially, he sought to overcome my low understanding level with a persistent explanation when I proceed to build the parts of theory and research design. In addition, he gave a lavish effort in terms of utilizing a dataset and interpreting the output in order to incorporate the dataset with the theory despite a busy schedule. Third, Drs. Cunningham and Shelley helped me gain an insight and direction to identify a reasonable theory, a number of justifiable variables, and run and interpret statistical data. I was inspired in many ways taking classes with Drs. Urbatsch and Shelley. Even though I did not have a chance to take a class with Dr. Cunningham, he was a passionate researcher and encouraged me to realize a better study. Through the criticism and encouragement of the POS members, I accomplished a higher quality of thesis.

# Abstract

A host of scholars have made great contributions to establishing a theory regarding potential causes on alliance credibility in areas including a quantitative and qualitative approach. Previous empirical findings support that taking account of only one ally in alliance power increase or decrease, which is a monadic power shift, regardless of the other ally's power shift is likely to affect alliance credibility; thus the power shift considering only one ally may be a significant contributor for decline of alliance credibility. Morrow and Leeds argue monadic power shifts might trigger a decline of alliance credibility providing a reasoning that one ally's power increase tends to demand its more autonomy to lead to conflicts of interests causing a decline of alliance credibility, or one ally's power increase is likely to make it feel less dependent upon alliance that might lead to weak alliance commitments, thus causing a decline of alliance credibility. However, I argue that depending upon the monadic power shift theory might overlook important dyadic effects. Since actors of alliance tend to interact with one another through cooperation or distrust behavior, taking account of power shift in allied-dyads that reflects a power ratio compared with past dyadic power shifts may be more plausible than monadic effects. In other words, a power shift of countries does not always invoke a less alliance credibility because dyadic power shifts in alliance might lead to no change of credible alliance while monadic power shifts tend to decrease alliance credibility. Therefore, I examine the relationship between a dyadic power shift and alliance credibility. I argue that dyadic power shifts, strictly distinct from monadic power shifts, have a significant effect on alliance credibility. Furthermore, I regarded gap of threat perception as a reasonable proxy for alliance credibility, and the gap of threat perception will be measured by affinity of nations based on the results of the UN roll-call votes because I provide a different approach to replace the existing measurement, fulfillment of alliance commitments, for the same dependent variable. I also refer to national material

capabilities index to measure the dyadic power shifts. The empirical evidence is incommensurate with the hypothesis. The results contradict the hypothesis that when dyadic power shifts in alliance occur, alliance credibility is likely to decrease. The results suggest that dyadic power shifts in alliance tends to facilitate increase of alliance credibility while additionally dyadic power shifts in non-allied or all dyads seem to trigger less affinity of nations regardless of my hypothesis that observations are limited to allied dyads.

# Chapter 1: Introduction

My desire to study the relationship between South Korea and the U.S. stems from its deep relevance to what I do in the military. Even though there should be abundant subfields that I am able to take an interest in, as a military man I determined to concentrate on alliance credibility out of topics within the relationship between South Korea and the U.S. In the first place the ROK-US military alliance has played a role in enabling South Korea to enhance its own security power and me to study in the U.S. Secondly, I would like to make a contribution by examining an important political issue in terms of military alliance between the two countries, since I am expected to study in the field of a political science. George Liska, in the beginning sentences of his *Nations in Alliance*, which remains one of the major theoretical directions, puts it: "It is impossible to speak of international relations without referring to alliances. For the same reason, it has always been difficult to say much that is peculiar to alliances on the plane of general analysis."[1] It is undeniable that alliances and alignments are one of the most widespread means to enhance own country's security. According to neorealist theory,[2] in an anarchic world, there is no central or higher authority to ensure complete security. Countries make various efforts to fill this security void. Even though it might be straightforward to enhance security by strengthening, it would not be easy for any nations to spend its entire budget on a military buildup. Thus, most countries tend to use not only military buildup but also alliances as a reasonable vehicle to achieve its security

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[1] George Liska, *Nations in Alliance: The Limits of Interdependence (*Baltimore, Md.: Johns Hopkins University Press, 1962), p. 3. For a comprehensive inventory and discussion of theoretical propositions in a more "behavioral" vein, see Ole R. Holsti, P. Terrence Hopmann, and John D. Sullivan, *Unity and Disintegration in International Alliances: Comparative Studies (*New York: Wiley, 1973).

[2] See Walz, *The Theory of International Politics,* chaps. 6 and 8, for the neorealist position on alliances under both bipolarity and multipolarity

goal. As Michael Altfeld observes, the tradeoff between arms and allies with a simple microeconomic model[3], states should pursue the alternative that ensures a significant increment of security at as cheap a cost as possible compared with the other. In sum, they seek out the optimum tradeoff that ensures increased security.

The dominant view in contemporary study regards alliances as vehicles for aggregating capabilities based on the balance of power or threat theory (Morgenthau 1973; Waltz 1979; Walt 1987). These theories center on the idea that allies gain security from the alliance. However, Morrow (1991) claims that alliances can be explained by the autonomy-security trade-off model, which additionally incorporates symmetric and asymmetric alliances. According to this model, symmetric alliances tend to provide both sides with the same benefits, including either autonomy or security, while in asymmetric alliances one side receives security benefits and the other side gains autonomy benefits. This feature of alliance may play a crucial role in determining how much countries trust their alliance partners because symmetric alliances tend to pursue solely autonomy as the same interest, yielding conflicts of interest.

Inarguably, the alliance between South Korea and the U.S. has been one of the most markedly asymmetric relationships as measured by Morrow's perception of asymmetry, although the conventional belief from South Korean perspective indicates the relationship to be a strong, firm, and mutual tie for the more than 50 years since the Korean War. However, as the rapid and unrelenting growth of sentiment against the U.S. persists, and the two countries' perceptions of the threat posed by North Korea drift apart, many security experts

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[3] Michael F. Altfeld, "The Decision to Ally: A Theory and Test," *Western Political Quarterly* 37 (December 1984), pp. 523-44. Also see James D. Morrow, "Alliances and Asymmetry: An Alternative to the Capability Aggregation Model of Alliances," *American Journal of Political Science* 35 (November 1991), pp. 904-33.

have been concerned about the rather strained relationship and conflictual interests that suggest the alliance may be in crisis. This gap in perceptions has widened and produced real-world consequences since the Roh administration took office in 2002 in South Korea, as demonstrated by the difference between the Korean policy of engagement and American containment.[4]  Even though the new president-elect, Lee Myongbak, pledged to make a great effort to recover the mutual relationship[5], many believe that the credibility of the alliance has irrevocably declined since the heyday of the relationship. I presume the recent contentious issue on the U.S. beef imports[6]  suggest power shifts caused by South Korean public opinion might affect credibility of the relationship between South Korea and the U.S.

I bring up an interesting issue studying what has been, is, and will the relationship between the two countries be like during an economic growth and even more escalated democratic consolidation. In order to discover a change of the relationship, I address the concept of *alliance credibility*[7]  that illuminates mutual ties that have undergone a power shift of dyads in alliance (hereafter "a dyadic power shift"). I define that alliance credibility, which is an identical term with alliance reliability, is the level of trust that allies feel through consideration of various means to measure credibility such as national preference or contribution as well as fulfillment of alliance commitments involved with warfare.

This thesis examines the relationship between a dyadic power shift and alliance credibility.

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[4]  See Victor D. Cha, "Isolation, not Engagement" *The New York Times,* December 29, 2002.
[5]  Published by Cho Sanghun, "Newly Elected South Korean Forecasts Chill With North", *New York Times,* December 21, 2007.
[6]  See Cho Sanghun, "South Korea Continues Beef Talks with U.S." *The New York Times,* June 17, 2008
[7]  Alliances can take various forms such as mutual defense pacts, non-aggression or neutrality pacts and entente. In many alliances, a nation does not actually have to intervene to fulfill its commitments. For example, nonaggression pacts require only that a nation not attack its ally. Although it is inaccurate in a strict sense, I use the term alliance *credibility or reliability* for convenience.

## *1.1 The purpose of study*

Several accounts have pointed to alliance reliability in times of war by examining alliance war participation imposed on different types of alliance commitments[8] (e.g., Singer and Small 1966, 1968; Holsti, Hopmann, and Sullivan 1973; Sabrosky 1980; Siverson and King 1980; Smith 1996; Leeds 1999, 2000, 2003). One of the characteristics of extant theories on testing alliance reliability is that it depends heavily upon the data embedded greatly in the past and based on war participation during 1816-1965. These theories have shown attention to various factors including regime type, regime change, class of alliance, age of alliance, asymmetry of alliance, or change in capabilities in a monadic way in order to examine the relationship with alliance reliability. Especially, James D. Morrow analyzed a set of 164 military alliances formed between 1816 and 1965 in order to buttress his arguments that alliances causing a greater change in nation's capabilities are more likely to break down and that asymmetric alliances typically last longer than symmetric alliances.[9] It is obvious that he provided a considerable insight into applying variables relevant to power shift to alliance credibility.

Relatively few studies have been devoted to dealing with power shifts; while most previous research regarded variables of regime, class or age of alliance, asymmetry of alliance. I assert that the power shift is more likely to reflect variables indicating power structure or power mechanism in alliance, constructed by nation's power or capabilities. Even though numerous studies have attempted to find and explore alliance reliability, relatively

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[8] These types of commitment elaborates the class of alliance that has a tendency of indicating that it is reasonable defense pacts are regarded as a larger commitment toward war involvement than neutrality agreements and passive entente.

[9] James D. Morrow, "Alliances and Asymmetry: An Alternative to the Capability Aggregation Model of Alliances," *American Journal of Political Science* 35 (November 1991), pp. 904-33.

little attention has been paid to the relationship between power shift and alliance credibility or reliability. The variable of asymmetry of alliance previously stated might have included a relationship between power shift and alliance credibility, yet there has been a clear-cut distinction that articulates asymmetry of alliance deals with only capabilities itself. As a result, these two variables ought be separated and considered theoretically independent each other in terms of the impact on alliance credibility. Although Morrow contributed to our understanding of the relationship between the power shift or asymmetry in an alliance and that alliance's credibility, I intend to make a meaningful contribution to complement the area of less studied, partly flawed, and untouched power shift relatively distinct from the variable of his power shift. Besides, there has been a great change in the international system since 1965 since national power experienced a rapid change through small power's growth or great power's decline, which may have caused asymmetry and power shift of alliance. Nevertheless, most research has not dealt with post-1965 data without depending on fulfillment of alliance commitments to mark a difference in the international system with the existing methodology to measure alliance reliability. Specifically, I intend to replace the existing dataset relied greatly on war participation data with a new dataset based on the UN roll-call data including the concept of the gap of threat perception.

I seek to apply a new variable to offer a more reasonable and extensive explanation of alliance credibility, thus I conduct a detailed examination of alliance credibility incorporating an additional concept of a monadic power shift, namely a dyadic power shift. In order to elaborate the relationship between the dyadic power shift and the alliance credibility and explore an unstudied part of the existing theories by offering a new interpretation of power shift, I develop two goals for this research. It is imperative that I address the concept of a dyadic power shift before I make the description of these two goals. The dyadic power shift in an alliance reflects the comparison of a relative power ratio in a dyadic relationship, namely consideration of the dyads in power change simultaneously. On the contrary, a

monadic power shift stresses only one country's power shift based on an absolute power index. For example, when on the one hand the U.S power index, that is contingent on how this is measured, increases from 10 to 20 in a certain year, on the other hand that of South Korea increases from 2 to 4 in the same year, there is no dyadic power shift but each country individually experiences a monadic power shift. It is because margin of 10 and 2 explicitly demonstrates a monadic power shift while there is no dyadic power shift that equals to 2 for both countries. In other words, the monadic power shift underlies that the U.S. and South Korea increases 10 and 2 each other in power index; by contrast, the dyadic power shift embraces the idea that the two countries increase the same degree of power simultaneously. My question starts from the proposition that a dyadic power shift unlike a monadic power shift is likely to yield a credible alliance. The two goals are as follows:

*To examine the relationship between a dyadic power shift and alliance credibility, thus I am able to find out how relative power shifts affected the ROK-US relationship. To apply a new empirical approach using the data from the UN General Assembly roll-call votes utilizing the idea of affinity of nations based on the gap of threat perception among countries, and this attempts makes a difference with the existing dataset that has depended heavily upon a fulfillment of alliance commitments.*

These two goals will suggest an alternative approach to estimate alliance credibility in the past and future and, of course, reflect current circumstances. We are able to clarify the relationship between a dyadic power shift unlike the existing monadic power shift and alliance credibility.

I believe that my empirical study on this relationship will allow for another potential measurement of alliance credibility and provide a broader concept to the existing theories. This analysis attempts to bolster the previous research using a different statistical analysis to better demonstrate the relationship between power shift and alliance credibility.

The motivation for studying the relationship a power shift and alliance credibility is to broaden our practical knowledge that enables us to take much account of a dyadic power shift.

*1. 2 Statement of the problem*

The widely-recognizable extant theories have mainly studied the relationship between power shift in a monadic sense, asymmetry of alliance, regime change, regime type, age of alliance and class of alliance commitments, and alliance credibility or reliability (Singer and Small 1966, 1968; Holsti, Hopmann, and Sullivan 1973; Sabrosky 1980; Siverson and King 1980; Morrow 1991; Smith 1996; Gartzke 1998; Mesquita, Morrow, Siverson, and Smith 1999; Leeds 1999, 2000, 2003; Gartzke and Gleditsch 2004). Moreover, the measurement of alliance credibility has depended greatly upon a fulfillment of alliance commitments based on war participation. As a matter of fact, except for some scholars such as Morrow and Leeds, there has been little empirical research relating power shifts to alliance credibility. Notably, when I analyze Morrow's claim that the probability that an alliance will be broken increases, the greater the change occurs in national capabilities over time (Morrow 1991, p. 919), and other existing findings including power change with regard to the feature of power appears to highlight nation's individual change based on a monadic power shift by considering only an absolute power concept rather than dyads' relative power change. Although the various existing variables with regard to power shift to explain alliance credibility or reliability are of great use, the existing theories have been too limited and narrow because the scholars overlooked the variable of a dyadic power shift, thus I believe that the dyadic power shift as a new independent variable becomes a valuable vehicle to broaden the limited research on alliance credibility. I assert that a dyadic power shift would be more reasonable to examine the relationship in alliance since the alliance accompanies an interaction by all actors, not a

single country. Thus, alliance credibility is likely to be controlled by an interaction causing cooperation or conflicts of the relationship.

Therefore, this thesis begins to seek out the answer for the question how the power change variable based on a dyadic power shift facilitates or reduces alliance credibility. The primary question to determine the relationship between a dyadic power shift and alliance credibility is:

*How did dyadic power shifts affect alliance credibility from 1950 to 2000?*

I address a dyadic power shift in order to concrete the explanatory variable. In order for a dyadic power shift to be accepted as a determinant of alliance credibility, it has to meet condition of following question:

*Is there any relationship between a dyadic power shift and alliance credibility?*

For this question, the hypothesis is:

*H1: The larger dyadic power shifts, indicating both nation's power ratio, are likely to trigger potential conflicts and yield less credible alliances.*

In order to test the hypothesis, I am required to make two crucial assumptions that provide a ground for a reasonable proxy replacing alliance credibility and imply another way of measuring the alliance credibility in Morrow's theory. These assumptions are:

*Assumption 1 (for main dependent variable): There is a negative relationship between the gap of threat perception[10] and alliance credibility. Thus, the larger gap of threat perception is likely to weaken and decrease alliance credibility.*

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[10] The gap of threat perception defines how much countries have a different idea on a shared and common threat. The more gap of this indicates a more conflictual relationship while a less gap of this guarantees a more trustworthiness.

In sum, the gap of threat perception would be a reasonable proxy to replace the concept of alliance credibility by enabling us to measure the same response variable (alliance credibility).

> *Assumption 2 (for alternative dependent variable to conduct a robustness test): More credible alliances are likely to last longer. Thus, older alliances tend to be more credible.*

Even though this assumption is not a central idea to study a dyadic power shift theory, it is necessary I include the age of alliance for the robustness later on.

Figure 1 depicts the relationship between dyadic power shift and alliance credibility as an inverse relationship to illuminate my main hypothesis and theory, the relationship between the gap of threat perception and the alliance credibility to buttress my assumption, and the relationship between the age of alliance and the alliance credibility to illustrate the additional assumption for robustness test. In order to measure the gap of threat perception, I utilize a concept of affinity of nations that has been studied by Garztke. Even though there is no detailed description of the relationship between the gap of threat perception and the affinity of nations, the correlation of the two concepts will be mentioned in a concrete way later on, and the affinity of nations will be examined from the U.N General Assembly roll-call votes.

Existing research provides some results supporting the first assumption on the gap of threat perception. Walt (1985) finds that without a shared perception of common interest, an alliance is likely to dismantle. Thus, the gap of threat perception helps explain the ebb and flow of alliance credibility. And Bennett (1997) found that when perception of common threats to the alliance members is declining or discrepant, the alliance is more likely to break. His finding analyzing threats further suggests that the gap of threat perception might be a primary cause of the alliance credibility.

**Figure 1. Schematization of Hypothesis, Theory, and Measurement**

Alliance
Credibility

Gap of Threat
Perperception

Alliance
Credibility

Age of Alliance

Gap of
Threat
Perception

Affinity of Nations

Alliance
credibility
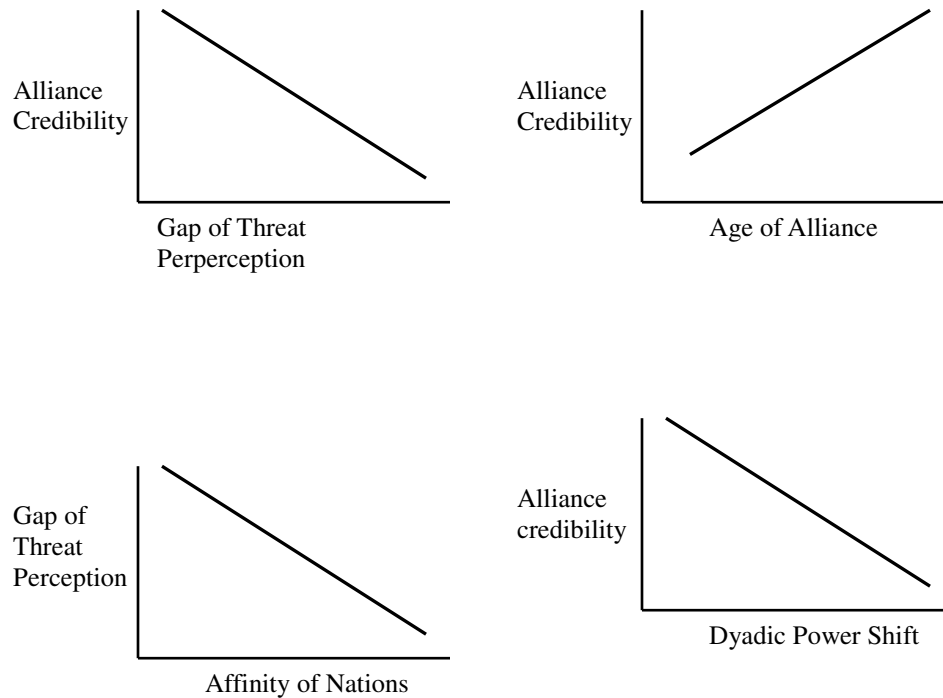
Dyadic Power Shift

## 1. 3 Methodology

Through an empirical approach, I attempt to examine the relationship between a
dyadic power shift and alliance credibility. Under the assumptions I made in the previous
section, I attempt to seek out the relationship between a dyadic power shift and a gap of
threat perception. The gap of threat perception serves as the dependent variable. In order to
utilize the data pertaining to the gap of threat perception, I referred to Documenting Votes in
the UN General Assembly V2.0 (1946-2005).[11]  In order to measure the gap of threat

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[11]  Gartzke, Erik and Dong-Joon Jo. *UN General Assembly Voting* V3.0 January 2002.
http://www.columbia.edu/~eg589/datasets.htm

perception, I employ the concept of *affinity of nations*[12] that Gartzke suggested. It illuminates how much nations are likely to agree or disagree on various issues regarding foreign policy, namely national preference. For example, if two countries agree much on issues, it would explain a greater affinity of nations. Nations tend to show a distinct degree of affinity of nations on international issues, for instance, such as nuclear testing, sanctions to a specific country, and policy in the Lebanese conflict that illustrates an overall security threat. Out of these diverse issues, I sought to select issues only relevant to security threats that can be applied to circumstances reflecting opinion of all member countries of the UN (e.g., arms reduction, disarmament, denuclearization and perception on international security in terms of war and conflict) in a bid to obtain the concept of the gap of threat perception. I created a new but, compared with Gartzke's, which included all kinds of international issues, reduced dataset. Therefore, my dependent variable is served by affinity of nations on international issues to be able to affect the security threats.

The main independent variable of my theory consists of two major elements, which are a dyadic power shift to reflect power change and the existence of an alliance. It is because my hypothesis underpins the power shifts in alliance. These two elements comprise the independent variable, the dyadic power shift in alliances, which combines these two conditions. I measure these concepts with data from the widely-used Correlates of War database used by plenty of scholars. First, as the variable of national capabilities calculating a

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[12] Eric Gartzke used the concept of affinity of nations in his article *"Kant We All Just Get Along? Opportunity, Willingness, and the Origins of the Democratic Peace"*, *American Journal of Political Science,* Vol. 42, No. 1, January 1998, pp. 1-27. His concept of affinity of nation represents how much nations agree or disagree on international security, economic, social, environmental and cultural issues based on the UN general assembly roll-call data.

dyadic power shift I sought to utilize National Material Capabilities (v3.02).[13] Second, as the variable of the existence or nonexistence of alliance I referred to Formal Alliances (v3.03).[14]

There are a number of other variables determined from my theory to affect alliance credibility as control variables. These 11 variables include international trade; national wealth; diplomatic exchanges; colonial history; multilateral alliance; class of alliance; regime type; regime change or political stability; shared alliance with the U.S. or U.S.S.R. during the Cold War; asymmetry of alliance; and a monadic power shift. For the first group of control variables, I referred to the datasets including diplomatic exchanges, class of alliance, and shared alliance in Correlates of War. Second, I relied on the datasets including international trade and per capita income GDP for national wealth in Penn World Trade. Third, I used the datasets involving a colonial history in General International Data by Paul Hensel. Fourth, I looked at the datasets including regime type and regime change in Polity IV Project. Lastly, I rested on National Material Capabilities dataset to describe asymmetry of alliance and a monadic power shift.

This statistical analysis will provide extensive knowledge to the existing theories and approach new questions for a new challenge. Even though plenty of studies on alliance credibility have relied upon a quantitative method, the tendency to examine the alliance credibility has adhered to a similar direction. I believe the quantitative approach that I suggest will lead a new and creative way to give a convincing answer on the alliance credibility.

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[13] Singer, J. David. (1987). "Reconstructing the Correlates of War Dataset on Material Capabilities of States, 1816-1985" *International Interactions*, 14: 115-32.

[14] Gibler, Douglas M., and Meredith Sarkees. Forthcoming. "Measuring Alliances: the Correlates of War Formal Interstate Alliance Data set, 1816-2000." Journal of Peace Research.

## *1. 4 Organization of the Study*

This thesis proceeds in the following way. Chapter 2 recapitulates some background on major theories regarding an overall feature of alliances, the history of the relationship between power change, referring to the dyadic power shift, characterized by a typical asymmetric alliance and the alliance credibility of South Korea and the U.S. Chapter 3 describes a few extant theories including a power change in a monadic sense, namely a monadic power shift, on alliance credibility. Chapter 4 elucidates my main theory and lays out a research design that depends upon an empirical method by description of various variables, data collection, operationalization, and measurement. Chapter 5 analyzes the results of testing my hypothesis, discusses the analysis and chapter 6 includes its limitations, and implications for future research.

# Chapter 2: Review of Literature and Theory

As repeatedly stressed in the previous two chapters, several analysts in international politics have attempted to use a number of variables such as regime type, regime change, a power shift in a monadic sense, asymmetry of alliance, age of alliance and class of alliance commitment as indicators for alliance credibility (Singer and Small 1966, 1968; Holsti, Hopmann, and Sullivan 1973; Sabrosky 1980; Siverson and King 1980; Morrow 1991; Smith 1996; Gartzke 1998; Mesquita, Morrow, Siverson, Smith 1999; Leeds 1999, 2000, 2003; Gartzke and Gleditsch 2004). Out of the various existing theories, two distinguished scholars, Morrow and Leeds, sought to examine the relationship between monadic power shifts and alliance credibility. And some researchers limned a correlation between alliance credibility and the gap of the threat perception based on a qualitative analysis that supports the assumption I made (Walt 1987; Glenn H. Snyder 1997). Morrow (1991) and Leeds (2003) attempted to test hypotheses about seeking out the relationship between a variable of power change and alliance credibility, which seems closely related to my theory, in a similar context but a different approach to clarify the theories. However, we can further build on their insights by including a dyadic power shift because both of them have stressed that a power change among the allies in a monadic sense, indicating a monadic power shift, is likely to decrease alliance credibility, merely based on the probability of alliance commitment violation.[15]  Thus, their central idea is just to observe the effect a change of each individual

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[15]  See James D. Morrow, "Alliances and Asymmetry: An Alternative to the Capability Aggregation Model of Alliances" *American Journal of Political Science,* Vol. 35, No 4, November 1991, pp. 923-24. See also Brett Ashley Leeds, "Alliance Reliability in Times of War: Explaining State Decisions to Violate Treaties" *International organization* 57, Fall 2003, pp. 815-17.

nation's capabilities on alliance credibility without considering both nations' power shift simultaneously. Therefore, this idea may have limited our understanding of the effects of power shifts. Furthermore, most researchers have seemed to depend heavily upon the dataset that includes whether or not nations promise their fulfillment of alliance commitments based on war participation with respect to the measurement of alliance credibility although the measurement has been a correct way.

In this analysis I attempt to find out whether a dyadic power shift affects credibility and to utilize a brand new dataset using affinity of nations in the UN General Assembly roll-call data to measure gaps of threat perception. The following sections will highlight the theories that relate a dyadic power shift in alliances to alliance credibility. In addition, it will clarify why I suggest a dyadic power shift in alliances as a main independent variable and additionally provide guidelines for how these existing variables should be controlled in later sections in order to seek out the relationship between a dyadic power shift and alliance credibility.

## 2.1 Power changes and alliance credibility

There have been several attempts to offer a reasonable theory relating power changes and the alliance credibility. Morrow and Leeds played a key role in laying out the relationship between power change in nations' capabilities and the age of alliance or the alliance credibility (Morrow 1991; Leeds 2003). Even though Morrow has not demonstrated the concept of alliance credibility, the age of alliance in his theory may play a key role to explain alliance credibility since older alliances are likely to be credible alliances. Variables involving power change were an important part of both scholars' analysis of alliance credibility. Furthermore, other scholars attempted to discover whether or not the change of a country's power level would have an impact on its alliance credibility (Siverson and King 1980; Bennett 1997). Since there are persistent attempts to seek out the causal relations

between the age of alliance or alliance duration and the alliance credibility, I am willing to follow the previous assumption that the alliance duration is an indicator of alliance credibility. This assumption suggests that the older age of alliance would be a natural consequence of a credible alliance, thus the age of alliance may be a reasonable proxy for alliance credibility.

Morrow argues that nations have a propensity to break alliances when they always prefer a better trade-off between autonomy and security without maintaining alliances by referring to three motivations to attract the shift: (1) a deterioration of its security or autonomy in the alliance; (2) an improvement in its security and autonomy out of the alliance; or (3) a shift in the nation's utility function. He stresses that the most reasonable factor to generate these three motivations for breaking the alliance lies in changes in power. First, his findings support the theory that growth in capabilities of one partner gives rise to the increase of its own security, which causes it to demand new concessions or the removal of old obligations, thus prompting them to break the alliance, eventually yielding a less credible alliance. It is because the enhanced security leads to more autonomy by demanding more national interests whereas the weakened security leads to less autonomy by conceding more national interests. Second, he analyzes that a decline in capabilities has the same effect by reducing security and causing the other partner to demand more autonomy. Thus, he hypothesized that larger changes in capabilities increase the likelihood of breaking the alliance. In his analysis, the result confirms his argument that greater changes in members' capabilities result in a higher chance to break the alliance, causing a less credible alliance (Morrow 1991, p. 919).

His finding represents that the unit of analysis was individual nations and the measurement of the variable of power change was carried out by the individual nations' capabilities. His measurement focused on the shift in each single nation's capabilities. His analysis underlies that a smaller change in nation's relative capabilities is likely to be an older alliance, and the measurement of the capabilities was based on a string of five-year

period.[16] Even though his analysis took account of the relative capabilities, we can expand his research that merely stressed a monadic power shift, by accounting for a dyadic power shift. To summarize, he examined the relationship between a power shift and age of alliance, and a larger power shift leads to an older alliance, namely a more credible alliance. However, he depends completely upon a monadic power shift.

In addition, Bennett sought to clarify the validity of the autonomy-security trade-off model of Morrow (1991) using the same monadic sense of power shifts but relevant utilizing a slightly different methodology, a hazard model, applied to 207 alliances from 1816 to 1984. In this analysis, he obtained stronger support for Morrow's finding. Once again, he stresses that the larger the relative changes in individual national capabilities, whether these increase or decrease, the less credible an alliance is likely to be (Bennett 1997, p. 870).

Leeds attempted to find whether or not changes in power of a state have an association with the violation of treaties in order to explain alliance credibility. She underscores that significant changes in the power of a state between the time an alliance is signed and the beginning of a war will be associated with a higher probability of alliance violation (Leeds 2003, pp. 816-17). Her theory supports that an increase or decrease of state power of more than 5 percent between the time of alliance formation and the time of war outbreak yields less credible. She emphasizes changes in power, thus she also relies on the monadic power shift in alliances by a different measurement of the power shift compared

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[16] Morrow examined the coefficients of a regression of age of alliance on each member's composite capabilities on each period. Composite capabilities scores used in the analysis were obtained from the Correlates of War project directed by J. David Singer at the University of Michigan. They are based on six different indicators of military capabilities: military expenditures, military personnel, total population, urban population, iron and steel production, and energy consumption. Thus, a nation's composite capabilities score is the average of its share of these six indicators. His analysis results in that a larger change in power is likely to be an older alliance, thus the older alliance represents a more credible alliance.

with Morrow. However, I observe that the context to test hypothesis has been similar with the existing theories because a strong evidence suggests that changes in power reduce alliance credibility.

## *2.2 The Theory Based on Dyadic Power Shifts*

A possible limitation is that no scholars have attempted to examine the relationship between a dyadic power shift and alliance credibility, not relying on concept of a monadic power shift. For example, if South Korea and the United States experience the same increase or decrease over a given period, what would the alliance credibility between the two nations be like? According to Morrow and Leeds's theory, the alliance credibility in this relationship is less likely to be credible because each nation's individual changes would entail an unstable relationship, regardless of the relative growth, decline, or no change in the dyadic power ratio. However, my theory begins with the distinction with their central idea that changes in power in a monadic sense would definitely lead to a less alliance credibility. I argue that not every monadic power shift causes less alliance credibility by the concept of a dyadic power shift. It is because even though there is a monadic power shift, it represents substantially no power shifts based on a dyadic power shift. My standpoint holds that if there is no change of the dyadic power shift, the alliance credibility does not change.

I have already noted that several existing theories on power shift and alliance credibility have been centered on seeking out the relationship between a monadic power shift and alliance credibility. In this section, I attempt to offer one version of a theory concerning a dyadic power shift. I start out by pointing out some deficiencies in the previous research connecting power shifts and alliance credibility.

I argue that merely taking a look at a monadic power shift, which focuses on one nation's change in power, on studying alliance credibility fails to capture the essence of power shift. By observing this inherent problem, my claim underlies a firm belief that the

crucial variable to interpret the relationship between both countries in alliance, especially a dyadic relationship is cautiously to observe the change in power including both countries, not depending upon simply one country's change. A monadic power shift disregards the other partner's power shift, thus neglecting simultaneous shifts of both countries. On the one hand a monadic power shift reflects an absolute gain or loss of power from one country, but on the other hand a dyadic power shift deals with a relative gain or loss of power from both countries. My research starts out with the inspiration that the latter could be a broader answer to present the essence of power shift that fill the shortcomings of the former.

Existing theories have dealt with a few factors involving increase or decrease of autonomy and security or characteristics of weaker and stronger countries to affect an alliance credibility by adhering to only one country's change in power, which is a monadic power shift. In other words, these theories have stressed a causal mechanism regarding a change in autonomy and security in accordance with change in power or ambiguous claim to emphasize power level. In order to fill this insufficient reasoning, I address a new causal mechanism, a renegotiation process, through which the dyadic power shift has an impact on an alliance credibility.

### 2.2.1 Demand of Contributing Role

As far as the demand of contributing role is concerned, it defines country's values including attitude and behavior toward another country in alliance. Specifically, when one power-gaining country accomplishes a relative increase of power from a domestic or diplomatic relationship, the power-gaining country is inclined to demand a more contributing role to the other power-losing country that goes through a relative power decline. Thus, the demand of contributing role is not a two-way but one-way process because only the power-gaining country can be an actor that demands the contributing role while the power-losing country can be an actor that performs the contributing role. For example, this concept

assumes that if the U.S. will provide more military aid to South Korea as a power-gaining country, the U.S. would want South Korea to do something corresponding to this contribution.

Out of these numerous decisions that governments make, the matter of alliance formation can be one of the most significant. In addition to the initial government decision making, they are likely to make plenty of other decisions to affect the change of an alliance after its formation. Thus, governments are forced to make the ceaseless decisions even though the issue is restricted to the domain of alliances. Subsequent to alliance formation, governments' decisions about an alliance might shift in the face of various circumstances. As I accentuate, dyadic power shifts play a key role to trigger the new government decision in the process of alliance formation and management. The results of the decisions reflect that governments break down the alliance causing a less alliance credibility, remain in status quo, or strengthen the alliance leading to higher alliance credibility. However, I argue that the dyadic power shift is more likely to lead to a less credible alliance that could be dismantled in any moment. Then, what would precipitate a less credible alliance? When a dyadic power shift occurs among countries, they might take account of a contributing role concerning how much they fulfill their alliance commitments during an outbreak of war. In other words, if one country starts to recognize that it contributes more than the other country does by the dyadic power shifts, the former is likely to demand a more contributing role to the latter. It is because countries that experience a relative power increase compared with a past dyadic power shifts have a propensity to expect the partners' countries that go through a relative power decrease to contribute as much as a relative power increase does. No dyadic power shifts would lead to any change of the contributing role since both countries feel the contributing role of them is equal. Conversely, dyadic power shifts would lead to change of the contributing role since one country feels the contributing role is not equal. Thus, a demand of a more contributing role is likely to get involved in a conflictual circumstance causing a less credible alliance. Even though a renegotiation process may recover alliance

credibility, conflicts would become worse and worse before the renegotiation process. Figure 2 represents the causal mechanism to connect the independent variable with the dependent variable by providing the theoretical ground regarding the demand of contributing role. In other words, when the dyadic power shift occurs, one country is likely to demand more contributing role owing to inequality of the existing contributing role caused by a relative power increase. Thus, the circumstance to trigger demand of more contributing role has a great propensity to lead to a more conflictual relationship causing a less credible alliance.

**Figure 2. Causal Mechanism for my Theory**
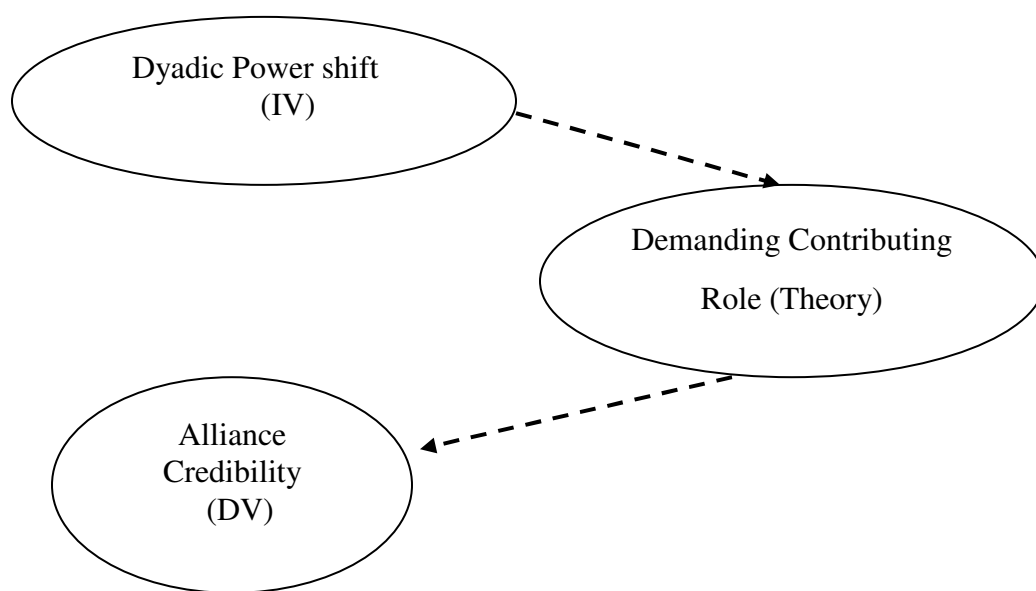
Of course, it is probable that countries may choose a renegotiation process to deal with this problem before the conflictual circumstances; however I assert that the process of demand of more contributing role tends to hamper the renegotiation process and promote more conflicts. The negotiation process will occur when the potential conflicts might lead to a critical crisis in a current administration such as severely deterioration of public opinion or considerable infringement of national interests.

Cost-benefit analysis reveals the cause of these conflicts in an alliance. Even though cost-benefit analysis is mainly used to assess economic phenomena in a society, it might also be applicable to alliances. This analytical frame seems to offer a tool to assess the new government decision-making in order to enhance as much efficiency as possible. There is no question that actors within this model tend to maximize net gains or to minimize net losses in different circumstances. One of the new government decision-making with regard to an alliance could be centered on evaluating equality or inequality of the contributing role, thus an efficiency of the contributing role. The aim of this process is to gauge the efficiency of the contributing role compared to past dyadic power shifts. If one country evaluates its partner's contributing role in alliance as less efficient, the former is more likely to demand the latter contribute more. Thus, I argue that demanding more contributing role of power-losing country in alliance may be able to trigger a conflictual relation; as a consequence the conflictual relation tends to lead to a less credible alliance. A conflictual circumstance is likely to persist because countries imposed on the more contributing role need a time to carry out a new contributing role by renegotiation process. On the other hand, if one country evaluates its partner's same efficiency of the contributing role relative to the past dyadic power shifts, the former is unlikely to demand enhanced contributing role of the latter. As a result, no demand of contributing role of one party in alliance may be able to fail to increase a conflictual relation. Thus the failing of increase of conflictual relation is likely to equal to the past alliance credibility. In other words, if one country increases its power relative to the other party's no change in power, the former, seeing its relatively greater contribution, is likely to demand more contributing power of the latter. It is because the former is likely to discover less efficiency of the latter's contributing role considering cost-benefit analysis that underlies the fact the former no longer feels itself to be obtaining something from the latter or it feels like it is losing something to the latter. In the case of one country's decrease in power, the consequence is identical with the previous context. Thus, the latter is likely to demand

more contributing role of the former considering the former's relatively smaller contribution. Figure 3 depicts and elaborates the justifiable theoretical ground for my theory based on the demand of contributing role. First, countries take a great account of the cost-benefit analysis to scrutinize an efficiency of the current government decision-making. Second, once countries discover inefficiency of the existing decisions that governments make, they tend to make new decisions. Third, as a result of the new decisions, power-gaining countries demand power-losing countries contribute more in alliance. It also implies there might be a chance for a renegotiation process to get rid of a conflictual circumstance, though the conflicts are likely to have a sufficient impact on alliance credibility before the renegotiation process begins.

**Figure 3. Elaborating my Theory**
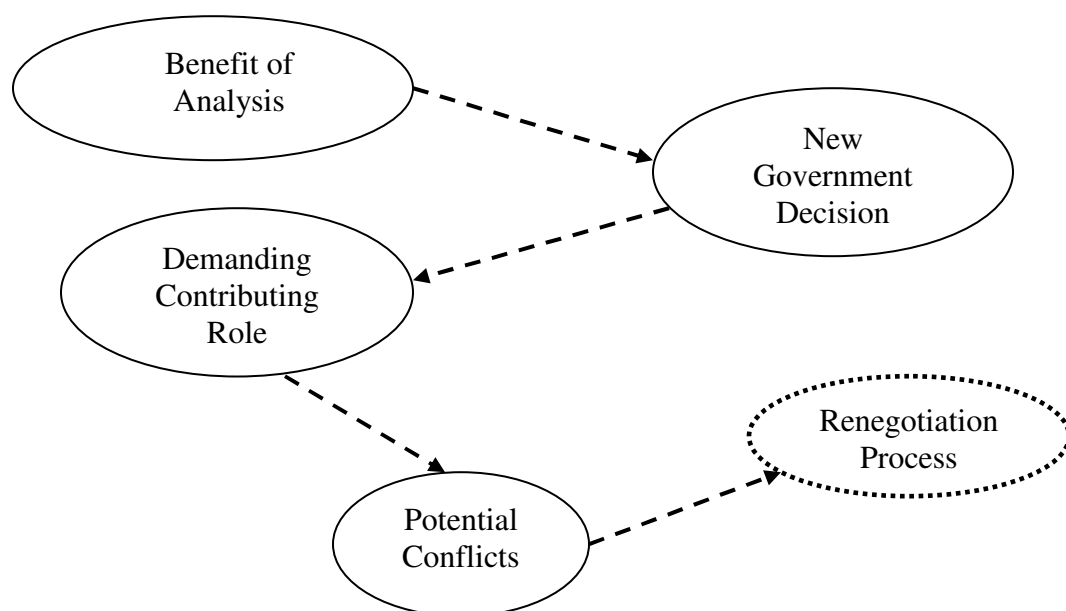


In order to illustrate the demand of contributing role reflecting the cost-benefit analysis, let us think of the relationship between the U.K. and the U.S. First, when the U.S. achieves a relative increase in power compared to U.K., the U.S is likely to demand the latter's more contributing role corresponding to the former's potentially increased

contributing role to the latter. If the U.S continues to feel its enhanced contributions toward South Korea produce costs more than benefits, both countries are likely to get involved in more conflictual circumstances before a renegotiation process to deal with these potential conflicts. It is because by its enhanced contributing role, the U.S. could provide more non-military and military assistance, however no change of the contributing role of the U.K. is likely to invoke potential conflicts between the two countries. Second, when the U.K. becomes a power-gaining country compared to the U.S by the dyadic power shift, the former is likely to demand the latter's more contributing role equivalent to the former's enhanced contributions. If the U.K. continues to feel its enhanced contributions bring costs more than benefits, both countries are likely to be concerned with more conflicts[17]. It is because by the enhanced contributing role, the U.K. may be able to offer more non-military and military assistance, but on the other hand no changing role of contribution from the U.S. by the past dyadic power shifts is likely to lead to more potential conflicts. Under circumstances that the U.S. (the U.K.) goes through a relative decrease in power, the U.K. (the U.S.) experiences a relative power increase, thus the latter tends to demand the former's more contributing role causing potential conflicts. Third, when both countries go through the same relative increase or decrease in power ratio, that is, when there is no dyadic power shifts, neither of both countries is likely to demand more contributing role due to the unchanged mutual contributing role. Both countries have a propensity to feel that they are contented with their demands based on the unchanged contributing role relative to each other. Therefore, there is

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[17] The conflicts here in dyads caused by the demand of more contributing role are distinct from militarized interstate disputes. These are any types of conflicts before a renegotiation process begins to cope with the conflicts (i.e., breaking off talks, retaliatory actions, or rise of anti-sentiment against both countries).

no need to demand more contributing role from each other, and there would be no change of alliance credibility compared to past dyadic power shifts.

In sum, in a relationship that does not require the demand of more contributing role, the relationship in alliance is unlikely to be involved in increasing conflicts and to yield the same alliance credibility. I assert that the less dyadic power shifts between the two allies underpin that the relationship in alliance is unlikely to increase more conflicts and more alliance credibility. Therefore, I stress that excluding and disregarding the fact that a dyadic power shift is likely to affect an alliance credibility might be a greatest mistake to construct a reasonable theory.

## 2.2.2 Gap of Threat Perception

As I introduced as a crucial assumption in the first chapter regarding the alliance credibility as the dependent variable, the gap of threat perception can be used as a plausible proxy taking a place of the dependent variable. In order to be the convincing proxy as the gap of threat perception instead of alliance credibility, I am required to offer compelling theoretical evidences. Steven M. Walt, one of the most distinguished scholars of military alliances, concludes that a divergent perception of the external common threat between the allies is likely to rupture or dismantle existing alliances.[18] He stressed the relationship between a gap of threat perception and alliance credibility, thus he demonstrates that the less gap of threat perception between the two allies is likely to be a more credible alliance. In a recent example from the ROK-U.S. relations, the former Roh administration embraced the Sunshine Policy while the Bush administration focused on a hard-line policy toward the reclusive North Korea. Many analysts shared the common view that the gap of threat perception of Bush and

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[18] Stephen M. Walt, "Why Alliances Endure or Collapse," *Survival*, Vol. 39, No. 1 (Spring, 1997), pp. 158-164.

Roh administration toward North Korea has widened, as a consequence the divergent perception of threat might have led them to undermine the trust of the relationship and the alliance.[19] The changing threat perception by Walt might have contributed considerably to the drifting apart on the issue of North Korean nuclear weapons. Thus, the gap of threat perception between an engagement policy by the Roh administration and a containment policy by the Bush administration toward North Korea is likely to provide a validity to correlate between the gap of threat perception and the alliance credibility. Figure 4 exhibits the relationship between the dependent variable and a plausible proxy for alliance credibility reflecting that alliance credibility and the gap of threat perception might have a significant correlation each other. Although there could be a limitation to apply alliance credibility to the gap of the threat perception with the same concept, I believe this attempt will validate the significant relationship between alliance credibility and the gap of threat perception. The two-sided dotted arrow in the figure represents a probable correlation of alliance credibility and a gap of threat perception, as stated above.

**Figure 4. Plausible Proxy for Alliance Credibility**



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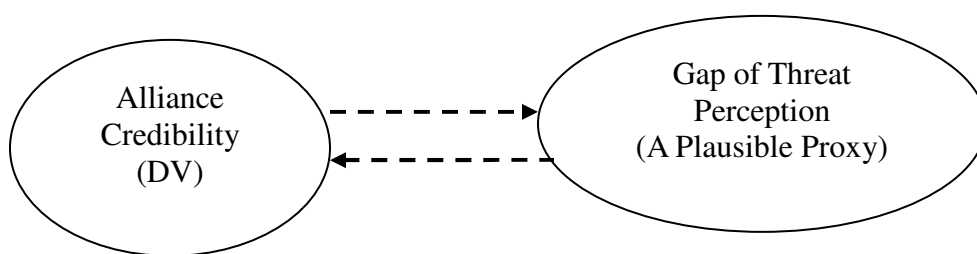
[19] See Cho Sanghun, "South Korea's Sunshine Policy Dims", *The New York Times*, January 17, 2008.

# Chapter 3: Research Design

I have already noted that several existing theories on power shift and alliance credibility have been centered on without a doubt seeking out the relationship between a monadic power shift and alliance credibility. In this section, I attempt to offer one version of a theory concerning a dyadic power shift. I start out with raising some deficiencies in dealing with power shift and alliance credibility in previous research.

I argue that merely taking a look at a monadic power shift, which engages in one nation's change in power, on studying alliance credibility displays a fatal limit to convey the essence of power shift. By observing this inherent problem, my claim underlies a firm belief that the crucial variable to interpret the relationship between more than two countries in alliance, especially a dyadic relationship is cautiously to observe the change in power encompassing all relevant countries, not depending upon simply one country's change. It is because a monadic power shift seems to presuppose that it is designed to disregard the other partner's power shift, thus denies all parties' relevant to the relationship power shift simultaneously. On the one hand a monadic power shift reflects an absolute gain or loss of power from one country, but on the other hand a dyadic power shift deals with a relative gain or loss of power from all relevant parties. Thus, the latter is more likely to offer a more persuasive answer to present the essence of power shift that makes up for the weak points of the former. I stress that excluding and disregarding the fact that a dyadic power shift is likely to affect an alliance credibility might be a greatest mistake to construct a reasonable theory.

The existing theories have dealt with a few factors involving increase or decrease of autonomy and security, and characteristics of weaker and stronger countries to affect an alliance credibility by adhering to only one country's change in power, which is a monadic power shift. In other words, these theories have greatly stressed a causal mechanism regarding a change in autonomy and security in accordance with change in power or

ambiguous claim to emphasize power level. In order to fill this insufficient reasoning, I address a new causal mechanism, a renegotiation process, that the dyadic power shift has an impact on an alliance's credibility.

## 3.1 Overall methodology

Based on the significant assumption that there is a strong negative correlation between the gap of threat perception and alliance credibility, I seek to examine the relationship between a dyadic power shift and a gap of threat perception. In order to show the validity of this relationship, I depend heavily upon a quantitative approach using multiple regressions since I adopted numerous variables. Referring to various existing datasets which have been widely used by a host of scholars in the past for exploration of the relationship between power shifts and alliance credibility, I will limit my study to the period from 1950 to 2000 taking availability of the datasets. My examination will be conducted with a term of every fifth year sample for the UN usefulness of dataset since I anticipate there might be extremely little change of data for every year; in addition I can expect to reduce cost of time and effort compared to every year's sample. The unit of analysis of my research is a dyad year based on every fifth year sample for 50 years. In other words, every observation of sample year will be analyzed by dyads.

## 3.2 Independent variable

As I briefly mentioned as an overall characteristic of the independent variable in the methodology section in Chapter 1, the independent variable in this analysis is based on a dyadic power shift in alliance, not monadic power shift. The independent variable may be bipartite consisting of two elements. One is dyadic power shifts to reflect power change and the other is power shifts in alliance. These two essential components, namely the dyadic power shift in alliances, play a crucial role to construct the independent variable. Both parts of this variable come from the COW dataset, which has been well developed and widely used.

For a variable related to nations' capabilities index to determine dyadic power shifts, first I sought to utilize NMC (v3.02). Second, for the existence or nonexistence of alliance I referred to Formal Alliances (v3.03). The dyadic power shift in an alliance reflects each ally's change in power within dyads measuring the comparison of a power ratio. There are many ways of measuring the dyadic power shift in alliance. I attempt to calculate the change of a power ratio between dyads characterized by one country and the other country's power ratio or within each country. These two ways converge in one same outcome. The two formulas are as follows:

$$\textit{Dyadic power shift}^1 \textit{ in }_t = (\ power^1_t / power^1_{t-5}\ ) / (\ power^2_t / power^2_{t-5}\ )$$

$$\textit{Dyadic power shift}^2 \textit{ in }_t = (\ power^2_{t-5} / power^1_{t-5}\ ) / (\ power^2_t / power^1_t\ )$$

According to these formulas, the outcome can range from infinitesimally more than 0 to infinite value. When the dyadic power shift equals 1, there is no dyadic power shift. However, when the dyadic power shift is smaller than 1 or is greater than 1, it represents some dyadic power shift. For example, when one the on hand the U.S. power index increases 10 to 20 from 1945 to 1950 as a starting year, on the other hand that of South Korea increases from 2 to 4 in the same year, there is no dyadic power shift, but there is a monadic power shift in that year. This is It is because in the case of the dyadic power shift, there is no change of power ratio, which equals to 2 at each time. However, in the case of the monadic power shift, the power index of the U.S. display 10 points increase while South Korea accomplishes 2 points increase. In this manner, the results describe that both countries increased power compared with the past power index. The difference between these two power shifts highlights that there is no dyadic power shifts while there is a monadic power shift by increasing. In addition, there might be a minor problem regarding the measurement of the independent variable. Even though I asserted that the dyadic power shift is likely to cause a less alliance credibility, the dyadic power shifts based on the measurement by the power ratio led to the two opposite results that one is a less credible alliance, and the other is a more

credible alliance. In other words, the dyadic power shifts that are larger than 1 are likely to lead to a less credible alliance, conversely the dyadic power shifts that are smaller than 1 are likely to yield a more credible alliance because 1 exhibits no dyadic power shifts. In order to deal with the problem above, I am required to anticipate an opposite result and interpret in a proper way when I select the two different observations, thus data with more than 1 and less than 1 of the dyadic power shifts.

### 3.3 Dependent variable

There is much difficulty to find a straightforward statistical dataset that illuminates a gap of threat perception among countries in a direct way. It is because Walt never depended upon an empirical approach, thus there is no substantial data to directly reflect the gap of threat perception such as survey results over time. For this reason, I lay out an indirect but plausible dataset, which uses as a proximate concept, the affinity of nations, based on the UN General Assembly data collected by Garztke. Out of these various issues, I sought to select issues solely related to security threats in order to obtain the precise concept of the gap of threat perception. Based on this concept of affinity of nations, when allied-dyads tend to disagree more each other on specific issues relevant to security threats, a larger gap of threat perception is likely to occur between the allies. Conversely when the allied-dyads are prone to agree more on issues, it supports there is a less gap of threat perception. As well as the inclusion of the same issues, every year the UN General Assembly involves diverse issues distincted from any previous years. Thus, the year I examine includes sufficiently distinct issues related to security threat compared with the previous year.

The dependent variable is the affinity of nation's score that reflects a different or same view on specific issues regarding security threat perception. For data pertaining to the affinity of nations, I used Documenting Votes in the UN general assembly V2.0 (1946-2005). The formula of the affinity of nations is as follows:

*Affinity of nations in t = (the number of agreements between dyad members$_t$ / the number of specific issues in$_t$) + (the number of disagreements between dyad members$_t$ / the number of specific issues in$_t$)*

In this formula, the agreement or disagreement represents the voting results when dyad members participate in the UN General Assembly votes, and specific issues are restricted to the ones only relevant to a variety of security threat such as disarmament, arms reduction, or denuclearization. This index ranges from -1 to 1. The case of '-1' represents a perfect gap of threat perception, thus complete disagreement on the issues. And the case of '1' means there is no gap of threat perception, thus perfect agreement on the issues. The case of '0' reflects half agreement and half disagreement on the issues. For example, in case of the relationship between South Korea and the U.S., I calculate how many times they agree or disagree on the specific issues. If they agree 20 times out of 20 issues, the affinity of nations will equal 1; if they disagree 40 times out of 40 issues, the affinity of nations will equal -1; and if they agree 10 out of 20 issues and disagree 10 out of 20 issues, the affinity of nations will equal 0.

## 3.3.1 Alternative Dependent Variables for Robustness Tests[20]

I anticipate possible problems with the single dependent variable characterized by examination of the UN General Assembly roll-call dataset. There might be some extent of probable skepticism with respect to a strong relationship between a gap of threat perception and alliance credibility. It is because the voting results from the UN General Assembly could include a limitation to reflect the gap of threat perception and alliance credibility since the gap of threat perception or affinity of nations might be an indirect means to lead to alliance

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[20] For detailed descriptions of variables for the robustness tests, see Appendix 5.

credibility. Furthermore, eroding confidence, I select the specific issues only relevant to security threats that exhaustively depended upon my subjective interpretation. Thus I am required to present verifiable alternative variables to measure the same dependent variable, alliance credibility, for a robustness test in order to figure out the relationship between dyadic power shifts and affinity of nations will exhibit a similar pattern with that between dyadic power shifts and the alternative dependent variables. I attempt to buttress a validity of the relationship between dyadic power shifts and alliance credibility utilizing the two major existing measurements of alliance credibility: the age or duration of alliance by Morrow (1991), fulfillment and violation of alliance commitments by Leeds (2003). And I use alliance endurance in the future on my own theory as another possible variable. I sought to utilize the exact same concept as Morrow, however alter the concept of Leeds by applying alliance commitments restricted to offensive and defensive alliance with MID dataset by reducing her measurement since I assert these two classes of alliance are sufficient to reflect alliance credibility by reducing cost of time and effort. I also support the endurance of alliance in the future would demonstrate alliance credibility because as long as dyads maintain alliance credibility, the alliance is unlikely to break in the near future.

*3.3.1.1 Age of Alliance*

Recent research on the relationship between democracy and commitment has attempted to utilize age of alliance as a highly correlated indicator of the strength of commitments (Bennett 1997). Although there is no clear-cut explanation for the relationship between the age of alliance and regime type (Maoz and Russett 1993), it may be meaningful that several authors attempted to utilize age of alliance as a measurement for alliance credibility. Morrow (1991) creates a theory on asymmetric and symmetric alliances by the autonomy-security trade-off model (see also Altfeld 1984). According to his theory, asymmetric alliances tend to last longer than symmetric alliances (Morrow 1991, p. 922) asymmetric alliances that have an older age are likely to reflect a more alliance credibility

than symmetric ones. Gaubatz (1996, pp. 128-33) also tests whether democracies are able to honor commitments by utilizing age of alliance as a convincing measurement for alliance credibility. Kaplan (1957, pp. 108-109) points out that "the longer an alliance exists, the greater its solidarity." Thus, he also attempted to test age of alliance in order to measure alliance credibility.

In sum, credible alliances are likely to last longer, and more durable alliances are likely to be more credible.

*3.3.1.2 Alliance Commitments through MID*

In an article concerning alliance reliability at war times by Leeds (2003), she attempted to measure alliance credibility through taking a close look at implementation or violation of any kind of mutual pacts or treaties. She sought to articulate the alliance commitments categorized into five types in the Alliance Treaty Obligations and Provisions (ATOP) dataset.[21] Depending upon a relatively higher class of alliance commitments, offensive and defensive alliances, in the ATOP data including an aggressive war participation, I attempted to measure alliance credibility through these two major alliance commitments reflecting whether countries pledged their alliance commitments by performing warfare. For example, in an offensive alliance between Canada and the U.S., the alliance between the two countries would be credible if Canada attacks China as the U.S. did in the Korean War. In a defensive alliance between South Korea and the U.S., the alliance between the two countries would be credible if the U.S. attacks countries that attacked South Korea. Regardless of offensive or defensive alliance, I assert that the degree of alliance credibility would be regarded same once the alliance commitments are honored. However, drawbacks of the

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[21] The ATOP dataset and the alliance reliability coding of Leeds, Long, and Mitchell are available at <www.ruf.rice.edu/~Leeds/atop.html>.

measurement utilizing the war participation indicate that offensive alliance commitments through MID do not have a sufficient sample size within 10 cases. Thus, the measurement will be mainly conducted by the number of defensive alliance commitments.

*3.3.1.3 Alliance Endurance on the Basis of the Near Future*

If alliances endure without breaking down in the near future, these would be likely to be credible. A rupture or dismantlement of alliances in the upcoming period is most likely to indicate decline of alliance credibility. Even though this variable might seem to have a similar context with age of alliance, it would reflect a difference from a perspective that age of alliance that does not last for five years in the near future can be measured. In sum, I attempt to examine this idea by seeing whether today alliances still will last for five years in the future. I assume that alliances enduring for at least five years indicate that the alliances have a minimum trust not to break down the relationship.

## 3.4 Control variables[22]

I control a number of variables likely to affect the relationship between dyadic power shifts and alliance credibility. Many of these come from the abundant existing theories delving into alliance reliability. A few other variables are derived from my intuition based on the conviction that these variables are likely, if missed, to bias in the relationship between the independent and dependent variable.

### 3.4.1 Variables from Existing Theories

Even though variables from the existing theories may not provide a strong justification between these variables and a dyadic power shift or alliance credibility, I believe

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[22] For detailed descriptions of the control variables including operationalization, see Appendix 4.

that these must be controlled because these have been done in studying alliance credibility by a number of distinguished scholars. Previous authors suggest eight crucial variables I need to control for in order to minimize potential misspecification: regime type I, regime type II, regime change, national wealth, shared alliance, asymmetry of alliance, monadic power shift, and class of alliance.

First, one of the most generalized variables to reflect an ideological similarity may be a regime by a political reason. Many scholars hold that whether or not allies have the same regime, whether democratic or autocratic, could have an impact on alliance credibility. Leeds (1999) observes that democratic and autocratic dyads have a greater propensity to cooperate causing more alliance credibility than dyads consisting of one democracy and one autocracy. Thus, the combination of the same regime type by sharing either democracy or autocracy might yield more credible commitments, more cooperative interactions and furthermore a more credible alliance than dyads consisting of one democracy and one autocracy. As far as a dyadic power shift is concerned, dyads of the same regime type are likely to be engaged in more cooperative activities to promote power increase than that of mixed regime. As a consequence, more cooperation increasing power may trigger the increased potential for dyadic power shifts.

Second, the theory of "Democratic Peace" (Doyle 1983; Gartzke 2007; Gleditsch 1992; Kant 1795) argues that democracies are unlikely to fight with one another. On the whole, democracies should be expected to consider deliberately in fulfilling their commitments, and it is not easy for democratic leaders to act in an opposite way against public opinion. There has been plenty of strong empirical evidence to prove this theory (Bremer 1992; Maoz and Abdolali 1989; Oneal and Russett 1997; Ray 1995). Gartzke claims

that affinity of nations as a willingness as well as institutional factors using UN General Assembly roll-call data[23] is able to explain the democratic peace, thus Dyads of democracies are a salient contributor to promote less wars, disputes, or conflicts than that of autocracies or mixed regime with one democracy and one autocracy. Thus these less conflictual circumstances are likely to facilitate more credible alliances between democracies than autocracies or mixed dyads. As with the previous regime type variable, democratic dyads are more likely to trigger the increased potential for dyadic power shifts.

Third, Leeds (2003) supports that regime change is likely to cause a less alliance credibility by testing one of her hypotheses. She argues that when a previously autocratic regime democratizes, or a previously democratic regime experiences an autocratic takeover, one can anticipate great changes in foreign policy.[24] Thus, whenever countries go through a critical change in domestic political institutions regardless of toward democracy or autocracy, their commitment to alliances fashioned by the previous regime is likely to be called into question since they face undercutting of alliance commitments from the previous regime. Dyads that went through at least one country's regime change have a great propensity to trigger the decreased potential for dyadic power shifts because the dyads tend to be less credible, reducing a possibility for power increase.

Fourth, Leeds (1999) puts it that wealthy states tend to be better integrated into the international system and the wealth promotes more transnational ties. Her analysis highlights that wealthy states are more likely to engage in cooperative behavior, and more cooperative relations might make a greater contribution to yield a more credible alliance. Regarding the

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[23] See Bret Leeds, "Alliance Reliability in Times of War: Explaining State Decisions to Violate Treaties", *International Organization,* Vol. 57, Fall 2003, pp. 801-827.
[24] Siverson and Starr 1994.

relationship between wealth of states and dyadic power shifts, states are likely to go through dyadic power shifts within dyads of wealthy states because these dyads are more likely to be engaged in activities to increase power than dyads of poor states or mixed dyads. Fifth, Leeds claims that shared alliances could serve as a reasonable proxy for shared positions on the East-West conflict during the Cold War. Thus, the effect of the shared super power-alliances involving the U.S. and the Soviet Union might be a reasonable way to capture the Cold War effect. For example, when South Korea and Taiwan have an alliance with the U.S., they are more likely to cooperate each other than with other countries that do not form an alliance with the U.S. With respect to the relationship between shared alliances and a dyadic power shift, dyads of shared alliance are likely to get involved in more cooperative activities to promote increasing power than that of non-shared alliance. Thus, the attempt to increase power might lead to the increased potential for dyadic power shifts. In addition, I test this variable before the end of the Cold War since unipolarity led by the U.S. is dominant in the world. After the Cold War, I will consider the effect of an alliance with the U.S.

Sixth, Morrow (1991) attempted to define what symmetrical or asymmetrical alliances are. He asserts that if both allies are in the same or different category the relationships are symmetrical or asymmetrical. Morrow concludes that asymmetric alliances are less likely to break in a given period than symmetric alliances and tend to be more credible (Morrow 1991, p. 918). He points out that it is easy to yield harmony of interests in asymmetric alliances. It is because each country in asymmetric alliances focuses on interests of security or autonomy by pursuing a different benefit, however both countries in symmetric alliances tend to pursue the same interests that only increase autonomy. Thus, asymmetric alliances are more likely to make a good harmony of interests causing a more credible alliance while symmetric ones are more likely to get involved in conflict of interests. In light of the relationship between symmetry of alliance and a dyadic power shift, symmetric alliances are likely to be involved in less cooperative activities by conflict of interests than

asymmetric ones. Thus, symmetric alliances with a higher probability to promote power increase may lead to the increased potential for dyadic power shifts.

Seventh, there are two striking major research projects by Morrow and Leeds to explain the relationship between a monadic power shift and alliance credibility. Morrow (1991) asserts that growth in capabilities in one partner country gives rise to increase of its own security, which causes it to demand more new concessions in negotiation regarding domestic and foreign policy, eventually facilitate them to break the alliance causing a less alliance credibility. In the case of a decline in capabilities, the same effect emerges by the declining country's obtaining less security and the other country's demanding more autonomy. Morrow concludes that a large change in power is likely to increase the attractiveness of breaking alliances, causing a less credible alliance. Leeds (2003) argues that changes in the relative power of a state may cause changes in its motivation to fulfill alliance commitments. Countries that experience decline in power are unlikely to be involved in conflicts because they are well aware of a low probability of winning. Countries that go through growth in power are unlikely to need an ally's support, thus they no longer need the cooperation of an ally. She observes states that undergo major changes in power, finding that they are unlikely to fulfill their alliance commitments. In sum, greater changes of power tend to reduce alliance credibility. Although attributes of a monadic power shift are completely distinct from those of a dyadic power shift, there still might be commonality in terms of sharing the feature of power shift. However, these two concepts are inherently distinct because there are no dyadic power shifts despite monadic power shifts. Accordingly, I assert there may be a significant multicollinearity between these two variables.

Eighth, Siverson and King (1980) stress the effect of the class of alliance on alliance commitments. Their analysis indicates that defense pacts, where the partners promise to assist another through a military deployment, indicate a stronger and greater commitment to war participation than rather passive entente or neutrality and nonaggression pacts. Holsti,

Hopmann, and Sullivan observe that ideologically similar nations tend to form high-commitment defense pacts rather than lower-commitment entente or neutrality pacts as coded by the COW.[25]  Their argument assumes that defense pacts bind nations more to their alliance commitment than do other categories such as nonaggression or neutrality pacts and ententes. Leeds found five different basic commitments such as defensive cooperation, offensive cooperation, neutrality, nonaggression, and consultation have different effects on the initiation of militarized interstate disputes, emphasizing a mutual defense pact as the highest alliance commitment. (Leeds 2003) In terms of the relationship between class of alliance and dyadic power shifts, dyads in a higher class of alliance are likely to be engaged in more cooperative activities than that in a lower class of alliance because of a more credible relationship. As a result, the former with a higher probability to promote power increase may lead to the increased potential for dyadic power shifts. A summarized description of the control variables based on the existing theories appears in Table 1.

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[25]  Siverson and Emmons 1991.

**Table 1. Variables from the Existing Theories**

| Variables | Rationale | Source |
|---|---|---|
| Regime Type I | Ideological Similarity → More Cooperation | Leeds (1999) |
| Regime Type II | Democratic Peace Theory<br>More Cooperation in Democratic Dyad | Kant (1795), Doyle (1983), Gleditsch (1992),Gartzke (2007) |
| Regime Change | Downplay of Existing Relationship → Political Instability | Leeds (2003) |
| National Wealth | More Integration and Interdependence | Leeds (1999) |
| Shared Alliance | Influence of the Cold War | Leeds (1999) |
| Asymmetry of Alliance | The Security-Autonomy Trade-off Model → Harmony or Conflict of Interests | Morrow (1991) |
| Monadic Power Shift | The Security-Autonomy Trade-off Model → Harmony or Conflict of Interests | Morrow (1991) Leeds (2003), |
| Class of Alliance | Strength of Alliance Commitments | Siverson and King (1980) |

### 3.4.2 Other Control Variables on My Own Theory

I attempt to articulate a few additional control variables based on my tentative theory, which are labeled as diplomatic exchanges, colonial history, international trade, and multilateral alliance.

First, one economic factor, international trade, appears to have an identical context with dyads of wealthy states on the ground that the more trade states exchange, the more interdependent, interconnected, and cooperative relationship they are likely to have. It also may trigger the increased potential for dyadic power shifts. Second, higher levels of diplomatic exchange might yield a more credible alliance. I assert that the higher levels of diplomatic exchange is likely to engage in more interdependent, interactive, interconnected international relations than are non-diplomatic exchanges, thus this behavior may enhance cooperative climate to cause a more credible alliance. In light of the relationship between diplomatic exchanges and dyadic power shifts, dyads of diplomatic exchanges with a higher

probability to trigger power increase may yield the increased potential for dyadic power shifts. Third, alliances, generally speaking, consist of two types, bilateral and multilateral. These types of alliances are likely to demonstrate a different level of alliance credibility. Even though the two competing collective security communities as major multilateral alliances, NATO and the Warsaw Pact, might have contributed to build up alliance credibility among member countries during the Cold War, multilateral alliances are likely to exhibit lower levels of alliance credibility than bilateral alliances. Countries with relatively weak power are likely to free-ride in multilateral alliances.[26] In a similar context with the free-riding problem, member countries in multilateral alliance tend to pass the buck to other members, clinging to a rather passive attitude. I argue that free-riding only occurs before countries have enough faith in alliance credibility to get away with it. As a result, multilateral alliances may be less credible than bilateral ones since the former are more likely to get involved in the free-riding problem than the latter. Regarding a dyadic power shift, dyads in multilateral alliances with a higher probability to trigger power decrease may lead to the decreased potential for dyadic power shifts. Fourth, a shared colonial history may yield a more credible alliance. For example, the relationship between South Africa and Burma, which had both been colonized by the U.K., might display a more credible alliance since a shared culture including a same language, institutions, and many intangible elements tends to produce ideological solidarity and play a significant role to establish a more cooperative environment and as a result a more credible alliance. In a sense of the relationship between a shared colonial history and dyadic power shifts, dyads of a shared colonial history are likely

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[26] See Olson, Mancur, *The Logic of Collective Action: Public Goods and the Theory of Groups* (Cambridge, MA: Harvard University Press, 1965), and see also Olson, Mancur, and Richard Zeckhauser, "An economic theory of alliances," *Review of Economics and Statistics* 48 (1966), pp.266-79.

to be engaged in more cooperative activities than that of non-shared colonial history. Thus, the former with a higher probability to promote power increase is likely to yield the increased potential for dyadic power shifts.

The summarized description of the control variables not based on the existing theories appears in Table 2. Although there might not be a strong justification between the control variables and the dyadic power shift, I assert that as model misspecifications go, omitted variable bias is riskier than including irrelevant variables. I assert that adding predictor variables that have a significant effect on both dependent and independent variable here include a less possibility to cause model misspecifications than deleting ones.

**Table 2. Variables by the Theories on My Own**

| Variables | Rationale | Area |
|---|---|---|
| International Trade | Pacifying Effect → More Cooperation | Economic Power |
| Diplomatic Exchanges | More Interdependence → More Cooperation | Foreign Policy |
| Multilateral Alliance | Free-Riding by Small Powers → Buck-Passing → Undercutting Trust | Collective Community or Organization |
| Colonial History | Ideological Similarity → More Cooperation | Historical Background |

# Chapter 4: Empirical Results and Discussion

The purpose of the data analysis is to examine the relationship between the dyadic power shift and alliance credibility. The analysis uses the affinity of nation's index for the main dependent variable and several secondary dependent variables such as the age of the alliance, the fulfillment of alliance commitments by combination of MID and ATOP data, and the future of the alliance by examining whether alliances last the next five years. The analysis also is designed to consider various control variables that might affect both dependent and independent variable. Statistical analysis of the relationships stated above requires techniques that account for unusual characteristics of the data, which considers dyads based on every fifth year from 1950 to 2000. The data encompasses both cross-sectional and time-series components, and because many nations have declared independence during the period under study, the number of politically related dyads changes over time. I utilize a maximum likelihood estimator that identifies the cross-sectional and time-series properties of the data. In order to rectify temporal autocorrelation I attempt to measure a common value for rho and specify Huber-White standard errors when heteroskedasticity across observations is likely (Leeds 1999). In case of future alliance as an additional dependent variable, I use logit or probit since these are the most common techniques for analyzing statistical models with dichotomous dependent variables. I have reason to expect autocorrelation in the error terms both cross-sectionally and intertemporally because the samples consist of repeated observations of the same dyads and observations of a number of dyads in the same period. Most of the statistical analyses are multivariate regressions using Stata's xtpcse command that depicts the dominant pattern of observations based on every fifth year's sample. I construct a variety of tables to analyze the statistical results. For the most part, my study examines the relationship between dyadic power shifts and the affinity of nation, comparing a reduced model including only control variables from previous research with a full model

including all control variables by adding several control variables based on my own theories. In the process of examining the reduced model and the full model, I consider two different conditions: one is whether dyads are in alliance, and the other is whether the dyadic power shift index is larger than 1 or it is smaller than 1 in order to obtain single result with the two anticipating opposite results. For example, if the dyadic power shifts of observations are becoming close to 0, these will be applied to observations that are becoming larger than 1. Second, I examine the difference between the post-1990 period and the pre-1991 period to take account of the different characteristics of the Cold War environment. Thus, I compare the results of the data from 1950 to 1990 with that from 1995 to 2000 as well as all sample year's data. In addition, through the statistical results I seek to figure out whether a dominant view or public opinion on change of alliance credibility by a host of security experts in South Korea is convincing. Third, I carry out the robustness tests to support my main finding, which is based on affinity of nations as the dependent variable. I run the regressions using the three secondary dependent variables to confirm whether they produce results that are consistent with the original result. Next, I compare a model with any types of alliance with models respectively including solely defense pacts, including defense pacts and non-aggression and neutrality agreements, and any types of alliance. Lastly, I consider a model transforming some variables to reduce the abnormality of their distributions.

## 4.1 The Reduced and Full Model by Partial and All Control Variables

Table 3 presents the results of estimates of credibility, measured as the affinity of nations, using the reduced and full models. While the existing and additional control variables on my own do engage in mostly higher index of affinity of nations and get involved in occasionally lesser index of affinity of nations, the inclusion of these control variables does not have an impact on the primary relationship between dyadic power shifts and alliance

credibility. The coefficient of the dyadic power shifts variable is highly significant. However, the result is inconsistent with the original hypothesis based on the presumption that

**Table 3. Dyadic Power Shift and Alliance Credibility, 1950-2000**

**Unit of Analysis: Dyad-Year**

| Dependent Variable: New Affinities | Reduced Model (The Existing Theories) | | | Full Model (Including My Theories) | | |
|---|---|---|---|---|---|---|
| Independent Variable | All Dyads | Non-Alliance | Alliance | All Dyads | Non-Alliance | Alliance |
| Dyadic Power Shift | -.0280*** | -.0301*** | .0302* | .0216 | -.0490*** | .0305* |
| | (.00486) | (.00504) | (.0171) | (.0166) | (.00505) | (.0169) |
| Dyads of Democracies | -.0522*** | -.0530*** | -.0711*** | -.0624*** | -.0430*** | -.0725*** |
| | (.00535 | (.00567) | (.0158) | (.0148) | (.00563) | (.0158) |
| Dyads of Same Regime | .0562*** | .0593*** | .0458*** | .0446*** | .0548*** | .0454*** |
| | (.00420) | (.00445) | (.0127) | (.0122) | (.00448) | (.0126) |
| Regime Change | .0157*** | .0216*** | -.0597*** | -.0597*** | .0176*** | -.0603*** |
| | (.00363) | (.00384) | (.0105) | (.0103) | (.00378) | (.0104) |
| Dyads of Wealthy States | -.0749*** | -.0810*** | -.0597** | -.0363* | .0112 | -.0859** |
| | (.0105) | (.0115) | (.0246) | (.0233) | (.0122) | (.0257) |
| Shared Great Power Alliance | -.00367 | -.0512*** | .0823*** | .0706*** | -.0210*** | .0860*** |
| | (.00475) | (.00554) | (.0127) | (.0108) | (.00570) | (.0130) |
| Symmetry | .118*** | .113*** | .141*** | .133*** | .106*** | .130*** |
| | (.00559) | (.00592) | (.0154) | (.0149) | (.00583) | (.0153) |
| Monadic Power Shift | -4.65*** | -5.016*** | -3.017*** | -2.63*** | -1.83*** | -2.89*** |
| | (.360) | (.398) | (.881) | (.777) | (.349) | (.940) |
| Class of Alliance | .111*** | | -.00179 | -.00927 | | .00384 |
| | (.00446) | | (.00897) | (.00795) | | (.00930) |
| Dyads of Shared Colonizer | | | | .0416** | .124*** | .0427** |
| | | | | (.0144) | (.00594) | (.0147) |
| Dyads of Diplomatic Exchange | | | | -.0116 | -.144*** | -.00781 |
| | | | | (.0117) | (.00404) | (.0119) |
| International Trade | | | | 4530*** | 8690*** | 4980** |
| | | | | (1100) | (1190) | (2170) |
| Multilateral Alliance | | | | .209*** | | .209*** |
| | | | | (.0368) | | (.0401) |
| Constant | .594 | .599 | .643 | .467 | .646 | .437 |
| N | 41723 | 38218 | 3505 | 3699 | 37918 | 3474 |

Note: Each cell contains the estimated coefficient with its associated standard error listed in parentheses below. *** indicates statistical significance at the.001 level. ** indicates statistical significance at the.01 level. * indicates statistical significance at the.05 level. The significance level applies to one-tailed test.

dyadic power shifts in allied dyads are likely to yield less alliance credibility since affinity of nation's index is likely to increase as the dyadic power shifts do, thus the sign of the regression is in the opposite, positive, sign in the wrong direction unlike the hypothesis. Furthermore, the coefficient of the dyadic power shifts in all and non-allied dyads (the first,

second, fourth, and fifth columns) exhibit a negative sign that affinity of nations tends to decrease as the dyadic power shifts increase. These results illustrate applying the dyadic power shifts to non-allied and all dyads just reflects a larger gap of affinity of nations regardless of the hypothesis. In these circumstances, these affinities of nations have no relationship with alliance credibility. In addition, through comparison of the allied dyads with non-allied and all ones, I discover that the coefficient of the dyadic power shift and several variables have the opposite sign in the full model. In other words, the dyadic power shift tends to yield less affinity of nations in all and non-allied dyads, conversely it has a propensity to promote more affinity of nations, namely a more alliance credibility in allied dyads. Both the reduced and full models indicating the same sign of coefficient supports that the relationship between the dyadic power shift and affinity of nations is significant regardless of the number of control variables.

In the reduced model, the coefficients of class of alliance demonstrate an insignificant relationship on affinity of nations. In the full model, the variable of the dyads of diplomatic exchange was included as insignificant contributor on alliance credibility. Noticeably, the coefficients of dyads of democracies, dyads of wealthy states, symmetry of alliance, and multilateral alliance indicate an inconsistent result with an opposite sign with the existing dominant views and my theories.

## 4.2 Comparison between Pre-1991 and Post-1990 Periods

Table 4 exhibits the comparison between the key periods representing the pre-1991 and the post-1990 era. This table provides a direct information for comparison between the Cold War and post-Cold War feature since the end of the Cold War confrontation was one of the biggest events in international relations. As shown in Table 5, the coefficients exhibit little difference between the pre-1991 and the post 1990 periods, and the coefficient of the

dyadic power shift has the same sign in each period. The results support that the period of

**Table 4. Dyadic Power Shift and Alliance Credibility, 1950-2000**

**Unit of Analysis: Dyad-Year**

| Dependent Variable: New Affinities | Post-1990 | | | Pre-1991 | | |
|---|---|---|---|---|---|---|
| Independent Variable | All Dyads | Non-Alliance | Alliance | All Dyads | Non-Alliance | Alliance |
| Dyadic Power Shift | .129*** | -.0773*** | .138*** | .0151 | -.0118* | .0230* |
| | (.0321) | (.00722) | (.0328) | (.0188) | (.00765) | (.0191) |
| Dyads of Democracies | -.0678** | -.00759 | -.0863** | -.0875*** | -.0515*** | -.0974*** |
| | (.0312) | (.0143) | (.0329) | (.0193) | (.00803) | (.0209) |
| Dyads of Same Regime | -.0371* | .0287* | -.0343 | .0534*** | .0562*** | .0528*** |
| | (.0253) | (.0137) | (.0268) | (.0148) | (.00503) | (.0154) |
| Regime Change | -.0490** | .0186*** | -.0524** | -.0583*** | .0157*** | -.0588*** |
| | (.0197) | (.00569) | (.0195) | (.0124) | (.00507) | (.0126) |
| Dyads of Wealthy States | .182*** | .0216 | .159*** | .0341 | .00864 | -.0693* |
| | (.0367) | (.0196) | (.0396) | (.0297) | (.0166) | (.0325) |
| Shared Great Power Alliance | .160*** | -.0729*** | .192*** | .0527*** | -.00398 | .0677*** |
| | (.0208) | (.00919) | (.0227) | (.0143) | (.00697) | (.0186) |
| Symmetry | .189*** | .0914*** | .191*** | .0999*** | .118*** | .0915*** |
| | (.0253) | (.00892) | (.0254) | (.0184) | (.00772) | (.0189) |
| Monadic Power Shift | -19.9** | -.0425 | -19.6*** | -2.14** | -4.55*** | -2.48** |
| | (7.17) | (.274) | (6.308) | (.789) | (.874) | (.980) |
| Class of Alliance | -.0259* | | -.00117 | .00144 | | .0157 |
| | (.0150) | | (.00831) | (.00934) | | (.0115) |
| Dyads of Shared Colonizer | -.0387* | .136*** | -.0424* | .0754*** | .116*** | .0799*** |
| | (.0224) | (.00907) | (.0227) | (.0194) | (.00778) | (.0204) |
| Dyads of Diplomatic Exchange | .0255 | -.135*** | .0314* | -.0245* | -.146*** | -.0210 |
| | (.0201) | (.00621) | (.0197) | (.0146) | (.00532) | (.0149) |
| International Trade | 445 | 10280*** | -2270 | 5506*** | 5110*** | 6460** |
| | (1340) | (2400) | (2650) | (1550) | (1410) | (3068) |
| Multilateral Alliance | .0526 | | .0345* | .217*** | | .206*** |
| | (.0726) | | (.0567) | (.0461) | | (.0522) |
| Constant | .501 | .679 | .498 | ..473 | .601 | .456 |
| *N* | 1109 | 14585 | 1059 | 2590 | 23333 | 2415 |

post-1990 is more significant than in the pre-1991 model. In the post-1990 model, the

coefficient of all dyads has a same sign with allied dyads. Several variables such as class of

alliance, dyads of same regime, and international trade in the post-1990 reflect insignificant

coefficients on alliance credibility while the coefficients of dyads of diplomatic exchanges

and class of alliance are insignificant in the pre-1991 model. Furthermore, the coefficient of

dyads of shared colonizer and wealthy states in the pre-1991 has changed into an opposite

sign in the post-1990. Although the post-1990 period measured in 1995 and 2000 starkly

postdates the collapse of the Soviet Union, the coefficient of the shared great power alliance

effect in the post-1990 still has a positive sign, which might suggest the U.S as an unilateral power is likely to promote a larger affinity of nations, namely alliance credibility.

### 4.3 Robustness Tests[27]

A variety of regressions described in the previous sections suggest that, contrary to the hypothesis, a dyadic power shift in allied dyads is likely to trigger a higher level of alliance credibility. I estimated several regressions using three alternative dependent variables, extent of alliance, and transformed models for the robustness tests. In the first robustness test, I estimated the regressions of the dyadic power shift on alliance credibility based on three different measurements: age of alliance, fulfillment of alliance commitments utilizing combination of MID and ATOP data, and endurance of alliance in near future. The only difference between the main dependent and alternative dependent variables is that the former includes observations of all and non-allied dyads unlike the latter that is restricted to allied dyads. However, under the same circumstances all dependent variables are restricted to the cases in alliance according to my hypothesis. The results, found in Appendix 5, show that the coefficient of the dyadic power shift on affinity of nations has the same sign with that on the MIDATOP data regarding the fulfillment of alliance commitments, but has the opposite sign when credibility is measured by age of alliance or future endurance of alliance. All of these relationships are statistically significant. Although several control variables lose, keep their significance, or convert the sign of coefficients, it just gives a lot of information that is only secondary. The dependent variables utilizing the endurance of future alliance and the age of alliance are consistent with my hypothesis by representing a negative sign of coefficient in the dyadic power shifts. In addition, the results embrace that the coefficients of

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[27] The results for these regressions are found in Appendix 5, 6, and 7.

dyads of same regime, dyads of symmetry, and multilateral alliances in endurance of alliance in the future represent insignificant coefficients compared to age of alliance, and several coefficients have converted into an opposite sign. I identify that MIDATOP data include more insignificant coefficients than affinity of nations. In sum, the results demonstrate that each two dependent variable could be consistent and inconsistent with my hypothesis.

In the second robustness test, I compare different types of alliance including three major alliance commitments: defense pacts, non-aggression or neutrality pacts, and entente. The results are likely to demonstrate whether each type of alliance would confirm to the results found when equally including all types of alliances. The results support the idea that the coefficients of alliance 1, alliance 2, and all types of alliance exhibit an identical sign, and are significant at the same time. Although there were some minor differences in the control variables across the different definitions of 'alliance,' the central result was the same. Dyadic power shifts consistently had the unexpected effect on alliance credibility.

In the third robustness test, I transform several of the independent variables to enhance the normality of their distributions.[28] The results suggest that the coefficient of the dyadic power shift in a transformed model as well as an untransformed model depicts the identical trend and that nearly all control variables are significant, although there are some minor differences in the few control variables.

## 4.4. Discussion

I attempted to analyze three different types of tables regarding my hypothesis, the Cold War effect, and the three alternative dependent variables. In this section, I discuss what

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[28] I conducted three transformations converting the dyadic power shift, monadic power shift, and international trade into natural log and square root, for example ln (dyadic power shift), ln (monadic power shift), and (international trade)$^{0.5}$ or $^{0.25}$.

would be a justifiable explanation about the differences of what I anticipated in these three analyses.

*4.4.1 My Hypothesis and Application of Control Variables*

In the first analysis regarding the main finding of this project, the coefficient on the dyadic power shift variable in allied dyads was clearly inconsistent with the hypothesis by exhibiting an opposite sign of coefficient. In addition, the coefficients of dyadic power shifts in all and non-allied dyads demonstrate that the dyadic power shifts are likely to yield less affinity of nations, thus lead to decline of dyads' credibility although the results do not provide any connection with the hypothesis. While all and non-allied dyads have no relationship with my theory and hypothesis, I discover that the hypothesis based on cases in allied dyads is inconsistent with my theory. These results reflect that my theory includes a limitation to explain the relationship between dyadic power shifts and alliance credibility. What would induce this opposite result with the hypothesis in allied dyads? When dyadic power shifts occur in allied dyads, power gaining countries are likely to demand more contributing role to power losing ones, however the demand of more contributing role might be eliminated by a spontaneous cooperation before it leads to potential conflicts. Alliances are likely to endure the existing credibility by preventing possible conflicts caused by the demand of more contributing role before renegotiation process occurs. Leeds (2003) demonstrated that 70% of alliances are reliable. In case of less dyadic power shifts in allied dyads, one country is unlikely to claim more contributing role to partner's country. The environment that there is less contributing role between the two countries may trigger potential conflicts regarding less improvement of the contributing role because countries in allied dyads tend to expect enhanced contributing role than before in order to maintain trust each other. The results suggest that the demand of contributing role based on my theory may

occur when there are less dyadic power shifts, namely no expectation for contributing role performed by partner's country.

With respect to significance of the existing control variables and additional control variables on my own theory, I discover that some of control variables by the existing theories are insignificant, or exhibit opposite sign of coefficients. The result exhibits that the dyads of democracies have an opposite sign of coefficient between table 3 and 4 causing a reverse consequence. The results supports that the dyads of democracies in allied dyads could lead to a less affinity of nations. These unexpected results may be originated from the influence of domestic politics by great consideration of public opinion and political chaos caused by a variety of actors. The results support that class of alliance and dyads of diplomatic exchange do not affect alliance credibility. Through the significance of the opposite sign of the coefficients of dyads of wealthy states, symmetry of alliance, and multilateral alliance that turns over my initial justifiable explanation with regard to the relationship between the control variables and the dependent variable, a reverse theory might be valid. Dyads of wealthy states are unlikely to facilitate a higher level of alliance credibility; rather joint wealth might trigger a decline of alliance credibility. The more interaction or interconnectedness might lead to a more possession of information toward partner's country, and more information may yield a more competitive circumstance in order to attain relatively increased interests. Thus, the circumstance would be possible for dyads of wealthy states to go into potential conflicts and disputes causing a less credible alliance than in case of non-wealthy dyads. Concerning symmetry of alliance, the results in Table 3 do not seem to support Morrow's theory. These results suggest that dyads of symmetry yield a higher level of alliance credibility while dyads of asymmetry yield more conflictual circumstances, leading to less alliance credibility. It is because the stronger power is likely to feel less alliance commitment than the weaker power in asymmetric alliances; on the other hand countries tend to feel equal alliance commitments in symmetric alliances. Symmetric

alliances have a propensity to exhibit a stronger alliance commitment than asymmetric alliances. Through the reversed result of multilateral alliance, it supports the idea that multilateralism is likely to play a significant role to facilitate alliance credibility. This might result from the logic that members of multilateral alliance are likely to mind and deal with the free-riding problem.

*4.4.2 The Cold War Environment*

In the second analysis considering different periods, the coefficients of shared great power alliance in both pre-1991 and post-1990 are highly significant, and the results in Table 4 support that the period of the post-1990 is likely to yield a more affinity of nations than that of the pre-1991. Even though the Cold War ended in 1991, the effect of the Cold War may be still valid in the post-1990 era. The result reflects that dyadic power shifts in both the pre-1991 and post-1990 have a significant impact on alliance credibility. Although alliances with the U.S. might have been less valuable without the Soviet Union threat, the significance of the shared great power effect is still dominant. I assert that the remnants of the Cold War effect by the two superpowers are still valid and influential in international relations.

*4.4.3 Three Alternative Dependent Variables*

In the third analysis on the robustness tests, for the most part the two dependent variables, including affinity of nations and MIDATOP, produce quite different results than do the other two dependent variables related to age of alliance and endurance of future alliance. The results from the robustness tests suggest the idea that my finding could be inconsistent with my theory based on the demand of contributing role since the two alternative variables using age of alliance and endurance of future alliance are inconsistent with my hypothesis while only one alternative variable is consistent with my hypothesis. I recognize that the alternative dependent variables using the concept of MIDATOP and endurance of future alliance tend to entail more insignificant coefficients than the other two dependent variables

include. The many insignificant coefficients may stem from a partially wrong operationalization of MIDATOP data relied heavily upon performance of war participation, and from oversimplification of the concept of future alliance since the duration of 5 years might not be a reasonable period to measure alliance credibility. The robustness tests support that the measurement using affinity of nations may not reflect alliance credibility because the two measurements using age of alliance and endurance of future alliance are consistent with my hypothesis while the one measurement by MIDATOP is inconsistent with my hypothesis. Even though the robustness tests do not provide strong evidence that affinity of nations as a plausible proxy for alliance credibility has a similar trend with the others' measurements I adopted, the measurement using affinity of nations for alliance credibility may be a significant way through the same sign of coefficient of dyadic power shifts from MIDATOP dataset.

# Chapter 5: Conclusion and Future Research

The results of the analysis lead to an unanticipated conclusion. The dyadic power shifts definitely matter on alliance credibility in a manner that turns over the hypothesis. The dyadic power shifts in allied or all and in non-allied dyads are highly significant in overall tests, suggesting that a crucial contributor to alliance credibility has not been studied in past research. More research is required to clearly explain the different effects of the dyadic power shifts in allied or all and non-allied dyads. I discovered that when I include all or non-allied dyads in the statistical analysis, the dyadic power shifts are likely to yield a less affinity of nations. Though, it is unclear that there is a significant relationship between the less affinity of nations and alliance credibility because these two types of observations are not consistent with my hypothesis. On the other hand, I found when I apply allied dyads to the multivariate regression model, the dyadic power shifts tend to trigger a larger affinity of nations, namely a more alliance credibility although the results are definitely inconsistent with my theory based on the demand of contributing role. I conclude the larger dyadic power shifts might lead to a larger affinity of nations, eventually a more alliance credibility only in allied dyads. It is because there may exist a difference between a general credibility in a general circumstance and alliance credibility in a specific one. In all or non-allied ones, the results can not be applied to my hypothesis and theory that the power-gaining countries tend to demand more contributing role to the power-losing ones that may lead to potential conflicts, causing a less credibility alliance. However, through the opposite result with my hypothesis, in allied dyads the potential conflicts might be prevented by a spontaneous cooperation when dyadic power shifts occur because the dyadic power shifts may facilitate an environment that the demand of contributing role may lead to build more alliance credibility.

Although I doubt that I have accomplished in seeking out unraveling causes for the alliance credibility, I am confident that I provided a single hypothesis in order to show the main independent variable, dyadic power shifts, is significant. I hope to instigate a change in discovering a potential determinant as dyadic power shifts on alliance credibility and indicator as affinity of nations for alliance credibility. Even though it is evident that additional analysis of the dyadic power shift or other indicators is required, the findings suggested in this research clearly indicate that dyadic power shifts are likely to be related to alliance credibility. Several fundamental problems still remain in this study. First, the theoretical explanation that the demand of contributing role affects the alliance credibility may be incorrect. There might be different theories to explain the inconsistency of my hypothesis. Second, two conflicting theories could be found since the robustness tests underlie that the one alternative dependent variable represents an opposite sign of coefficients compared with the other two alternative dependent variables. It is because there is a difficulty that credibility is very hard to measure: different variables ostensibly capturing the same concept are producing diametrically opposite results. However, the result that the two measurements are consistent, and the one is inconsistent with my hypothesis does not support that my measurement using the affinity of nations is wrong. Third, in an empirical approach, a few control variables on my own theories that may include a less justification to explain the relationship between the control variables and dyadic power shifts or alliance credibility might deflect an interpretation of various tests. However, removing possibly significant control variables could lead to a riskier conclusion than including less relevant ones.

If the alliance credibility can be accounted for partially by the dyadic power shifts, then there may be great possibilities for future research. First, in a perspective of building more theoretical explanation to supplement my theory based on the demand of contributing role, jealousy appears to be a convincing explanation why the demand of contributing role

leads to potential conflicts. Jealousy as well as cost-benefit analysis may play a key role to establish the reasons for the effect of the demand of contributing role by dyadic power shifts. When the dyadic power shift occurs, one country is likely to feel jealous over the power gaining countries. This theory does not allow me for the exclusion that the jealousy might be linked to a change of a political behavior in a foreign policy. Second, more attempts to account for the difference between the effects of dyadic power shifts in allied dyads or in all and non-allied ones are necessary. Especially, my theory includes a limitation to explain the relationship between the dyadic power shift in all or non-allied dyads and alliance credibility, though other justifiable explanations to figure out what would cause this relationship could be possible. I might need to create a hypothesis and theory that encompasses a broader concept of credibility including all types of dyads and offer an elaborate theory why alliances would cause a difference in explaining alliance credibility. Third, the results on the significance of symmetric alliances are inconsistent with the existing theory by Morrow. The results could be stemmed from a different definition and operationalization of asymmetry and symmetry of alliances. However, the more convincing definition to categorize different types of alliances must take a substantial level of asymmetry or symmetry of alliance into account. Fourth, in an empirical dimension, finding more convincing alternative dependent variables to measure alliance credibility is necessary. Lastly, the South Korean case could be a possible application of the analysis of the relationship between dyadic power shifts and alliance credibility. The statistical result demonstrates more alliance credibility in allied dyads since 1990, whereas some security experts' analysis[29] and public opinion in South Korea reflect

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[29] Samsung Lee, *A Nuclear Issue and Foreign Policy Toward the U.S. in the Korean Peninsula* (Seoul: Hangilsa, 1994); Jongchul Park, *The U.S. Conflicts and Accommodation with Both South and North Korea* (Seoul: Orm, 2002).

that alliance credibility has become worse since 1990. The empirical results might embrace that the alliance credibility between South Korea and the U.S. did not experience a constant decline over time since 1990; rather the estimation stresses a constant increase of alliance credibility at the same period. The finding describes that the estimation is not consistent with a dominant strain of relationship by security experts' analysis. Other case studies considering the results of several control variables such as dyads of democracies and wealthy states, and symmetry of alliance as well as dyadic power shifts in this study could be worth to examine the relationship between South Korea and the U.S.

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# Appendix 1 Independent Variable

| Variable / Theory | Operationalization | Measurement | Available Dataset |
|---|---|---|---|
| **A Dyadic Power Shift**<br><br>A dyadic power shift in alliances plays a crucial role to have an impact on alliance credibility. A dyadic power shift is likely to trigger potential conflicts causing a less credible alliance by demanding more contributing role based on power ratio compared with a past dyadic power shifts. Thus, power-gaining countries that went through a greater dyadic power shift by increasing tend to demand more contributing role to power-losing countries. | In a dyad year, a relative power ratio using countries capabilities index between the same two countries or one country and the other country with the two different periods will show a dyadic power shift. For example,<br><br>*A dyadic power shift in1950 = ($Power^1_{1950}$/$Power^1_{1945}$) / ($Power^2_{1950}$/$Power^2_{1945}$) the dyadic power shift = ($Power^2_{1945}$/$Power^1_{1945}$) / ($Power^2_{1950}$/$Power^1_{1950}$)*<br><br>*\*Two dyadic power shift conditions (it is larger than 1 or smaller than 1) would indicate the opposite sign of coefficient, however same result may be reflected* | Interval | National Material Capabilities (v3.02) http:// correlatesofwar.org |

# Appendix 2 Dependent Variable

| Variable / Theory | Operationalization | Measurement | Available Dataset |
|---|---|---|---|
| **Alliance Credibility**<br><br>Demand of contributing role is likely to cause a less alliance credibility. For example, power-gaining countries that attained more relative increase tend to demand more contributing role to the power-losing countries, as a result there might be a potential conflicts or disputes in the relationship. Thus, the relationship is likely to spawn a less credible alliance. | In a dyad year, two country's agreement on every issue equals to "1" and complete disagreement equals to "-1" thus, index of affinity of nations will range from -1 to 1.<br><br>*For example, Affinity of nations in 1950 = (the number of agreements of dyads$_{1950}$ / the number of specific issues in$_{1950}$ + (the number of disagreements of dyads$_{1950}$ / the number of specific issues in$_{1950}$)* | Interval | The reduced affinity of nations dataset using the UN votes |

# Appendix 3 Alternative Dependent Variables

| Variables / Theory | Operationalization | Measurement | Available Dataset |
|---|---|---|---|
| **Age of Alliance**<br><br>Many existing theories support alliance credibility has a close relationship with age of alliance or duration of alliance that how long alliance has lasted is a strongly significant variable to reflect alliance credibility. | In a dyad year, How long have alliances lasted since the formation of alliance? Unless the alliances break down up to now, year of the first formation of alliance will be the age. But in case of collapse of alliances, the age will be calculated from the starting year of the new alliance.<br><br>*Age of alliance in t = t-a starting year of alliance For example, if alliance started since 1945, the age of alliance equals to 5 in 1950 (If alliances have been broken down, a new starting year of alliance will be applied* | Interval | Formal Alliance Data (v3.03) http:// correlatesofwar.org |
| **Alliance Endurance**<br><br>If alliances endure without breaking down in the future, these are likely to be credible. It is because a rupture or dismantlement of alliances in upcoming period could be a marked indicator of decline of alliance credibility. | In a dyad year, *whether the alliance between the two countries will last in the next five years. Yes:1 (credible) , No:0 ( less credible)* | Interval | Formal Alliance Data (v3.03) http:// correlatesofwar.org |

| Variables / Theory | Operationalization / Measurement | Available Dataset |
|---|---|---|
| **Alliance Credibility Based on Combination of MIDATOP**<br><br>To examine whether countries are likely to observe or break their alliance commitments at wartimes might display whether the level of alliance credibility is high or low. Out of 5 types of alliance commitments based on Leeds' categorization, I attempt to select two strong alliance commitments including offensive and defensive one. According to class of alliance, I attempt to identify whether countries engage in Militarized Interstate Disputes under the class of alliance. However, the offensive alliance included plenty of non-available data compared with the defensive alliance data. It is likely to depend heavily on the defensive alliance data with a significant variation.<br>I attempt to apply both alliance credibilities to the dependent variable. | Here, to specify the sphere of MID, I attempt to define MID as more than 1 fatality level (1-25 casualties) and 16 high activity level (Attack) based on Dyadic MID dataset by Zeev Maoz. Since the data are engaged in the duration from 1950 to 2000. There is not much warfare recording more than 1,000 casualties. Furthermore, if I involve every level of MID, the strength of alliance commitment might be partially biased because the two allies are regarded that they have the same obligation of alliance commitment. Thus, I describe the threshold as the combination of fatality and high collision activity to minimize the possible bias. In a dyad year,<br><br>*Alliance credibility in t =*<br>*(Numbers of offensive alliance pledged / 5)+(Numbers of defensive alliance pledged / 5)*<br>*Highest alliance credibility equals to 2 when countries pledge all alliance commitments for five years, and lowest value will be 0 when countries break all alliance commitments for five years.*<br><br>Interval variable | Zeev Maoz (2005). Dyadic MID dataset (version 2.0):http:// psfaculty. Ucdavis.edu/ zmaoz / dyadmid.html and ATOP dataset www.ruf.rice.edu/~ Leeds/atop.html |

# Appendix 4 Control Variables

| | Variables / Theory | Operationalization | Measurement | Available Dataset |
|---|---|---|---|---|
| 1 | **Colonial History**<br><br>Colonial history may play a crucial role to trigger a more credible alliance due to the effect of ideological solidarity such as culture, language, institutions and so on. The pro or anti-colonial history based on a dividing view on a colonial history appears to trigger more cooperative activities, thus more cooperation increasing power may trigger the increased potential for dyadic power shifts. | In a dyad year,<br><br>*whether two countries have the same colonizer,*<br>*Yes: 1, No: 0*<br><br>It depicts as a dummy variable. | Ordinal | ICOW Colonial History Data by Paul Hensel http://garnet. acns. fsu.edu./ ~phensel /intldata.html |
| 2 | **Diplomatic Exchanges**<br><br>Diplomatic exchanges based on a degree of interaction of exchanges are likely to promote alliance credibility due to a cooperative climate. Diplomatic exchanges appear to trigger more cooperative activities, thus more cooperation increasing power may trigger the increased potential for dyadic power shifts. | In a dyad year, which level of diplomatic exchanges exist,<br><br>*0:No relations*<br>*.5:unilateral diplomacy*<br>*1: bilateral diplomacy*<br><br>It depicts as a dummy variable. | Ordinal | Diplomatic Exchange (v2006.1) http://correlates ofwar.org |

| | | | | |
|---|---|---|---|---|
| 3 | **International Trade**<br><br>Trade may a significant factor to yield a pacifying effect to enhance international cooperation. International trade appears to trigger more cooperative activities, thus more cooperation increasing power may trigger the increased potential for dyadic power shifts. | Without considering GDP, the pacifying effect may be biased by the size of countries.<br>In a dyad year,<br><br>$(Import+Export)_1 / GDP_1 + (Import+ Export)_2 / GDP_2$ | Interval | PWT 6.2 (Economic data) http://pwt.econ. Upenn,edu/ php_site/ pwt621 |
| 4 | **Multilateral Alliance**<br><br>Multilateral alliance may facilitate less alliance credibility because member countries might freeride the collective security community concentrating on passing the buck to other members. Multilateral alliances appear to trigger less cooperative activities, thus less cooperation decreasing power may trigger the decreased potential for dyadic power shifts. | In a dyad year,<br><br>*Whether two countries form multilateral alliance with more than 3 member countries.*<br>*Yes:1*<br>*No: 0* | Ordinal | Formal Alliance Data (v3.03) http:// correlatesofwar. org |

| 5 | **Regime Change**<br><br>Countries that have undergone regime change in recent period are likely to be less credible. These countries tend to downplay existing relationship with other countries generating less credibility.<br>Regime change might trigger less cooperative activities, thus less cooperation decreasing power may trigger the decreased potential for dyadic power shifts.<br>In addition, this is one of the crucial existing theories done in the past. | In a dyad year, in the last five years, whether the two countries experienced regime change.<br><br>*If polity score shows more than 3, it reflects quick regime change in recent year. Yes: 1, No: 0*<br><br>The sum of each country's value. | Interval | CIDCM Polity IV Project Variables http//: www.cidcm. umd.edu/ polity/ data |
|---|---|---|---|---|
| 6 | **Regime type I**<br><br>Dyads of same regime (both democracy and autocracy) are likely to be more credible than dyads of mixed regimes (democracy and autocracy and vice versa)<br>Since ideological similarity might trigger countries to build trust. (Crucial existing theories often done in the past). | In a dyad year, in order to judge which type of regime the two countries have,<br><br>*1: both democracy*<br>*0: both autocracy,*<br>*1: both autocracy*<br>*0: both democracy*<br><br>Thus, other cases automatically construct the mixed regime (when there is neither of democracy and autocracy) | Ordinal | Diplomatic Exchange (v2006.1) http://correlates ofwar.org |

| 7 | **Regime type II**<br>According to the Democratic Peace theory, democracies are likely to be more cooperative and credible than other regime. For example, democracies retain more accountability and discretion to fulfill their alliance commitments; However, autocracies depend heavily upon one dictator by his arbitrary decision involving less credibility. Dyads of democracies might trigger more cooperative activities, thus more cooperation increasing power may trigger the increased potential for dyadic power shifts (crucial existing theories often done in the past). | | Interval | CIDCM Polity IV<br>Project Variables<br>http//: www.cidcm. umd.edu/ polity/ data |
|---|---|---|---|---|
| 8 | **National Wealth**<br>Wealthy states are prone to be more integrated into an international system and to require more transnational ties. Thus, wealthy states might engage in more cooperative activities. Another economic index as well as an international trade may be a significant cause to generate a dyadic power shift (crucial existing theories often done in the past). | In a dyad year, per capita income percentage of the U.S.<br>Taking minimum percentage out of the two countries ,thus *Min (country A and country B).* | Interval | PWT 6.2 (Economic data)<br>http://pwt.econ. Upenn,edu/ php_site/ pwt62 |
| 9 | **Shared Great Power Alliance**<br><br>The shared alliance with the superpowers like the U.S. and the Soviet Union is likely to be more credible before the end of the Cold War (crucial existing theories often done in the past). | In a dyad year, taking the influence of the Cold War into consideration, I attempt to exclude post Cold War era.<br>*Whether countries have an alliance with the U.S. or the Soviet Union, Yes: 1 No: 0* | Ordinal | Formal Alliance Data (v3.03)<br>http:// correlatesofwar. org |

| | **Asymmetry of Alliance**<br><br>Asymmetric alliances tend to be more credible than symmetric ones since the former tends to pursue a different interest promoting harmony of interests; conversely the latter is prone to pursue the same interest causing conflict of interest. Asymmetry of alliance might trigger more cooperative activities, thus more cooperation increasing power may trigger the decreased potential for dyadic power shifts (crucial existing theories often done in the past). | In a dyad year, calculating the ratio between the two countries' capabilities index.<br>Country A's capabilities / country B's capabilities<br><br>*Max (A,B) / Min (A,B)* | National Material Capabilities (v3.02) http:// correlatesofwar. org |
|---|---|---|---|
| 10 | | | |
| 11 | **Monadic Power Shift**<br><br>According the existing theories by Morrow and Leeds, a power shift is likely to decline alliance credibility. Countries that experience considerable increase of power tend to claim more their autonomy. Thus, it may cause conflict of interests between the two countries deteriorating alliance credibility. Monadic power shift seems to have a direct impact on a dyadic power shift. | In a dyad year, Selecting maximum value of country A's power shift and country B's power shift, thus<br><br>*Max ($A_{1955}$-$A_{1950,}$ $B_{1955}$-$B_{1950)}$* or<br>*Sum ($A_{1955}$-$A_{1950}$) + Sum ($B_{1955}$-$B_{1950}$)*<br><br>To do so is to measure an absolute change in power. | National Material Capabilities (v3.02) http:// correlatesofwar. org |
| 12 | **Class of Alliance**<br><br>The existing theories stress that class of alliance may be a great contributor to trigger alliance credibility. Defense pacts, non-aggression/neutrality, and entente may reflect strength of alliance commitment. Class of alliance might trigger more cooperative activities, thus more cooperation increasing power may trigger the decreased potential for dyadic power shifts (crucial existing theories often done in the past). | In a dyad year, which category of class of alliance countries belong to.<br><br>*Defense pacts: 3*<br>*Non-aggression / Neutrality: 2*<br>*Entente: 1* | Formal Alliance Data (v3.03) http:// correlatesofwar. org |

# Appendix 5 Robustness Test Added Dependent Variables

| | Main dependent Variable | Alternative variable 1 | Alternative variable 2 | Alternative Variable 3 |
|---|---|---|---|---|
| Independent Variable | New affinities | Age of alliance | Midatop | Future Alliance |
| Dyadic Power Shift | .0305*<br>(.0169) | -4.29***<br>(1.31) | .0158*<br>(.00951) | -1.20***<br>(.279) |
| Dyads of Democracies | -.0725***<br>(.0158) | 9.68***<br>(1.077) | -.00716<br>(.00791) | -1.13**<br>(.389) |
| Dyads of Same Regime | .0454***<br>(.0126) | -1.37<br>(.861) | .0113*<br>(.00651) | .193<br>(.270) |
| Regime Change | -.0603***<br>(.0104) | 2.57***<br>(.791) | .00199<br>(.00517) | -.752***<br>(.223) |
| Dyads of Wealthy States | -.0859**<br>(.0257) | -10.14***<br>(2.19) | -.0296*<br>(.0141) | 2.403**<br>(.979) |
| Shared Great Power Alliance | .0860***<br>(.0130) | .525<br>(.846) | -.0184***<br>(.00566) | 2.67***<br>(.318) |
| Symmetry | .130***<br>(.0153) | 1.82*<br>(1.19) | .0123*<br>(.00923) | .398<br>(.438) |
| Monadic Power Shift | -2.89***<br>(.940) | -321***<br>(82.3) | .261<br>(.372) | 119**<br>(52.9) |
| Class of Alliance | .00384<br>(.00930) | -5.36***<br>(.651) | -.0243***<br>(.00317) | |
| Dyads of Shared Colonizer | .0427**<br>(.0147) | -5.75***<br>(1.023) | -.0154**<br>(.00669) | .730*<br>(.364) |
| Dyads of Diplomatic Exchange | -.00781<br>(.0119) | 6.62***<br>(.9072) | .0317***<br>(.00524) | .883***<br>(.258) |
| International Trade | 4980**<br>(2170) | 828000***<br>(149000) | 353<br>(965) | -195000***<br>(35900) |
| Multilateral Alliance | .209***<br>(.0401) | .168<br>(2.708) | -.0442*<br>(.0275) | -.728<br>(1.066) |
| Constant | .437 | 28.7 | .0828 | 3.59 |
| N | 3474 | 1663 | 3982 | 3034 |

Note: Each cell contains the estimated coefficient with its associated standard error listed in parentheses below.
*** indicates statistical significance at the.001 level. ** indicates statistical significance at the.01 level.
* indicates statistical significance at the.05 level. The significance level is applied to one-tail test.

# Appendix 6 Robustness Test Alliance Type

| Independent Variable | Alliance | Alliance 1 | Alliance 2 | Alliance 3 |
|---|---|---|---|---|
| Dyadic Power Shift | .0305* | .0251* | .0242* | .0305* |
|  | (.0169) | (.0179) | (.0177) | (.0169) |
| Dyads of Democracies | -.0725*** | -.0859*** | -.0708*** | -.0725*** |
|  | (.0158) | (.0119) | (.0162) | (.0158) |
| Dyads of Same Regime | .0454*** | .0584*** | .0436*** | .0454*** |
|  | (.0126) | (.0138) | (.0131) | (.0126) |
| Regime Change | -.0603*** | -.0730*** | -.0653*** | -.0603*** |
|  | (.0104) | (.0114) | (.0107) | (.0104) |
| Dyads of Wealthy States | -.0859** | -.0837*** | -.0887*** | -.0859** |
|  | (.0257) | (.0267) | (.0268) | (.0257) |
| Shared Great Power Alliance | .0860*** | .112*** | .100*** | .0860*** |
|  | (.0130) | (.0148) | (.0135) | (.0130) |
| Symmetry | .130*** | .134*** | .134*** | .130*** |
|  | (.0153) | (.0171) | (.0162) | (.0153) |
| Monadic Power Shift | -2.89*** | -2.013* | -2.29** | -2.89*** |
|  | (.940) | (.966) | (.963) | (.940) |
| Class of Alliance | .00384 |  | -.0505** | .00384 |
|  | (.00930) |  | (.0182) | (.00930) |
| Dyads of Shared Colonizer | .0427** | .0770*** | .0669*** | .0427** |
|  | (.0147) | (.0200) | (.0161) | (.0147) |
| Dyads of Diplomatic Exchange | -.00781 | -.0109 | -.00424 | -.00781 |
|  | (.0119) | (.0128) | (.0123) | (.0119) |
| International Trade | 4980** | 5067** | 5025** | 4980** |
|  | (2170) | (2210) | (2190) | (2170) |
| Multilateral Alliance | .209*** | .251*** | .197*** | .209*** |
|  | (.0401) | (.0510) | (.0459) | (.0401) |
| Constant | .437 | .390 | .501 | .437 |
| N | 3474 | 3044 | 3267 | 3474 |

Note: Each cell contains the estimated coefficient with its associated standard error listed in parentheses below. *** indicates statistical significance at the.001 level. ** indicates statistical significance at the.01 level. * indicates statistical significance at the.05 level. The significance level is applied to one-tail test.

# Appendix 7 Robustness Test Transformation

| Independent Variable | Untransformed | Transformed |
|---|---|---|
| Dyadic Power Shift | .0305* | .0952*** |
| | (.0169) | (.0274) |
| Dyads of Democracies | -.0725*** | -.0782*** |
| | (.0158) | (.0154) |
| Dyads of Same Regime | .0454*** | .0488*** |
| | (.0126) | (.0123) |
| Regime Change | -.0603*** | -.0584*** |
| | (.0104) | (.0105) |
| Dyads of Wealthy States | -.0859** | -.0593** |
| | (.0257) | (.0254) |
| Shared Great Power Alliance | .0860*** | .867*** |
| | (.0130) | (.0122) |
| Symmetry | .130*** | .0877*** |
| | (.0153) | (.0158) |
| Monadic Power Shift | -2.89*** | -.0268*** |
| | (.940) | (.00382) |
| Class of Alliance | .00384 | .00578 |
| | (.00930) | (.00925) |
| Dyads of Shared Colonizer | .0427** | .0312* |
| | (.0147) | (.0148) |
| Dyads of Diplomatic Exchange | -.00781 | .0154 |
| | (.0119) | (.0126) |
| International Trade | 4980** | 39.6*** |
| | (2170) | (7.57) |
| Multilateral Alliance | .209*** | .200*** |
| | (.0401) | (.0402) |
| Constant | .437 | .229 |
| N | 3474 | 3474 |

Note: Each cell contains the estimated coefficient with its associated standard error listed in parentheses below.
*** indicates statistical significance at the.001 level. ** indicates statistical significance at the.01 level.
* indicates statistical significance at the.05 level. The significance level is applied to one-tail test.