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Ki-Tae Park

This document was submitted as a dissertation in June 2010 in partial fulfillment of the requirements of the doctoral degree in public policy analysis at the Pardee RAND Graduate School. The faculty committee that supervised and approved the dissertation consisted of Bruce W. Bennett (Chair), Jefferson Marquis, and Chaibong Hahm.
This dissertation was submitted to the Pardee RAND Graduate School in 2010 in partial fulfillment of the requirements for the degree of Doctor of Philosophy in Policy Analysis.

There has been much research attempting to explain North Korea’s strategic actions and decision-making processes. However, most of these studies were one-time analyses that emphasized direct relationships between North Korea’s current situation and its strategic actions—a type of analysis that precludes understanding systemic and long-lasting causal relations. Furthermore, these studies have primarily employed a rational choice theory-based framework, in particular, Expected utility theory, in which the net expected utility derived from a linear combination of subjective value and the probability of each option is the key determinant in decision-making. As a result, observers have witnessed frequent anomalies in North Korea’s strategic moves (e.g., risky behaviors regardless of its strategic cost-benefit analysis), which cannot be adequately explained by the rational choice model.

To understand these differences between theory and the real world, this research begins with a search for an alternative analytical framework. Prospect theory, which seeks to understand the cognitive decision-making processes of an individual under risk conditions, is presented as an alternative. In prospect theory, the net prospective utility, derived from a non-linear combination of the expected value and probability of each option, is the key determinant in decision-making. In particular, certain aspects of individuals’ cognitive decision-making—loss aversion, the endowment effect, and the framing effect—play a significant role in determining net prospective utility in the cognitive choice model.

Considering the significant explanatory power of expected utility theory which has been established in other interstate conflicts over the last several decades, a robust approach will be to incorporate the two different decision-making models (rational and cognitive choice) into the same analytical framework. This research will thus analyze selected cases with the theoretical arguments of each model, identify the strengths and
weaknesses of each, and determine the conditions under which each model has greater explanatory power.

In order for these two models to be used in a single analytical framework, this dissertation must identify a method for determining which model is most appropriate in a given situation. This research tests hypothesis that asserts that North Korea’s strategic situation or position—identified as the domain of gains or of losses—will determine which decision-making model will be more effective. After testing these hypotheses against a series of North Korea’s strategic moves over the last several decades, this dissertation finds that in the domain of gains, North Korea’s actions are predicted by the rational choice model, and that in the domain of losses, North Korea’s actions are predicted by the cognitive choice model.

Based on these results, this dissertation recommends that the ROK-US combined forces establish a rational deterrence strategy against North Korea when it is in the domain of gains—building credible and capable deterrence means, mainly composed of offensive capabilities, in an attempt to convince Pyongyang that its provocation will surely face catastrophic consequences. Conversely, when North Korea is in the domain of losses or in a desperate situation, this dissertation recommends establishing a cognitive deterrence strategy—constructing coercive means to deny its strategic and military objectives. These means will require a mix of highly reliable and credible defensive (e.g., intelligence systems exploiting the cutting edges of Unmanned Aerial Systems, missile defense systems incorporating all layers of defense, and anti-artillery systems capable of disrupting North Korea’s long-range artillery and MLRS) and offensive (e.g., tactical and strategic air interdiction forces aimed at neutralizing North Korea’s operational and highly-valued targets) capabilities, to make clear to Pyongyang that its military provocations will never succeed.
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ABSTRACT

This dissertation is to analyze North Korea’s Decision-making process regarding its nuclear programs with two choice models—Rational Choice and Cognitive Choice—and suggest effective/adaptive/robust deterrence strategy for the ROK-US combined forces.

Rational Choice Model (RCM), endorsed by expected utility theory, suggests that North Korean leadership should adopt the option maximizing its expected utility in its nuclear confrontations with its “opponents,” while Cognitive Choice Model (CCM), endorsed by prospect theory, anticipates that Pyongyang would adopt the option meeting its reference point, heavily influenced by his domains of actions (either the domain of gains or losses). Sharing the same root and method of calculating utility, they have one explicit difference in weighting probability assigned to each outcome—the RCM weights the value and probability assigned to each outcome in a linear manner, while the CCM does in a non-linear manner depending on the range of probability, thus resulting in different prediction.

According to the “Hypothesis Testing” using North Korea’s four nuclear-related provocations (1st Nuclear Crisis 1993-1994, 2nd Nuclear Crisis 2002-2003, 1st Nuclear Test 10/2006, 2nd Nuclear Test 5/2009), unlike the traditional wisdom, the CCM is more explanatory than the RCM in explaining Pyongyang’s strategic behaviors on its nuclear programs. Based on this testing result, this dissertation suggests coercive strategies (mainly composed of punishment, risk, decapitation and denial strategy) exploiting the unique characteristics of air power as an alternative deterrence strategy to effectively deter North Korea in the future because it is best fitted for influencing the decision-making process of North Korea.
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## ACRONYMS and GLOSSARY

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Definition</th>
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<tbody>
<tr>
<td>ACTD</td>
<td>Advanced Concept Technology Demonstration</td>
</tr>
<tr>
<td>ACTS</td>
<td>Air Corps Tactical School (USAF)</td>
</tr>
<tr>
<td>ADM</td>
<td>Atomic Demolition Munitions (USA)</td>
</tr>
<tr>
<td>AF</td>
<td>Agreed Framework (between the US and DPRK)</td>
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<tr>
<td>CAS</td>
<td>Close Air Support</td>
</tr>
<tr>
<td>CBRNE</td>
<td>Chemical, Biological, Radioactive, Nuclear and high-Explosive</td>
</tr>
<tr>
<td>CEP</td>
<td>Circular Error Probable</td>
</tr>
<tr>
<td>CPV</td>
<td>Chinese People’s Volunteer (Chinese troops involved in the Korean War)</td>
</tr>
<tr>
<td>CCP</td>
<td>Chinese Communist Party</td>
</tr>
<tr>
<td>C3</td>
<td>Command, Control and Communication</td>
</tr>
<tr>
<td>C4ISR</td>
<td>Command, Control, Communication, Computer, Intelligence, Surveillance and Reconnaissance</td>
</tr>
<tr>
<td>CCM</td>
<td>Cognitive Choice Model</td>
</tr>
<tr>
<td>CFC</td>
<td>Combined Forces Command (Korean peninsula)</td>
</tr>
<tr>
<td>CVID</td>
<td>Completely, Verifiably, and Irreversibly Dismantle (North Korea’s Nuclear Programs)</td>
</tr>
<tr>
<td>CRS</td>
<td>Congressional Research Service (USA)</td>
</tr>
<tr>
<td>DPRK</td>
<td>Democratic People’s Republic of Korea</td>
</tr>
<tr>
<td>DMZ</td>
<td>Demilitarized Zone (Korean peninsula)</td>
</tr>
<tr>
<td>FROG</td>
<td>Fire-Rocket Over Ground (North Korea)</td>
</tr>
<tr>
<td>GMTI</td>
<td>Ground Moving Target Indicators</td>
</tr>
<tr>
<td>HEU</td>
<td>Highly Enriched Uranium</td>
</tr>
<tr>
<td>IAEA</td>
<td>International Atomic Energy Agency</td>
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<tr>
<td>ICBM</td>
<td>Intercontinental Ballistic Missile</td>
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<tr>
<td>KCNA</td>
<td>(North) Korea Central News Agency</td>
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<tr>
<td>KEDO</td>
<td>Korea Energy Development Organization</td>
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<tr>
<td>KOTRA</td>
<td>Korea Trade Association (ROK)</td>
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<td>KPA</td>
<td>Korea People’s Army (North Korea)</td>
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<tr>
<td>KWP</td>
<td>Korea Workers Party (North Korea)</td>
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<tr>
<td>MD</td>
<td>Missile Defense</td>
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<tr>
<td>MDL</td>
<td>Military Demarcation Line (Korean peninsula)</td>
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<tr>
<td>Abbreviation</td>
<td>Full Form</td>
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<tr>
<td>MLRS</td>
<td>Multiple Launch Rocket System</td>
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<td>MRBM</td>
<td>Medium Range Ballistic Missile</td>
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<tr>
<td>NATO</td>
<td>North Atlantic Treaty Organization</td>
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<tr>
<td>NDC</td>
<td>National Defense Committee (North Korea)</td>
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<tr>
<td>NBC</td>
<td>Nuclear, Biological, and Chemical</td>
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<tr>
<td>NLL</td>
<td>Northern Limit Line (Korean peninsula)</td>
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<tr>
<td>NPR</td>
<td>Nuclear Posture Review (USA)</td>
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<tr>
<td>NPT</td>
<td>Nuclear Non-Proliferation Treaty</td>
</tr>
<tr>
<td>ODS</td>
<td>Operation Desert Storms (in 1991)</td>
</tr>
<tr>
<td>OIF</td>
<td>Operation Iraqi Freedom (in 2003)</td>
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<tr>
<td>PLA</td>
<td>People’s Liberation Army (Chinese Army)</td>
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<tr>
<td>POL</td>
<td>Petroleum, Oil and Lubricant</td>
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<tr>
<td>PRC</td>
<td>People’s Republic of China</td>
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<tr>
<td>QDR</td>
<td>Quadrennial Defense Review</td>
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<tr>
<td>RCM</td>
<td>Rational Choice Model</td>
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<tr>
<td>ROK</td>
<td>Republic of Korea</td>
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<tr>
<td>ROKAF</td>
<td>Republic of Korea Air Force</td>
</tr>
<tr>
<td>SOF</td>
<td>Special Operation Forces</td>
</tr>
<tr>
<td>SPA</td>
<td>Supreme People’s Assembly (North Korea)</td>
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<tr>
<td>SRBM</td>
<td>Short Range Ballistic Missile</td>
</tr>
<tr>
<td>START</td>
<td>Strategic Arms Reduction Treaty (in 1991 between the US and Russia)</td>
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<tr>
<td>TMD</td>
<td>Theater Missile Defense</td>
</tr>
<tr>
<td>TWEA</td>
<td>Trade With Enemy Act (USA)</td>
</tr>
<tr>
<td>UNSC</td>
<td>United Nation Security Council</td>
</tr>
<tr>
<td>UNC</td>
<td>United Nations Command (Korean peninsula)</td>
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<tr>
<td>USA</td>
<td>The United States America</td>
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<tr>
<td>USAF</td>
<td>United States Air Force</td>
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<tr>
<td>USFK</td>
<td>United States Forces Korea</td>
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<tr>
<td>UAS</td>
<td>Unmanned Aerial System</td>
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<tr>
<td>WMD</td>
<td>Weapons of Massive Destruction</td>
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</table>
“So it is said that if you know your enemies and know yourself, you can win a hundred battles without a single loss. If you only know yourself, but not your opponent, you may win or may lose. If you know neither yourself nor your enemy, you will always endanger yourself.”

Chapter 3 (Attack by Stratagem) in *The Art of War*, Sun Tzu

Northeast Asia Region

Dok-Do

Jin-Do

East Sea (Dong-Hae)
Introduction

Objectives
- Identifying problems in the previous studies on North Korean’s strategic behaviors,
- Searching for an alternative focusing on cognitive characteristics of choice problem,
- Testing hypotheses regarding North Korea’s decision-making processes,
- Suggesting effective/robustadaptive deterrent strategies for the ROK-US

Motivation
The ruling conservative circle in Seoul (as of 2009) claims that “North Korea has exploited the ‘Sunshine Policy’ to obtain the most needed foreign currency while maintaining their strategic goals of developing nuclear weapons and reunifying the Korean peninsula on their terms.”

The progressive circle asserts that “the ‘Sunshine’ policy has led to considerable progress in mitigating military tensions on the Korean peninsula. In order for deterrence strategy to succeed, the ROK-US should induce North Korea to the ‘gain domain’ so that North Korea will become risk-averse to defend their hardly-won gains.”

Research Questions
- Why does North Korea sometimes make risky choices in its competition with much stronger states-the ROK-US combined forces—even though there would only be a slim chance of winning?
- Could prospect theory better explain North Korea’s past behaviors, including its nuclear weapons program, than the rational choice theory?
- What kinds of deterrence strategies would be needed to establish effective, robust, and adaptive deterrence strategy against North Korea armed with nuclear weapons?
Chapter 1: Introduction

“Thus the highest form of generalship is to balk the enemy's plans; the next best is to prevent the junction of the enemy's forces; the next in order is to attack the enemy's army in the field; and the worst policy of all is to besiege walled cities.”

Chapter 3 (Attack by Stratagem) in the Art of War, Sun Tzu

1. Research Motivation and Objectives

Since the end of the Korean War in 1953, the strategic behavior of North Korea (officially the Democratic People’s Republic of Korea or DPRK) has been closely examined by analysts in both South Korea (officially the Republic of Korea or ROK) and the United States (US). Most previous research has used a simple analytical methodology in which direct relationships are identified between North Korea’s current status or strategic positions and its acts. In this approach, which is based on expected utility theory¹, the utility of each choice is calculated as a linear combination of the probability and value assigned to the potential outcomes corresponding to that choice. This approach has been widely used for three main reasons: it is relatively easy to measure the costs and benefits of specific behaviors, it is easy to conceptualize the concepts of gain and loss, and, most importantly, it offers distinct and clear explanations of the relations between independent variables (North Korea’s positions or status) and the dependent variable (North Korea’s acts).

However, this approach assumes that North Korea’s preferences are invariant and transitive, which has made it difficult to understand and predict risky and abrupt changes in its behaviors. Consequently, establishing effective, adaptive, and robust deterrent strategies based on such predictions has been correspondingly difficult. North Korea’s strategic status has significantly shifted since the end of the Cold War, but expected

¹ Expected utility theory was initially introduced by Bernoulli in 1738 and widely used as a foundation in building models regarding a decision-making process under the conditions of risk. It claims that the expected utility, measured by the linear product of the value and probability assigned to each outcome of a certain option, is the key determinant in actors’ choice of options available. To make it simple and rigorous for a variety of occasions, this theory established several axioms to support its key assumption of humans’ rationality, including the transitivity and invariance of individuals’ preference over options. Both axioms require that an individual’s preferences over options be coherent and consistent, regardless of outcomes and contexts, to predict constant patterns of humans’ behaviors.
utility-based approaches do not explicitly account for such long-term and risky/abrupt changes of Pyongyang’s behaviors in its nuclear-related provocations. North Korea’s unique power structure, in which one man wields absolute authority in deciding national affairs, implies that an analytic approach incorporating the cognitive characteristics of an individual’s decision-making process could be useful. Prospect theory\(^2\), which both considers long-term behavioral patterns and puts a special emphasis on the cognitive aspects of decision-making processes under risky conditions, is one such methodology.

Although they have both been seen to be useful in different situations, there has been a lack of meaningful attempts to compare and combine these two prominent decision-making models either generally, or specifically as regards the Korean Peninsula. It is surprising that the two models have not been synthesized, given the fact that both models have a common origin in the work of Bernoulli in 1739. The biggest difference between the two is how they weigh each probability and how they value each outcome. In most cases, proponents of each decision model have tried to identify the anomalies and weaknesses found in the other model. Consequently, there has been a lack of effort to discover the specific conditions in which each model might have relative strengths against the other.

Thus, there exists an unexplored, potentially fruitful opportunity for analysts of North Korea’s strategic decision-making: establish an eclectic model to which both theories contribute, each exerting its strengths in a specific setting. If constructing this combined model proves impossible, a useful alternative could be to identify the conditions under which each model has more explanatory and predictive powers than the other. Therefore, this research has the following objectives:

1) Identify problems in the previous studies of North Korea’s strategic behaviors,

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\(^2\) Prospect theory, first introduced in 1979 by Kahneman and Tversky, has been widely used to explain several anomalies found in expected utility theory (e.g., loss aversion, the endowment effect, the status quo bias, and the framing effect). It asserts that there are some cases in which each probability or value is non-linearly applied to the calculation of the expected utility due to the cognitive characteristics of an individual’s decision making-process mentioned before. Also, it posits that the phenomenon of “preference reversal” may be often observed depending on where an actor is framed on his domain—either domain of gains or losses. As a result, two key axioms for rationality established in expected utility theory—the transitivity and invariance of preferences—is seriously undermined in prospect theory.
2) Search for an alternate framework focusing more on the cognitive characteristics of an individual’s decision-making process,

3) Incorporate these two decision-making models into a single or common analytical framework,

4) Test hypotheses regarding North Korea’s decision-making processes,

5) Suggest effective, robust, and adaptive deterrent strategies for the ROK-US combined forces based on the results of empirical testing.

2. Research Questions

There have been no significant empirical studies for building an effective deterrence strategy based on the actual decision-making processes of the North Korean leadership, particularly in regards to its nuclear proliferation activities. There have been a number of studies that have examined the causes of North Korea’s nuclear ambitions and presented diplomatic options for countering these ambitions. However, most of these studies have focused on the structural determinants of North Korea’s foreign policy decisions—e.g., the international distribution of power on the Korean peninsula, the balance of military power between North and South Korea, and the relationship between international and domestic factors within the North Korean regime (Mack, 1991/1993; Kang, 1994/95; Mazarr, 1995a/1995b). This dissertation refers to this approach as the “structural approach,” because the authors of these studies have concentrated on structural factors in explaining North Korea’s behaviors, just as neo-realists did during the past several decades (Waltz, 1995; Legro & Moravcsik, 1999:13-16).

The structural approach, however, is not very powerful in explaining North Korea’s strategic actions because most of its past behaviors have not been consistent with the logic of rational choice theory, upon which the structural studies rely. According to rational choice theory, a maximal net expected utility is the only determinant for an actor to act, and the value of each option is generally assumed to be fixed over time. However, North Korea has repeatedly behaved in ways that contradict this logic. They have sometimes taken the risk of confronting a strong opponent, even though the cost of confrontation far outweighed the benefit of cooperation in terms of expected value. Additionally, North Korea has sometimes changed its foreign policy from confrontation
to engagement, or vice versa, depending on changes of US policy. The structural approach, which is based on rational choice theory, cannot explain the variations in North Korea’s diplomatic and military behaviors.

Therefore, in order to better understand asymmetric conflicts between weak and strong states and the variations of North Korea’s foreign policy, this dissertation needs a new approach to answering the following question: *Why does North Korea sometimes make risky choices in its competition with much stronger states, namely, the ROK-US combined forces, even though there is only a slim chance of winning?*

Fortunately, prospect theory has been widely employed in studies of international conflicts to explain the irrational behaviors of individual decision makers. First introduced to the field of economic psychology by Daniel Kahneman and Amos Tversky in 1979, prospect theory represents a new approach to explaining the behaviors of actors in the asymmetric conflicts that have emerged since the end of the Cold War. In particular, it has helped to explain why a national leader may initiate a war, which is one of the most risky strategies available and often contradicts rational analysis. Prospect theory is interested in the cognitive characteristics of individual decision makers—how they are influenced by, for example, *loss aversion, status quo bias* and *framing effects*.

Individual decision makers tend to overvalue the negative utility of losses relative to the positive utility of equivalent gains (*loss aversion*). As a result, they are liable to invest more effort in defending their current assets rather than obtaining additional gains (*status quo bias*). This induces a unique cognitive pattern, where actors treat potential losses and gains in different ways. The *framing effect* implies that an individual decision maker is likely to be very risk-acceptant when faced with potential losses (choices are framed in the “domain of losses”), in order to avoid additional loss and recoup their sunk costs. Conversely, they are likely to be risk-averse when faced with potential gains (choices are framed in the “domain of gains”) to defend their current assets (Jervis, 1989/1991; Levy, 1994b). With this different approach that has been shown to explain irrational behavior of individual decision makers, this dissertation asks: *Could prospect theory better explain North Korea’s past behaviors, including its nuclear weapons program, than the rational choice theory?*
Currently, there are disputes among scholars and policy makers about which approach—rational choice theory or prospect theory—is better at explaining North Korea’s foreign policy, in terms of its nuclear proliferation behaviors and establishing countermeasures both in the ROK and the US. Adopting a rationalist stance, for instance, the current ruling conservative circle in South Korea (as of 2009) has criticized the “Sunshine” policy of the previous progressive government as appeasement because there has not been any reduction in the level of threats from North Korea. They even claim that “North Korea has exploited this policy to obtain the most needed foreign currency while maintaining their strategic goals of developing nuclear weapons and reunifying the Korean peninsula on their terms.”

Some of this rationalist school suggests that a “tit-for-tat” strategy, a common rational deterrence strategy, would be one of the most effective options because it requires explicit and thorough verification of North Korea’s implementation of its obligations (Spector & Smith, 1991; Mack, 1993; Bracken, 1993:1420; Downs, 1999:280-281).

On the other hand, the progressive circle in South Korea has taken a different approach, asserting that the “Sunshine” policy has led to considerable progress in mitigating military tensions on the Korean peninsula. They assert that the ROK needs to implement a different approach in dealing with North Korea because North Korea has a different power structure from other ‘normal’ countries and is now in the “loss domain.” In order for a deterrence strategy to succeed, ROK and the US should bring North Korea to the “gain domain” so that North Korea will become risk-averse toward defending their hard-won gains (Sigal, 1998/2000/2002; Cumings, 1997/2004; Harrison, 1994/2002; Oberdorfer, 2001a/2001b). As a result, they warn that “if current hostile policies toward North Korea by the current conservative ruling party in Seoul continue, all achievements made for the last ten years would vanish and this outcome would be very harmful in both mitigating military tensions between two Koreas and revitalizing its ailing economy.”

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Incorporating previous two decision-making models and current debates on deterrence strategies against North Korea, particularly its nuclear proliferation behaviors, this dissertation will try to address the following research questions to meet the research objectives mentioned previously:

1) What are the models’ key arguments in analyzing North Korea’s decision-making processes?
2) Which model best explains North Korea’s decision making process, depending on North Korea’s specific strategic status?
3) Under which specific conditions does one model outperform the other?
4) Which strategies have the ROK and US used in countering North Korea, and how effective have those strategies been?
5) What kinds of military and diplomatic measures should be established by the ROK and US to more effectively counter North Korea’s behavior in the future?

3. Outline

Chapter 2 reviews existing scholarship on North Korea’s decision-making process. After first elucidating several decision models, it applies these models to previous studies of North Korea’s decision-making processes, determines what, if any, connections exist between the models, and assesses the explanatory power of each model.

Chapter 3 will first describe in detail two decision models—the rational choice model, which is based on rational choice theory, and the cognitive choice model, which is based on prospect theory. Then, hypotheses regarding North Korea’s decision-making process will be presented. Finally, a case study procedure for testing these hypotheses will be suggested.

Chapter 4 then tests these hypotheses across a series of four selected cases: the first (1993-1994) and second (2002-2003) nuclear crises, and the first (2006) and second (2009) nuclear tests. Cases have been selected because each one is visible enough to elicit the key variables needed as inputs for each decision model. North Korea’s diplomatic and military action in each case is first recounted in detail, and is then analyzed from the perspective of each model. In particular, the influence of North Korea’s strategic
domain—that of gains or losses—will be seen in its decision-making processes. In addition, this dissertation conducts two-phase analyses in each case study to strengthen analytical power: the first qualitative analysis is used to obtain North Korea’s decision environment or “contexts,” while the second quasi-empirical analysis is employed in an effort to augment empirical power for this dissertation by calculating the numeric value of expected utility in each outcome using mathematic equations that reflect two choice models.

Chapter 5 begins to apply the case study results to the present day situation. First, the lessons learned from each case about the appropriateness of each decision model for understanding and predicting North Korea’s behavior are briefly summed up. Second, North Korea’s current domain and strategic assets, particularly its asymmetric strengths including weapons of mass destruction (WMD), are examined. Finally, a detailed assessment of the coercive deterrence options available to the ROK and US is presented.

Chapter 6 will integrate the entire study by recommending specific strategies for the ROK-US forces to employ in order to effectively counter North Korea’s nuclear threats.
Previous Studies on North Korea’s Decision-Making Process on its Nuclear Programs

Studies for analyzing leadership characters
- Focused on the impact of *Kim il-Sung* and *Kim Jong-Il’s* leadership style and personality on Pyongyang’s decision-making process

Studies for analyzing political structure of North Korea
- Focused on the interrelations among Pyongyang’s three power structures (Party, Cabinet, and Military) in producing a policy decision

Studies exploring the influence of external factors
- Focused on the impact of external powers on Pyongyang’s decision-making process

Request for a new alternative
- Focused on individual’s decision-making process using two choice models
- Rational Choice and Cognitive Choice Models
Chapter 2: Literature Review

“He wins his battles by making no mistakes. Making no mistakes is what establishes the certainty of victory, for it means conquering an enemy that is already defeated.”

Chapter 4 (Tactical Disposition) in the Art of War, Sun Tzu

This chapter reviews the existing scholarship on North Korea’s decision-making process, and discusses criteria for selecting an appropriate decision model. First, three decision-making models are reviewed: the Expected Utility Model, the Group Decision Making Model, and the cognitive choice model. Second, three types of studies looking at North Korea’s decision-making are summarized, each type with a different emphasis: leadership characteristics, political structure, or external influences. Finally, considerations for selecting the most useful decision-making model are discussed.

Established decision-making models typically seek to use systemic changes in the international system to explain a state’s internal decision making process. Accordingly, the main approach taken by previous studies of North Korea’s decision making has been to connect the international context to internal strategic choices. They first try to identify the impact of the power distribution on the Korean peninsula on North Korea’s internal decision-making process, then determine the interactions between internal and external factors, and finally suggest recommendations and policies for the ROK and the US based on these analyses. However, too much focus has been paid to the simple correlations between the DPRK’s strategic positions and actual behaviors and to the individual leadership styles of Kim Il-Sung and Kim Jong-II. Consequently, it has been difficult to develop a general decision making-process supported by theories and models during the last several decades.

Given North Korea’s unique government (e.g., an absolute dictatorship), one should analyze its decision-making process differently from those of other countries. Existing analyses have sometimes been successful in eliciting short-term predictions about North Korea’s potential behaviors. However, these efforts have failed to explain North Korea’s long-term behavior, because they focus too much on specific events occurring in a short period of time. As a result, the predictive power of these existing
methods is minimal when applied in a prospective manner. This gap in the theoretical literature thus provides the motivation to search for an alternative analytical framework to analyze the DPRK’s decision-making process.

In an effort to search for a new framework, this dissertation will first evaluate the relative strengths and weaknesses of three decision-making models. Next, this dissertation will examine three types of research approaches that have been applied specifically to Pyongyang’s decision-making process, and assess whether they are consistent with the logic of each decision model. Before proposing an alternative theoretical framework, this dissertation will also examine the degree to which these existing models accurately predict North Korean behavior.

1. Decision Making Models

The first decision making model, expected utility one, was introduced in 1738 by Bernoulli. The majority of models in use are some variant of expected utility, and across all of these different types, one assumption—rational choice—remains unchanged: a human being is a rational actor, which implies that he or she will choose the option that maximizes expected utility, given the constraints of the situation (Shoemaker, 1982; Quattrone & Tversky, 1988:719-720). This theory of rational choice has dominated all academic fields, especially in economics and political science, because of its simplicity and rigor in explaining various social phenomena and predicting the potential behaviors of human beings. Several variants, differing in their interpretation and valuation of model variables, have developed since Bernoulli’s original model, but both the rational choice assumption and mathematical framework for calculating utility have remained constant. The expected utility model, followed by the group decision making model and then the cognitive choice model, will now be discussed in more detail.

Expected Utility Model

The expected utility model remains the most prominent model, and has become one of the key foundations of microeconomics. It assumes that individuals make rational decisions to maximize/optimize gains within a set of given constraints. Also, this theory assumes that a rational actor has unlimited capabilities to gather all kinds of alternative
options, estimate the outcomes of those options, assess the preferences of other actors and their response to his decisions, and finally calculate the expected utility by combining the expected value and probability assigned to each outcome (Levy, 1988:485-486; Zagare, 1990: 239; Quackenbush, 2004:94-96). To enable this analytic simplicity and parsimony, the expected utility model requires several assumptions regarding individual preferences: the transitivity, completeness, dominance, and elimination of an individual preference over options5 (Shoemaker, 1982: 541-543; Tversky & Kahneman, 1986:252-254).

For its application to the practical analysis of a decision making process, the expected utility model needs to take several variables as inputs:

1) the options the decision-maker has to choose from in the real-world situation,
2) the value subjectively assigned to each outcome of a certain option,
3) the probability subjectively assigned to each outcome of a certain option,
4) and the base-line value or decision-maker’s perception on the status quo, where there are several options available to a decision-maker, each option could produce several outcomes, and the summation of each probability assigned to all outcomes of a certain option is equal to 1.0 in a specific choice problem. The base-line value would be used as a reference point to compare each option. Even though objective values can be assigned to variables in certain cases, the majority of values are assigned subjectively. Typically, the individual decision-maker is the only actor able to decide the values for each variable, and thus subjective valuations are the most common type.

Given the key assumptions mentioned above, the decision rule for the expected utility model is as follows: Expected utility (value) of a certain option or strategy (j):

\[
E (U/V)_j = f(p_1)u(B_1 - C_1) + \ldots + f(p_n)u(B_n - C_n) = \sum_{i=1}^{n} f(p_i)u(B_i - C_i),
\]

where \( p_i \) denotes the subjective probability assigned to a specific outcome (\( 1.0 = p_1 + p_2 + \ldots + p_n \)), \( B_i \) denotes the subjective benefit assigned to a specific outcome, and \( C_i \) denotes the subjective cost assigned to a specific outcome in this option (j).6 The actor will

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5 These assumptions will be discussed in much greater detail in the next chapter.
6 In a certain choice problem, an individual actor has several strategies and then each strategy (j) would yield several outcomes or consequences (i). In its 2009 nuclear provocation, for instance, North Korea might have had several options (j): maintaining Status Quo, engaging international communities more aggressively, stepping up tensions by testing its nuclear device, etc... By conducting its second nuclear test, Pyongyang might have had several positive and negative outcomes (i): proving its nuclear capability,
choose the option that will maximize his expected utility out of options available, each of which should have a higher value than the base-line value. In this process of deciding his option, the **key determinant is the relative size of each expected utility** if there are at least two options he could choose. For instance, a certain option could produce a negative expected value. Yet this option could be selected as his choice unless any other choices could yield higher value than this in terms of numeric value. In a case where all options produce positive values, the same rule would be also applied. In sum, the option that could guarantee the highest expected utility or the least negative expected utility, out of several options, would be selected as his choice if he is a rational actor (Boardman & Greenberg, 2006:27-46).

**Group Decision-Making Model**

Because the majority of important foreign policy decisions are decided by a group of elites, studies for analyzing group decision-making processes began to appear in the early 1960s. Initially, it was assumed that because each group is comprised of rational individuals, a group would make similar decisions as an individual. In addition, some analysts estimated that an elite group would make even more rational and efficient decisions than an individual because of the additive benefits of having more than one rational individual involved. Specific advantages of a group decision-making process include: pooling of resources, specialization of labor, a greater variety of opinions, and greater acceptance of the decision (Greenberg & Baron, 1997). For more complex situations, some scholars claim that group decision making is better than individual decision making because the information processing and calculation requirements exceed the capacity of an individual.

However, in contrast to the predicted advantages of group decision making processes, analysts have identified through several empirical experiments a variety of anomalies, which represent a significant departure from the rationality of humans in real-world situations. According to some researchers, a variety of disadvantages and
inefficiencies appear to exist in a group decision making process due to the unique nature of group settings—the existence of a group leader, the consensus-emphasizing environment, and the difficulty of imposing responsibility on an individual for a certain decision. Other disadvantages to group decision making include: time wasted, diverted and interrupted decision processes, group conflicts, intimidation by group leaders and negative leader behavior (Greenberg & Baron, 1997; Forsyth, 1999).

In response to these drawbacks, three broad types of research have been introduced to address systemic problems imbedded in group decision making processes. One line of research claims that cognitive biases may be accentuated in a group setting. For example, there are tendencies to discuss common information, to focus on colorful and interesting information, and to escalate commitment under a group setting because there is stronger pressure for a quick decision (Kahneman & Tversky, 1984; Whyte, 1993; Staw & Ross, 1993). Another field of research examines group polarization. In group polarization, there is a strong tendency to take more extreme decisions—called the “risky-shift phenomenon”—because each individual’s responsibility for and obligation to his or her decision is reduced in a group setting. The third line of research considers “group-think,” which is one of the most frequently studied and cited examples of the imperfection of groups to serve as decision makers. Janis defines the ‘group-think’ as follows: “a mode of thinking that people engage in when they are deeply involved in a cohesive in-group, when the members’ strivings for unanimity override their motivation to realistically appraise course of action.” (Janis, 1972:72)

Because nations’ foreign policy decision-making processes involve a small number of key elites, inevitably involving group decision-making environment, new models were formulated in order to account for these drawbacks. Based on the evidence that the key arguments of the rational choice model are seriously undermined in a group decision making environment, two new models—the organizational decision and

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7 Janis suggested eight symptoms of “group-think” in his book: 1) an illusion of invulnerability, 2) collective rationalization in order to discount warnings, 3) an unquestioned belief in the group’s inherent morality, 4) stereotyped views of enemy leaders, 5) direct pressure on a member who expresses arguments counter to the group’s prevailing view, 6) self-censorship of deviations from apparent group consensus, 7) share illusions of unanimity and 8) emergence of self-appointed “mind-guards” — members who protect the group from information that might disrupt the group’s complacency about the morality and effectiveness of its decision. Irving Janis, *Victims of groupthink: a psychological study of foreign-policy decisions and fiascoes*, (Boston: Houghton, Mifflin, 1972).
bureaucratic decision models—were introduced in the early 1970s. Essentially, both models claim that constraints can prevent a rational actor from reaching a rational decision through a group decision-making process.

In the organizational and bureaucratic decision models, each organization in a certain government is assumed to have a unique interest in expanding its influence and in acquiring more financial support. To achieve these objectives and goals, organizations appear to have different standards of rationality than those established by rational choice theory. Organizations can manipulate the value and probability assigned to each option, restrict their options, and put pressure on individuals in its organization to follow a consensus. Under these circumstances, the principle of “procedural rationality,”8 which is assumed to be true in rational choice theory, can be heavily undermined. Instead, “bounded rationality,”9 in which several practical constraints in the real world play a significant role, has become a key assumption of these group decision models. Bounded rationality acknowledges that a human being has a limited capability to conduct overwhelmingly complex processes during decision making. Faced with these constraints, organizations establish “bounded” decision procedures that maximize its group interests—a strong departure from the substantial instrumental rationality (Zagare, 1990:239-243).

These group decision making models distinctly differ from the expected utility model in terms of their requirements for objectivity. In the expected utility model, the key variables, such as the value and probability assigned to each outcome, are generally believed to be formulated in an objective way, independent of psychological aspects. Of course, personal perceptions could be added to the calculation of value and probability,

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8 The rationality of humans is one of the most important assumptions in the rational choice theory. Depending on the level of consideration of human capacity, it is divided into three different types: the procedural, instrumental, and bounded rationality. The procedural rationality assumes that humans have omnipotent ability in gathering information, establishing well-defined preferences over options, identifying other actors’ preferences and reactions, and calculating the expected utility of a certain option using all factors mentioned. Based on this assumption, humans make a decision just as they procedurally act in their daily life. In contrast, the instrumental rationality put an emphasis on the behavior in which humans instrumentally choose an option based on predetermined preference ranking over options. Herbert A. Simon, “From Substantive to Procedural Rationality,” in S.J. Latis, ed., Method and Appraisal in Economics, (Cambridge: Cambridge University Press, 1976).

9 Of three different types of rationality, the bounded rationality assumes that humans have limited capacity in calculating all elements, and their decisions are heavily influenced by non-rational factors, such as emotional and psychological aspects. Also, these factors become increasingly large when humans are under a group decision setting.
but the process of calculating these values could be assumed to be conducted in an objective manner. In contrast, some cognitive aspects in the group setting—the propensity toward risky choices and the pressure of a group leader—can have significant effects in the organizational and bureaucratic models.

**Cognitive Choice Model**

The cognitive choice model is based on the key assumptions and arguments of prospect theory. Since it emphasizes the cognitive patterns of human decision-making processes, this dissertation defines it as a cognitive decision model. The subsequent chapter will treat the cognitive choice model in much greater detail, but this dissertation presents it briefly here. Prospect theory is a variant of expected utility theory, with two important differences: the weighting of probability and the reversal of preferences depending on actors’ strategic positions.

As in the rational choice model, the value and probability assigned to each outcome are key variables to be identified before calculating the expected utility of each option in the cognitive choice model. In the process of specifying value and weighting probability, however, the cognitive characteristics of humans (e.g., the status quo bias, endowment effect, loss aversion, framing effect and risk-dependent choice) are seriously taken into account (Tversky & Kahneman, 1986; Quattrone & Tversky, 1988; Currim & Sarin, 1989; Levy, 1997).

Depending on one’s strategic position (e.g., either within the domain of gains or the domain of losses)\(^\text{10}\), an actor’s preference for a certain option can change dramatically, even though the expected outcome is not changed and sometime suggests adopting another one. For example, if an actor is in the domain of losses, he is likely to choose a risky option with a lower expected utility if it is able to give him a small chance of returning to the acceptable status quo. Of course, taking a risky option may result in more...

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\(^{10}\) This dissertation conceptualizes “the domain of gains and losses” as “subjectively perceived status of individual (regime) himself relative to the status quo.” If an individual perceives he is in the domain of gains, the current status quo is acceptable to him. In contrast, he is in the domain of losses if the status quo is unacceptable to him. Based on this conceptualization, North Korea’s domain of action is interpreted as perception on its strategic status (mainly influenced by Pyongyang’s domestic, external, and South Korean factors) relative to its “opponents.”
catastrophic damages than taking the safer choice with a higher expected utility, such as accepting a concession. If an actor is rational, they will choose the option that maximizes expected utility. The risky behavior possible under the cognitive choice model represents significant violations of the procedural and instrumental rationality assumptions of the rational choice model. However, these irrational behaviors have been well observed in a variety of individual decision-making environments--buying insurance plans, gambling in a casino, and risky military involvement decisions by national leaders (Levy, 1992; Levy, 1996; Berejikian, 2002a).

The key problem regarding prospect theory concerns its generality: whether this theory can be applied to the group decision-making environments in which most foreign policies are decided. As mentioned before, this theory concentrates on the individual perception of the value and probability assigned to each option. Is there any problem in expanding this theory to a group decision making situation? The constraints of a group setting, mentioned in the previous section, must be considered: the tendency to take more risky choices, the existence of a leader’s pressure on individuals, and the pressure to follow group consensus (Levy, 1992/1997).

However, when considering past examples of dictatorial regimes like North Korea’s, the influence of a charismatic leader seems to have been enormous in foreign affairs decisions (e.g., Adolf Hitler, Joseph Stalin, and Saddam Hussein). Even though there were nominal group decision making-processes under these dictatorships, leaders’ perceptions about a certain issue and cognitive patterns would have been the most important factors leading to the ultimate decision (Gregory & Harrison, 2005). Because of North Korea’s similarities to these examples in terms of foreign policy decision-making, the cognitive choice model could provide a very useful approach for analyzing its decision making processes. None of the rational choice models can explain the DPRK’s current behavior of aggressively taking risky strategies regarding its nuclear standoff with neighboring countries. Therefore, the cognitive choice model’s greater emphasis on the cognitive patterns of the dictator’s decision-making process is likely to be more useful.
2. Previous studies on North Korea’s decision-making process

Previous research regarding North Korea’s decision making process can be classified into three broad categories: (1) analyses into the unique personalities of North Korean leaders—Kim Il-Sung and Kim Jong-Il; (2) analyses of the interactions among North Korean political entities—Party, Cabinet and Military; and (3) analyses that explore the influence of external factors surrounding North Korea. The following section summarizes the most relevant literature in each of these three categories.

Studies analyzing leaders’ personalities

Until the end of the Cold War, most research on North Korea’s decision-making process analyzed the leadership styles and personalities of its two leaders—Kim Il-Sung and Kim Jong-Il—to explain North Korea’s strategic moves and predict potential actions. These studies tried to first identify unique leadership characteristics and then examine the impact of those leadership styles on its decision-making process. According to those studies, the leadership style of Kim Il-Sung was so charismatic and powerful that nobody inside the DPRK’s political structure could resist him. Under these circumstances, the decision making-process inside North Korea was assumed to be identical to the individual decision-making process of Kim Il-Sung himself. These studies argue that his desire for seeking absolute power led North Korea’s decision-making to be so hostile and nonnegotiable that far more military provocations were observed during his rein than in the period after he died in 1994. In addition, the studies argue that Kim Il-Sung intentionally used belligerent and hostile leadership styles to convince his opponents, including South Korean leaders, that he is so risk-acceptant that he would never give up in any military confrontation (Seo, 1989; Sin, 1996; Lee, 1997).

Analyses of Kim Jong-Il’s leadership style are quite different from those of Kim Il-Sung, and mainly focus on enigmatic charisma and Confucian fatherhood. Also, more focus was placed on his personal characteristics of unpredictability and brutality (Go, 1993; Lee, 1995; Jeon, 1995; Hwang, 1999). All these elements of his personality were used as key evidence to claim that North Korea’s decision-making process has always sought confrontation over negotiation, and never provided concessions, regardless of its strategic conditions. Since its South Korean secession policy has changed periodically,
however, this argument does not appear to have much reliable explanatory power over time. For instance, Pyongyang provided a significant concession to the US in the 1994 ‘Geneva Agreement’ by agreeing to freeze its ambitious nuclear programs and put them under a strict international monitoring regime in return for economic and security assurances from the international community.

These personality-based approaches have not provided a theoretical foundation for a long-term analysis of North Korea’s decision-making process, because research focused on personal characteristics is more appropriate for the analysis of short-term action-reaction exchanges between rivals. Additionally, it is likely that researchers’ personal biases might have influenced these analyses due both to their propensity towards certain policies, as well as the fact that personal judgment and experience are strong factors in a research analyzing individuals’ characters. These hidden factors have been a strong barrier to the objective and empirical analysis of North Korea’s decision-making process. Therefore, there is a strong need to search for an alternative analytical foundation to objectively analyze North Korea’s decision-making process in the long-term manner.

**Studies analyzing the political structure of North Korea**

Shortly after Kim Il-Song’s death in 1994, a fundamental change in research on North Korea’s decision-making process occurred, shifting from a focus on leadership style to a focus on political structure and interactions among political entities in North Korea. Even though some studies had addressed the impact of the political structure in the North Korean regime on its decision-making process during Kim Il-Song’s era, they are limited in their ability to extract any meaningful implications, given Kim’s absolute power. North Korea’s political structure—composed of the Party (North Korea’s Workers’ Party), Cabinet (government) and Military (Korean People’s Liberation Army)—was purely nominal, and under Kim’s complete control (Baek, 2002). Since this structure could be considered one of the tools for implementing Kim’s directives effectively, studying power dynamics among those institutions seemed irrelevant to the analysis of North Korea’s decision-making process during his rein on Pyongyang. Kim’s
death, however, has had significant implications on the direction and manner of North Korea’s decision-making process (Jang, 2001; Heo, 2000).

Faced with significant leadership challenges due to unprecedented economic hardship in the early 1990s and a relative lack of charisma compared to his father, Kim Jong-Il took an extraordinary measure to stabilize political crises and slowly solidify his power base by implementing “Military First Politics.” Under this unique political initiative, Kim Jong-Il has provided much of the country’s resources to the military, and it has become a key player in deciding all important national affairs since the death of Kim Il-Sung. Even though he had secured practical political power in the North Korean regime since the early 1990s, Kim Jong-Il has still not ascended to the country’s highest post—the head of North Korea, a post his father had occupied for the last five decades. Instead, he has taken the following posts in a gradual manner in order to strengthen his power base: Supreme Commander of North Korean People’s Liberation Army (PLA) in 1993, Chairman of the National Defense Commission in 1994, and General Secretary of North Korea’s Workers Party in 1998. Therefore, studies have more frequently focused on the interactions among key political entities in North Korea and their impact on its foreign policy decisions, particularly in regards to its nuclear weapons program (Baek, 2003; Kim, 2001; Park, 2001).

According to these studies, North Korea’s military has wielded absolute power in decision-making processes for key national issues because Kim Jong-Il relies completely on the military for regime survival. Correspondingly, the other two components of North Korea’s political structure—the Party and Cabinet—have been losing control over the decision-making process for the past decade (Im, 2001; Yu, 2000). Compared to Kim Il-Song’s era, this phenomenon suggests a significant change in North Korea’s political structure. During the past five decades of Kim Il-Song’s reign, the North Korean Workers’ Party was a key player in controlling North Korean society. Given the strong philosophical principle that the peoples’ army should provide the key means to realize communist revolution around the world, the military was under complete control of the Workers’ Party during the Kim Il-Sung era. Even in the smallest military units, such as the platoon level, political officers dispatched from the workers’ party supervised and monitored military officers.
When confronted with the serious regime crisis after Kim Il-Song’s death, however, this political structure was forced to change in order for the DPRK regime to survive. Considering North Korea’s unique geopolitical location of being surrounded by large powers, and its regime type of an absolute dictatorship, strong military control seemed to be the only solution for avoiding dissolution of its controlled society. Consequently, these studies argue, North Korea’s decision making process has been prone to yielding high-risk choices and revisionist policies, in order to internally solidify its regime and externally demonstrate its hostility as a deterrent, regardless of its strategic positions (Yu, 2000:43-45; Im, 2001: 112-114). But, these studies have ignored the influence of external factors: North Korea’s deteriorating economic performance, its deepening international isolation, the widening gap in conventional military capabilities between it and South Korea, and South Korea’s growing diplomatic and economic status at the global level.

**Studies exploring the influence of external factors**

Studies regarding the external factors surrounding North Korea have become more prevalent since the mid-1990s, when the DPRK began engaging with Western countries, including the United States, to avoid international isolation and acquire the aid needed to survive. Most of these studies have focused on relations between North Korea and the United States and the US’ influence over North Korea’s decision-making process regarding its nuclear weapons program, although the influence of China and South Korea are also being considered with greater frequency. After the end of the Cold War, the non-proliferation of weapons of mass destruction has been a key national interest for the US, and developing WMD has been the key negotiating card and final deterrent on the part of North Korea. Under this strategic political environment on the Korean peninsula, negotiations between the US and the DPRK ensued and continue to date (Kim, 1995; Park, 1997)

According to these studies, North Korea’s decision making process seems to have been influenced by the changes of US policy toward North Korea. On the Korean Peninsula, the US has been a key player for both South and North Korea’s decision making process regarding foreign policy since the liberation of Korea in 1945. The
United States’ strong military alliance with South Korea, its strong influence over the international consortium for providing economic aid to North Korea, and its influence over neighboring countries—China, Japan and Russia—have been a practical reality North Korea has had to consider in its foreign policy decision-making process for the last five decades. As a result, most of these studies conclude that North Korea has taken hostile actions against harsh US policies, while it has taken cooperative actions in response to friendly or engagement US polices in an effort to maintain the survival of its regime (Martin, 2002; Kang, 1994/95; Sigal, 2002).

In addition, some studies claim that the influence of China over North Korea’s decision-making process has been increasing given North Korea’s heavy reliance on China for its strategic materials, including oil and food, since the collapse of the Soviet Union. According to these studies, China’s influence seems to be growing because of its strategic proximity with North Korea and its willingness to exploit North Korea’s nuclear programs in forestalling US military strategy in this region by exhausting much of its resources in tackling Pyongyang’s nuclear provocations (Scobell, 2004; Liu, 2003). Despite the lack of influence over North Korea’s decision-making process relative to other superpowers, South Korea’s politics have become a more significant element in North Korea’s decision-making process ever since the ROK President Kim Dae-Jung initiated engagement efforts known as the “Sunshine Policy.” Some scholars argue that inter-Korean economic cooperation during President Kim’s tenure has provided North Korea with the valuable foreign currency desperately needed to survive. As a result, the DPRK’s dependency on South Korean capital has provided South Korea with some leverage for restricting North Korean behavior (Kim, 2002).

All these studies have largely focused on external factors assumed to be influencing North Korea’s decision-making process, and focused less on North Korea’s

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11 President Kim Dae-Jung, Republic of Korea, suggested three principles in implementing his administration’s North Korean policy at his inauguration ceremony in February 1998: “1) South Korea will not tolerate military provocations from the North; 2) South Korea does not have any intention to harm and absorb North Korea; and 3) South Korea will initiate its North Korean policy from the places where cooperation and reconciliation between the South and North is available right now and expand to all areas once confidence is built.” Under these principles, his government set aside the principles of “reciprocity and transparency” from then conservative circles in Seoul, but rather endorsed increasing cooperation and reconciliation gradually and then expanding to all areas, as advocated by the “functional integration theory” widely used in Western Europe during the 1970s-1980s. See details at Kim Dae-Jung Cyber-Hall, http://www.kdjhall.org/board/index.html?id=kdj02&no=108.
internal factors, such as the influence of the military/party/cabinet and Kim Jong-Il’s personal perception on its status quo. Considering the status of North Korea in the international distribution of power, North Korea’s internal factors could be a subsidiary element in its decision-making process, as neo-realists have argued for the last several decades (Kang, 1994/95; Mazarr, 1995a/95b; Walts, 1995; Lego & Moravcsick, 1999). Reflecting North Korea’s unique political structure, however, this grand theory of power distribution or the theory of “balance of power” needs to be reinforced with another analytical foundation.

Considering North Korean behavior in the past two decades with regards to its nuclear weapons program, its choices—very often confronting with the only international ‘hegemonic power,’ the United States—have departed significantly from the actions predicted by structural realism (e.g., joining the international system in an attempt to obtain security and economic assurance provided by hegemonic powers by abandoning its nationalistic adventurism), which was a grand paradigm for understanding the international politics during the Cold War. For instance, North Korea has periodically resisted international pressure and even escalated its hostility despite its weakness and vulnerability to external factors—a behavior not well explained by the tenets of structural realism. As a result, there is a strong need for an alternative model in which all imaginable elements, including both internal and external factors, are combined to better explain North Korea’s decision-making processes.

3. Selecting alternative models

Having reviewed three decision-making models and three types of studies examining North Korea’s decision-making process, this dissertation will now consider how best to use this research to understand and predict North Korea’s future actions. The expected utility model supported by rational choice theory has been a key analytic foundation for the analysis of the decision making process of both individual actors and groups of individual actors at the global level. Although several anomalies inconsistent with the key principles of the rational choice theory have been observed in real-world
situations, this primary model has contributed significantly to expanding scientific research methods into a variety of academic fields since the end of the World War II.

Unfortunately, rational choice theory has not often been employed in the analysis of North Korea’s decision making processes to date. Key concepts and assumptions of rational choice theory should have been included in the previous analyses, for example, that North Korea is a rational actor pursuing utility maximization, and North Korea employs instrumental or procedural rationality in its decision making processes (e.g., 1. define problems, 2. consider alternatives, 3. set up decision criteria, 4. choose an option maximizing its expected utility and 5. implement its option). By concentrating too much on North Korea’s unique political structure and ‘so weird and despotic’ leadership characteristics, however, previous studies omitted these principles and tended to emphasize personal biases in their study.

To avoid those biases and seek consistent patterns in the analysis of North Korea’s decision-making processes, an eclectic approach, composed of the appropriate components of all decision models and previous studies, could be useful. The North Korean regime has had two distinct characteristics: absolute dictatorship and strong militarism. Considering the nature of these characteristics, one could suggest a cognitive decision making process as an alternative, in which the individual propensities of avoiding losses and pursuing risks to recoup sunken costs are emphasized.

Given the assumption that North Korea is a rational actor worrying about its survival and seeking utility maximization (expanding its power), the rational choice theory could also be employed in analyzing North Korea’s decision making process alongside prospect theory. As a result, such an approach could provide practical explanatory power in analyzing North Korea’s decision making processes by employing two decision-making models—the rational choice model and cognitive choice model—and identifying the key conditions under which each decision model is more appropriate than the other.
Models for Analyzing North Korea’s Decision-Making process on its Nuclear Weapons Program

Rational Choice Model
- Endorsed by expected utility theory
- Key Determinant in a choice is expected utility relative to the status quo

Cognitive Choice Model
- Endorsed by prospect theory
- Key Determinant in a choice is deviation relative to a subjective reference point
Chapter 3: Methods of Analysis

“In respect of military method, we have, firstly, Measurement; secondly, Estimation of quantity; thirdly, Calculation; fourthly, Balancing of chances; fifthly, Victory.”

Chapter 4 (Tactical Disposition) in *the Art of War*, Sun Tzu

1. Theoretical Framework

The Goals of this chapter are to identify two analytical frameworks upon which North Korea’s past strategic behaviors will be evaluated, establish hypotheses regarding its decision-making process and suggest a general procedure of how to test them.

From the decision-making models identified in the previous chapter, this research selects two decision-making models as its foundation to analyze North Korea’s decision making processes: the rational choice and cognitive choice models. The former is based on the rationality of humans (e.g., the transitivity and invariance of individual preferences over options available) and the method of calculating utility used in expected utility theory (e.g., the linear combination of the value and probability assigned to each option or outcome). In contrast, the latter is built on the key arguments and axioms of prospect theory, in which cognitive patterns of an individual’s decision making process (e.g., loss aversion, risk-dependent choice, framing effect, etc) are highly evaluated and value and probability are non-linearly weighted in calculating utility.

These two models appear to have more explanatory powers relative to previous studies in analyzing North Korea’s decision making processes due to following reasons. First, they have been focusing on an individual decision-making process under risky conditions, in which the environment of uncertain or risky outcomes is represented by probabilities assigned to each outcome. Second, they include and share key arguments and assumptions from models previously mentioned (e.g., assuming a rational actor seeking his own interests, following an instrumental procedure for maximizing his benefits, etc.), so avoiding redundancy in building a model. Finally, they are best fitted into analyzing North Korea’s decision-making processes given its power structure (e.g.,
absolute dictatorship), in which psychological characteristics of a dictator’s decision making process would play an important role in its decision of national affairs.

**Rational Choice Model**

**History and Basic Concepts**

**History**

The rational choice model, mainly supported by the axioms and logic of expected utility theory, has long been the prominent foundation for building theories and models in various academic disciplines — social science, political science, psychology, economics, etc. Since its foundation by Bernoulli in 1738, expected utility theory has been the basic foundation for ensuing decision making models and evolved into a variety of variants to best explain the contemporary social problems, but its key assumption remains unchanged—a rational decision maker or individual chooses the option or strategy that could maximize its expected utility given its constraints: 

\[ \sum_{i=1}^{n} F(p_i)U(x_i), \]

in which the expected utility, derived from the linear combination of the probability and utility, is a key determinant in its choice out of several options available.

However, it was von Neumann and Morgenstern in the early 1940s that played a significant role in specifying the concepts of key variables and suggesting the detailed methods of calculating utility. For example, they suggested two concepts of how to characterize utility: 1) cardinal utility - the method of assigning a specific numeric value to each utility versus 2) ordinal utility - the method of providing ranking information to each utility without numeric valuation. Furthermore, they provided several key axioms to support the “instrumental rationality” of human behaviors (e.g., the invariance and transitivity of individual’s preferences over options), which made it easier to simplify a model building and expand the applicability of this model.

This research was aided by prevailing empirical environments of academia after the World War II. This is one of the reasons that the application of rational choice theory was spread into many areas of science, because it was well fitted for following the scientific research methodology mentioned in the previous footnote. Consequently, this rational choice model, primarily based on expected utility theory, “has been used
prescriptively in management science (especially decision analysis), predictively in finance and economics, descriptively by psychologists, and has played a central role in the theories of measurable utility” (Shoemaker, 1982:529).

**Key Concepts**

In order for this utility model to be parsimonious and explanatory for various occasions, there should be some key assumptions: 1) the Invariance of preferences over options (coherence); 2) the transitivity of preferences among options available (consistency); and 3) the dominance in selecting an option. These are the key elements constituting the individual’s rationality in its decision-making process, which are the basic principles for all expected utility theories, as well as more broadly the rational choice theories.

**Concept #1: Invariance**

Of those assumptions, the *invariance* of individual’s preferences is the fundamental principle because it plays an important role in rendering the rational choice model to produce constant results, regardless of the changes in context or situation over time. Without this assumption, this dissertation could not build any coherent framework in analyzing individual’s behaviors. For example, several different outcomes could be produced under the same decision structure depending on the changes in context, unless this dissertation builds this assumption. This assumption requires that “the preference orderings among available options should not depend on how their outcomes and probabilities are described and thus that two alternatives holding the same decision structure should yield the same choice” (Quattrone and Tversky, 1988:719-727). That is, different representations of the same choice problem should yield the same preference ranking such that the preference between options could be independent of their description or representation, if they are under the same decision structure.

**Concept #2: Transitivity**

Second, the *transitivity* assumption requires that there be consistency in preference orderings among options available. This is conceptualized by the following logic: if A is preferred to B and B is preferred to C, then A is preferred to C. There is one condition upon which this assumption could hold: “it should be possible to assign to each
option a unique value that does not depend on the other available options” (Tversky and Kahneman, 1986:253). This means that the options should be evaluated separately, and the consequence of a specific option does not depend on the alternative options. Without this assumption, it is impossible to calculate a consistent expected utility of each option, which is the key advantage of expected utility theory compared with other decision making models.

Concept #3: Dominance

Third, the assumption of dominance also plays a crucial role in making the rational choice model simple or parsimonious by eliminating any state of the world that yields the same outcome and selecting the most dominant option in the following decision setting: “if one option is better than another in one state and at least as good in all other states, the dominant option should be chosen” (Tversky and Kahneman, 1986:253). Considering this assumption also holds for two previous assumptions, it appears to be the most compelling and significant assumption for the normative theory of choice, in which prescriptions are the most relevant factors to a model building.

Concept #4: Risk-aversion and -acceptance

In this subjective expected utility model, an actor’s utility of a particular good or option is a function of the net asset levels of it and most individuals have diminishing marginal utility for most goods, which is reflected by a concave or convex utility value function depending on an individual’s propensity toward risk—either risk-averse or risk-acceptant or risk-neutral (see Figure 3-1).

Figure 3-1: Types of individual toward risk
This individual’s attitude toward risk is also better represented by the curvature of a value function, and its value function is independent of the probability assigned to each outcome. That is, there would be a linear combination of the value and probability assigned to each outcome to produce an expected utility, individual’s behaviors are projected over a single value function across the whole range of gains and losses and the net expected utility of a certain option is compared to the total asset levels of that actor at that decision period (Levy, 1997:91). Also, a single individual type is only contemplated in this model—either risk-averse or risk-acceptant or risk-neutral (See Figure 3-2). In other words, a mixed individual in which he could simultaneously become both risk-averse and risk-acceptant could not be considered in this rational choice model.

**Figure 3-2: Value Function of the Expected Utility Model**


**Variants of the RCM**

Depending on differences in the interpretation and nature of key elements, such as the value and probability of each outcome, the expected utility model has evolved into several variants, as will be seen in the following table (See Table 3-1). In other words, key differences among variants are composed of the following elements: 1) what kind of utility value was used (ordinal utility versus cardinal utility); 2) what types of probability transformation was applied ($f(p)$ – subjective probability, measured by individual’s
perception regarding specific outcome’s occurrence versus \( w(p) \) – weighted probability, measured by probability weighting function; and 3) under what condition the utility of outcome \( (x) \) was measured (\( v(x) \) is measured under certainty versus \( u(x) \) is measured under uncertainty).

<table>
<thead>
<tr>
<th>Table 3-1</th>
<th>Nine Variants of The Expected Utility Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. ( \sum p_ix_i )</td>
<td>Expected Monetary Value</td>
</tr>
<tr>
<td>2. ( \sum p_ix(v(x)) )</td>
<td>Berroullian Expected Utility(1738)</td>
</tr>
<tr>
<td>3. ( \sum p_ix(u(x)) )</td>
<td>von Neumann-Morgenstern Expected Utility(1947)</td>
</tr>
<tr>
<td>4. ( \sum f(p_i)x_i )</td>
<td>Certainty Equivalence Theory</td>
</tr>
<tr>
<td>5. ( \sum f(p_i)v(x_i) )</td>
<td>Subjective Expected Utility (Edwards, 1955)</td>
</tr>
<tr>
<td>6. ( \sum f(p_i)u(x_i) )</td>
<td>Subjective Expected Utility(Ramsey, 1955;Savage, 1954)</td>
</tr>
<tr>
<td>7. ( \sum w(p_i)x_i )</td>
<td>Weighted Monetary Value</td>
</tr>
<tr>
<td>8. ( \sum w(p_i)v(x_i) )</td>
<td>Prospect theory (Kahneman and Tversky, 1979)</td>
</tr>
<tr>
<td>9. ( \sum w(p_i)u(x_i) )</td>
<td>Subjectively Weighted Utility (Uday Karmarkar, 1978)</td>
</tr>
</tbody>
</table>

Note: \( v(x_i) \) denotes an interval-scaled utility measure constructed under certainty; \( u(x_i) \) denotes one constructed via lotteries; \( f(p_i) \) denotes the subjective probability assigned to each outcome; \( w(p_i) \) is defined as probability weighting function.

Source: Shoemaker (1982), 538.

Subjective Expected Utility Model

Considering the significance of analyzing individual’s perceptions on the value and probability of a certain outcome, this research employs the Subjective Expected Utility model—\( \sum f(p_i)v(x_i) \), in which the subjective probability and value of each outcome are key independent variables. Each option could have several different outcomes and probabilities assigned to them. Based on key assumptions and the logic of operation, the expected utility model posits that “actors aim to maximize their expected utility by weighting the utility of each possible outcome of a given course of action by the probability of its occurrence, summing all possible outcomes for each option or strategy, and selecting that strategy with the highest expected utility” (Levy, 1996:180).
Summary and Decision Rules under the RCM

In sum, the net expected utility is a key determinant upon which all options available would be evaluated, an actor’s propensity toward risk is reflected through the shape of a subject value function, the uncertainty of a certain event is represented by probability assigned to each event, and there is a linear combination between the utility and probability in this rational choice model. Based on these key assumptions and logic of operation, this dissertation could set up the following decision rules or behaviors of a rational actor:\(^\text{12}\):

- The net expected utility of a certain option is the key determinant in an actor’s decision
- North Korea will search extensively for options (at least two) and make probabilistic judgments about their consequences
- North Korea will update their preferences and adjust their strategies in light of new information
- North Korea leadership will display consistent risk propensities across different representations of the same choice problem
- North Korea will be sensitive to marginal costs and diminishing returns

Using the RCM

Two variables needed to calculate net expected utility

In order to analyze North Korea’s decision-making processes on the basis of the expected utility model, it is recommended to identify some key independent variables from each case study—North Korea’s subjective value, North Korea’s subjective probability assigned to each outcome and North Korea’s net expected utility (value) assigned to each option or outcome. In addition, the North Korea’s actual behavior in each case study, as a dependent variable, should be evaluated in the form of a net utility so that it could be compared with the net expected utility to be calculated using key independent variables identified before.

Variable 1: Subjective value of each outcome

To determine the North Korea’s subjective value assigned to each option in a certain case study, this research first identifies options available North Korea could

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contemplate given its strategic constraints. Secondly, the preference order over options would be placed depending on the significance of each option in meeting North Korea’s strategic objectives or goals. Finally, some numerical values or cardinal values, if possible or available, are assigned to each option in a proportional way so that the preference order previously established could be represented.

**Variable 2: Subjective probability of each outcome**

Once all available options are identified, one could determine North Korea’s subjective probability assigned to each outcome by conducting a content analysis for its diplomatic interactions with other players and its strategic status. Since it is a subjective value, North Korea’s own perception and belief on each outcome are primary factors in determining the final value of the probability assigned to each outcome. Given North Korea is very strict in controlling information, however, it is very difficult to obtain official data revealing North Korea’s real intentions on each option and outcome. The only solution to resolve this methodological problem could be a researcher’s subjective evaluation based on North Korea’s propaganda and official diplomatic/military interactions with its allies and enemies.

**Calculating net expected utility of each option**

Based on the subjective value and probability assigned to each outcome(i), North Korea’s net expected utility (value) of a certain option(j) could be calculated as follow (Boardman and Greenberg, 2006:168): the net expected utility (value) of a certain option(j), \( E(U/V)_j = f(p_i)u(B_i - C_i) + \ldots + f(p_n)u(B_n - C_n) \), where \( p_i \) denotes the probability assigned to each outcome \( (1.0 = p_1 + p_2 + \ldots + p_n) \), \( B_i \) denotes the benefit assigned to each outcome, and \( C_i \) denotes the cost assigned to each outcome.

Under the assumption that North Korea is a rational actor, it will choose a strategy that could maximize its net expected utility out of options available. Consequently, one could determine whether North Korea’s actions in a certain condition are consistent with the basic principles of the rational choice model (expected utility theory) by comparing two values: the net expected utility versus the actual North Korea’s action.
Cognitive Choice Model

Primary Differences from RCM

Initially developed by Daniel Kahneman and Amos Tversky (1979), Prospect theory is “an empirical model of a decision-making that stands as the leading alternative to the expected utility model as a theory of choice under conditions of risk” (Levy, 1996:179). In contrast to expected utility theory, prospect theory posits that decision makers do not maximize their utilities, but evaluate outcomes with respect to the level of deviations from a reference point rather than the net asset levels (the reference dependence choice), are likely to overvalue losses relative to the comparable gains (the loss aversion), and tend to be risk-averse when framed with choices between gains while risk-acceptant when framed with losses—the framing effect (Levy, 1992a:171,1992b:284-288, 1996:179, 1997:87; Berejikian, 2002:165).

The cognitive choice model is based on the key arguments and assumptions of Prospect theory and is basically similar to the rational choice model in the sense that both are decision making models under risky conditions, except for one significant difference—the cognitive or psychological patterns of human decision-making processes, which one calls as the “framing effect” and “reference-dependent choice,” are seriously considered in this model. In other words, the cognitive choice model emphasizes the framing effect around an individual’s reference point in its analysis, while the rational choice model does not consider this pattern, instead only focusing on the linear combination of the utility and probability of a certain outcome with equal weight. Consequently, prospect theory argues that there is no way to well explain several anomalies found in expected utility theory, as explained in the previous part, unless there is well-structured analysis of the cognitive patterns of the decision-making process.

Lab evidence of CCM’s validity

These hypothesized patterns of an individual’s decision-making process have been well confirmed by several behavioral experiments in various disciplines, including buying insurance products, gambling in a casino, and investing in share markets (Kahneman and Tversky, 1979; Tversky and Kahneman, 1986; Shoemaker, 1980; Levy, 1992:171), and have been widely applied to the field of regional conflicts by several scholars in international relations (e.g., Farnham, Jervis, Mcdermott, Levy, McInerney, etc.).
Key Concepts

Concept #1: reference dependent choice

There is much evidence that people are more sensitive to changes in assets rather than the net asset levels and to gains and losses from his personal reference point rather than to the total levels of his wealth (Kahneman and Tversky, 1979:277). This is a critical analytical assumption of prospect theory and is in a sharp contrast with the principle of expected utility theory, in which an individual utility is defined over the total levels of assets, just as this dissertation identified in the previous part of this chapter. This reference dependence in an individual choice problem is especially important because people treat losses and gains in a different manner, overvaluing losses relative to comparable gains. One could graphically observe this asymmetry in the treatment of gains and losses in a subject value function (see Figure 3-3), in which the loss side of the value function is steeper than the gain side (Levy, 1997:87).

Figure 3-3: Subjective Value Function in prospect theory
Source: Author’s reconfiguration from the original sources

Therefore, depending on where his reference point is located on the subjective value function, an individual’s propensity toward risk would change dramatically. For instance, if an individual is located in the domain of losses relative to his reference point, he will be aggressively risk-acceptant to avoid worse situations and recoup sunk costs. On the other hand, if he is in the domain of gains relative to his reference point, he would be more cautious and reluctant to take risky actions to avoid potential losses and defend his current gains. That is, a change in decision frame can result in a change in preference, known as a “preference reversal,” even if the values and probabilities of outcomes remain the same. This phenomenon is in a sharp contrast with one of several principles found in expected utility theory—the invariance of preference (see also Figure 3-3).

In addition, the reference point also plays another important role in an individual’s decision-making process because all kinds of options available are evaluated against a certain reference point. This personal reference point would be established from various factors such as his personal expectation and aspiration on a certain issue, past experiences on the same issue, personal perception of his opponents, and social norms and comparisons (Kahneman and Tversky, 1979: 277; Levy, 1997:91).

**Concept #2: Loss Aversion**

To understand other important characteristics of prospect theory, such as the loss aversion and frame effect, one needs to identify some characteristics of human decision-making patterns—the endowment effect and the status quo bias. In the individual’s decision-making process, these two concepts seem to be highly intertwined. Once an individual possesses something valuable, he adjusts more quickly to that new possession and tries to defend it because people tend to value current holding more than future possession (the endowment effect). Also, people tend to maintain current assets rather than increase or improve his gains under risky conditions (the status quo bias). As a result, combined with the loss aversion in a human decision making process, these two elements make a decision-maker more risk-acceptant in their defense of current possession than expected utility theory anticipates. That is why international negotiations holding the structure of distributing losses, rather than distributing gains, are extremely difficult to reach an agreement.

**Concept #3: Framing Effect**
The *endowment effect*, the *status quo bias* and *loss aversion* create the *framing effect* in an individual’s decision-making process. This effect means that individuals’ decisions could change dramatically depending on his position in each decision setting. In other words, an individual’s preference for a certain option varies over time depending on where he is located in the domain of losses (costs) or gains (benefits) on his decision setting. This sharply contrasts with the principle of expected utility theory that postulates the invariance of preference, yielding the same outcome so long as the value and probability of an outcome is unchanged, regardless of different representation of each option.

**Framing Effect: Example 1**

To understand the *framing effect* of prospect theory, imagine that someone faces a following choice problem: (A-1) a sure gain of $80.00 (expected utility value is $80.00) and (A-2) an 85% probability to win $100 and a 15% probability of winning nothing (expected utility value is $85.00). The first involves a sure gain of $80.00, and the second involves an 85% chance of winning $100.00 with a 15% chance of winning nothing. Laboratory experiments (Kahneman and Tversky, 1979; Tversky and Kahneman, 1981) demonstrate that most people who are presented with this choice problem prefer the sure gain (choice A-1: $80) to the risky choice (choice A-2: $85) in spite of the fact that choice (A-2) has a higher expected monetary value than choice (A-1), which is contrary to expected utility theory, in which the net expected utility is a key criterion in a choice. This demonstrates that most people prefer a sure gain to an even higher potential gain if it has the possibility of winning nothing. On the basis of this experimental result, prospect theory concludes that people tend to avoid the risky choice and to prefer a safe choice when framed with two possible gains (See the gain domain of Figure 3-4).

**Framing Effect: Example 2**

Prospect theory also reveals that most people choose to accept risk in a certain context. To understand a risk-acceptant choice, imagine that someone is forced to choose between (B-1) a sure loss of $60.00 (expected utility value is -$60.00) and (B-2) a gamble involving an 85% probability of losing $100.00 and a 15% chance to lose nothing (expected utility value is -$85.00). Faced with this choice, most people prefer the gamble (B-2) to the sure loss (B-1), even if the monetary expectation of the gamble (-$85.00) is worse than that of the sure loss (-$60.00). On the basis of this experiment,
some prospect theorists conclude that people are inclined to accept the risky choice which would include a small chance of losing nothing when faced with two possible losses (See the loss domain of Figure 3-4)

**Framing Effect: Implications**

The implication of these “reference-dependent” choices or “framing effect” in prospect theory is that an individual’s choice depends upon attitudes toward risks rather than upon the principle of maximizing the net expected utility. A decision-maker makes a choice not because it yields maximum utility, but because it is a risk-taking or risk-averse choice in his decision setting. As a result, this framing effect of prospect theory violates the assumption of consistent and transitive preference over options, which is the key assumption not only to expected utility theory but also to nearly all rational choice theories. Speaking in details, the framing effect cannot be reconciled with the principle of independence of irrelevant alternatives or the related invariance assumption, which requires that logically identical choice problems should yield identical results (Levy, 1997:93).

![Figure 3-4: Subjective Value Function in prospect theory](image)


**Concept #4: Certainty Effect**

There is another important axiom in prospect theory—*the certainty effect*.

Generally speaking, people overweight outcomes which are certain relative to those which are merely probable. In other words, people overweight extremely small and high
probabilities and underweight moderate and high probabilities. As a result, he or she would like to value the outcome with the absolute possibility of zero or 1.0, rather than moderate possibility ranging between 0.2 and 0.6. Just think about the Russian roulette game, in which two choices are given: removing the last bullet from a pistol and removing one bullet from the remaining 4. Even though the probability of removing the risk is the same as a 1/6 in an expected value term between two choices, the psychological impact on its choice is significantly different: most people prefer the first choice of removing the last bullet because of the certainty effect—hoping to completely eliminate the risk or fatality (Kahneman and Tversky, 1979; Tversky and Kahneman, 1981; Quattrone and Tversky, 1988; McDermott, 2004a:152).

**Certainty Effect: Implications**

This effect implies that the risk-taking tendency predicted by prospect theory may not occur in extremely improbable or almost certain events. For instance, the risk-acceptant attitude in the domain of losses may not occur in a certain case where the probability of the outcome is extremely small or where the outcome is too catastrophic (Tversky and Kahneman 1986:258). Tversky and Kahneman tried to employ this certainty effect in their prospect theory with the form of probability weighing function. That is, when the probability of a certain outcome is extremely low or high, more weight would be added to the probability than the utility of a certain outcome, while less weight would be added to the probability when it is in the moderate range of probability (see Figure 3-5).

For instance, North Korea would add more weight to the value than the possibility of an outcome when its provocation of testing a nuclear device provides very little chance of success and enormous catastrophe to its regime, thus resulting in a rational choice maximizing its expected utility despite its deep domain of losses. But Pyongyang’s behaviors might be very unpredictable when it is in the range of extremely low and high probability under complete isolation from the international community. To avoid this kind of desperate situation, sending a clear signal and maintaining communication lines with North Korean leadership would be needed in an attempt to convince them that its provocation will surely fail and cause the end of its regime.
Summary and Decision Rules under the CCM

In sum, Kahneman and Tversky developed this prospect theory in an attempt to identify those observed anomalies found in a real-world choice structure (e.g., the risk-dependent and reference-dependence choice of a human-being), suggest practical explanations for them (e.g., the status quo bias, the endowment effect and the framing effect) and predict the potential behaviors of an individual actor (e.g., risk-acceptant behavior in the domain of losses, while risk-averse behavior in the domain of gains).

Based on these key assumptions and logic of operation, this dissertation could set up following decision rules and behaviors of an individual decision maker framed with psychological domains:

1. The net prospective utility of a certain option is the key determinant in an actor’s decision
2. North Korean leadership will display a strong bias toward risk-seeking strategies to avert losses relative to the reference point
3. North Korean leadership will evaluate options vis-à-vis their reference point and ignore other pertinent information about the choice problem
4. North Korean leadership will systematically change risk propensities with the adoption of a new reference point, despite the absence of new information

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• North Korean leadership will accommodate very quickly to gains (at or above their reference point); conversely, decision makers do not accommodate quickly to losses

• North Korean leadership will continue or even escalate risk seeking strategies to recover sunk costs

**Using the CCM**

**Editing and Evaluation Phases**

There are two phases in applying this theory to real-world choice problems—the editing and evaluating phases. In the editing phase, an individual actor identifies his personal reference point, available options, possible outcomes, and the value and probability of each outcome of a certain option. In the evaluating phase, he or she combines the value, reflected in the S-shaped value function, with its weighted probability, reflected in the form of the probability weighting function. And then, he or she chooses an option that could maximize his prospective utility out of options available: the prospective value of a certain option is given by,

\[ V = \sum w(p_i) u(x_i) \]

where \( p \) is the subjectively perceived probability of outcome \( x \), \( w(p) \) is the probability-weighting function, and \( u(x) \) is a subjective value function (Levy, 1992:179-181; 1997:92).

**Four variables needed to calculate net expected value**

To analyze North Korea’s decision-making processes under risky conditions on the basis of prospect theory, several parameters and variables should be identified in each case study: North Korea’s subjective reference point upon which all available options would be evaluated; North Korea’s perception regarding where it is located on the subjective value function—either the domain of gains or losses; North Korea’s subjective value and probability assigned to each outcome in a certain option, which are the same elements used in the analysis of the previous rational choice model, but there is a significant difference in transforming the subjective probability and value.

**Variable 1: Subjective reference point (of the decision-maker)**

A subjective reference point would be established from a variety of factors: North Korea’s national objectives or goals, its social and ideological norms—the “Juche” or self help ideology, its perception of regime stability, and its perception of the balance of
power on the Korean Peninsula, especially its power relative to South Korea. In determining its future reference point of its strategic moves, the status quo would be used as a referenced point upon which alternative reference points would be evaluated. So, its reference point could be one out of two explicit forms: maintaining the status quo and breaking the status quo to seek more favorable strategic gains. Since the evaluation on a North Korea’s subjective reference point is highly subjective and it is difficult to gather any documents revealing its reference point, one would be able to get some insights regarding its reference point indirectly through North Korea’s propaganda and its diplomatic/military interactions with its allies—China and USSR (Russia) and enemies—the ROK, the US, and Japan.

Variable 2: Domain (of the decision-maker)
Another important variable to be identified is the North Korea’s perceptions of its location on its subjective value function. Once North Korea’s subjective reference point is set up on the basis of its strategic constraints, its domain would be quickly identified through its cognitive processes of decision-making, in which some key characteristics of a human decision-making process—the loss aversion, the endowment effect, and the status quo bias—would play a crucial role in determining its locations on its subjective value function. For instance, if North Korea is satisfied with a current status quo and all strategic constraints are favorable to its regime, it should be placed in the domain of gains. On the other hand, if North Korean leadership would think that status quo is unacceptable and is even getting worse to its regime, it will perceive that it is located in the domain of losses. Consequently, there is close relationship between setting up reference point and its perception on its domain, and that relation would become a key decision factor influencing a North Korea’s actual choice.

Variables 3 and 4: Subjective Value and Probability of each outcome
The last task is to identify North Korea’s subjective value (utility) and probability assigned to each outcome. These variables are basically the same elements which were identified and employed in the rational choice model. But there is a significant difference in the way the subjective probability is weighted and the “preference reversal” occurs in calculating the net expected utility. In the case of the expected utility model, an equal weighting would be applied to both value (utility) and probability—a linear combination of the value and probability assigned to each outcome. In contrast, the probability-
weighting function would be employed in calculating the net prospective utility when analyzing North Korea’s decision-making processes using prospect theory.

For example, if probability is extremely low or high such that it is nearly zero or 1.0, more weight would be given to probability than utility, while probability will be underweighted in the moderate and high range. Consequently, the “preference reversal” predicted by prospect theory might not occur when the probability assigned to each outcome is extremely low and the expected outcome is catastrophic: “an actor might be risk-averse even when he is located in the domain of losses and risk-acceptant even when he is located in the domain of gains.”

2. Establishing hypotheses

Determining North Korea’s domain of action

To find out stable trends or patterns of North Korea’s decision-making process over long period, North Korea’s domains of actions should be set up before establishing hypotheses on North Korea’s behaviors in its nuclear weapons programs. Once this general framework of the North Korea’s strategic position on its subjective value function is established, each case study would be superimposed on this domain, which provides more technical availability and validity given limited qualitative and empirical data on its strategic intents from Pyongyang. The North Korea’s domain or strategic position on its subjective value function is its psychological perception with respect to its status or power relative to its adversaries, in particular, the ROK. Broadly speaking, three factors appear to influence the establishment of North Korea’s strategic domain: the external factor, the internal factor and the ROK factor. Combined with its reference point or national goal, Pyongyang’s domain of action is supposed to play a significant role in influencing behaviors in its strategic choice problem under the rational choice model (expected utility theory) and the cognitive choice model (prospect theory).

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15 In general, this certainty effect is believed to interact with the reflection effect in the value function to reinforce tendencies toward risk-aversion for gains and risk-seeking for losses in a choice problem between a certain outcome and a lottery. Yet, in this dissertation it is employed to demonstrate that risk propensities by prospect theory might not occur at a time when North Korea’s action surely leads to failure and its ensuring outcome is catastrophic. For individual’s responses to probabilities, see Levy (April, 1996), op.cit., 185 and Daniel Kahneman and Amos Tversky, “Prospect theory: An Analysis of Decision Under Risk,” Econometrica, Vol. 47(1979), 265 and 282-283.
External Factor
The external factor is composed of several international elements affecting North Korea’s own perceptions regarding its relative status and power against external opponents. Foreign aid from its allies—China, USSR and Eastern communist blocks—in the form of political and diplomatic alliance, economic support, and security assurance might have constituted favorable external factors during the Cold War. On the other hand, US pressure in the form of military presence on the Korean peninsula and economic sanctions and diplomatic isolation would have been harmful external factors to the North Korean regime.

Domestic Factor
The internal factor measures the level of regime stability within North Korea: How effectively does the Kim’s regime oppress its opponents?; How tight is information control on its ordinary population?; Does North Korea run its economy well enough to feed its population?; And does power transition from father to son go smoothly without any problem? What stable internal factor means is that the North Korean regime efficiently controls its political opponents and ordinary population so that there is not any possibility of uprising against its regime.

ROK Factor
The ROK factor means the level of social stability, the rate of economic growth in South Korea, and the level of ROK-US security alliance. If South Korea moves toward more democratic society and rapidly growing economy, its general level of stability will grow and people’s dissatisfaction will decrease. The strength of the ROK-US security alliance and the level of the United States’ defense commitment to South Korea also play an important role in stabilizing South Korean society because the South Korean economy is highly dependent on the security of the Korean peninsula.16

North Korea’s Domain of Actions Since 1953

External Factor

16 South Korea has gained some invaluable economic profits by US defense commitment on the peninsula: reducing the strains on the ROK defense budget by US provisions of its sophisticated military equipment; being given regional stability for economic growth by a US role as a regional stabilizer; and warranting a huge amount of foreign investments by the presence of US military on the peninsula. See Norman D. Levin, Do the Ties Still Bind?: The US-ROK Security Relationship After 9/11 (RAND: Project Air Force, 2004), 11-23.
In general, North Korea’s strategic domain relative to its arch-rival—the ROK—has dramatically changed from its absolute gains in the early 1950s to absolute losses in the early 1990s mainly due to structural factors, such as the collapse of communist block in eastern Europe, including the Soviet Unions, resulting in a sharp drop of all needed materials for sustaining its economy and military.

For instance, Pyongyang initiated its rehabilitation project shortly after reaching the truce pact with the UN command in July 1953 with strong supports from its communist block. Joseph Stalin agreed to grant 10 billion ruble in an effort to rebuild North Korean economy completely destroyed during the Korean War, the communist China provided a huge amount of labor forces in North Korea’s reconstruction project by stationing its huge military forces of about 100,000 until late 1958, and the communist block in eastern Europe provided a variety of machinery, electric generation, road construction, and iron production equipment, totaling about 1.2 billion dollars of worth. Combining all that foreign aid from Pyongyang’s communist block, this aid accounted for 31.6 percent of total North Korean government budget in 1954. With those economic initiatives, North Korea was able to complete its rehabilitation project at the end of 1950s and began to lead ahead of South Korea in all economic indicators during the entire 1960s when its average economic growth rate was 9.4%, higher than that of South Korea—8% (Baek, 2007:229-230).

On the other hand, South Korea experienced serious social chaos shortly after the Korean War in the form of democratic movements and ensuring harsh crackdowns by then authoritative Lee Sung-man administrative, culminating in the military coup attempt in the early 1960s led by major General Park Jeong-Hee. While there seems to have been some ups and downs in terms of relative economic performance between two Koreas until the late 1960s, however, North Korea has no longer been a competitor to South Korea since the early 1970s when the effect of the first five-year economic development plan (1963-1967) led by President Park began to reveal (Go, 2007:138-140), as evidenced in the following figures showing economic performance between two Koreas.

For instance, South Korea marked an average growth rate of 9% periods between 1967 and 1971 and successfully overcame the first Oil Crisis (1973) by aggressively
participating in large-sized construction projects in the Middle East, while North Korea began declining its growth rate since the early 1970s and reached its record negative growth rate of -7.6% in 1992 when its two allies—China and Russia—requested hard-currency payment in their trades with Pyongyang (see Figure 3-6/7).

![Economic Growth Rates between Two Koreas and NK's provocations 1965-1995](image)

**Figure 3-6: Trends in Economic Growth Rates of two Koreas, 1965-1995**

![Comparison in Gross National Income between two Koreas](image)

**Figure 3-7: Trends in Gross National Income between two Koreas, 1990-2007**
Heavily influenced by one’s economic performance, defense budget has also observed a growing gap between two Koreas since the mid-1980s, significantly tilting toward South Korea’s favor after the Cold War. In fact, North Korea has never spent an ample amount of money in modernizing its antiquated conventional weapons systems since the mid-1980s because of lack of foreign currencies derived from deteriorating economic performance, while South Korea began its aggressive military acquisition program known as “Yul-Gok” in Korean terms in the early 1990s, further expanding the gap between two Koreas (See Figure 3-8).

With regard to diplomatic competitions between two Koreas, North Korea has been also losing its advantages to South Korea since the end of Cold War. President Roh Tae-Woo of South Korea, shortly after his inauguration in 1988, aggressively engaged in normalizing with its previous enemies—the Soviet Unions and the PRC. He tried to infuse the transitional period of ending Cold War at the global level into Korean Peninsular to exploit its momentum so that North Korea would be forced to accept the changing security environment surrounding the Korean Peninsula and come to a
negotiating table for achieving peaceful cooperation and reconciliation. After several years of his aggressive efforts of engaging two major North Korean allies, South Korea officially normalized its ties with the Soviet Unions in 1989 and the PRC in 1991. On the other hand, North Korea’s efforts to engage the US and Japan have failed due to a sharp difference on then impending issues, such as the dismantling of Weapons of Mass Destruction and North Korea’s abduction of Japanese citizens, thus resulting in its absolute diplomatic isolation from its enemies, as well as allies (Baek, 2007:40-41; Im, 2007:185-191).

**ROK and North Korea’s Domestic Factors**

In terms of the ROK factor and North Korea’s internal stability, however, North Korea has enjoyed its absolute advantages until the early 1990s. For instance, South Korean society was unstable and the level of instability was even deteriorating due to military coup attempts led by Army Major General Park Jeong-Hee in the early 1960s and Chun Doo-Hwan in the early 1980s shortly after President Park’s assassination by his aide and ensuing harsh crackdowns on democratic movements.

With regard to external environment surrounding the Korean peninsula, Pyongyang seems to have been in an upper-hand until the mid-1980s. Faced with the quagmires in the Vietnam War, for instance, the Nixon administration proclaimed the “Nixon Doctrine” in the early 1970s in an attempt to withdraw from the Vietnam in a graceful manner and engage the rising star in this region—China, shortly after his inauguration in 1970. According to this doctrine, the US military decided to withdraw one division out of two then deployed on South Korea, resulting in a huge security concern on decision makers, as well as ordinary people of South Korea. In addition, the ROK-US security alliance further deteriorated during the Carter administration in the latter 1970s by his threatening to withdraw all remaining US ground forces due to then President Park’s harsh crackdown on democratic movements in the South Korea (Go, 2001: 140).

In contrast, North Korean regime has never faced any significant internal security challenge and instead further strengthened its regime stability by successfully instating Kim Jong-II (“Dear Leader”) as an apparent heir to Kim Il-Sung (“Great Leader”) during
this period. For instance, Kim Il-Sung had completely controlled North Korean Workers Party by September 1958 through purging influential factions backed by the Soviet Unions and China. In the mid-1960s, Kim Jong-Il began to instate the “Juche” or self-help ideology as a leading guideline of Workers Party for establishing monarchical or “Su-Ryeong” system in Korean terms in an effort to effectively confront oppositions from its communist allies—the Soviet Unions and China—arguing communist party is ruled by collective leadership system. Pyongyang had completed the “Su-Ryeong” system by establishing the “DPRK Socialist Constitution” in September 1972. Kim Il-Sung had finally achieved successful power succession to his son—Kim Jong-Il—by implementing a series of measures in the early 1990s: 1) appointing Kim Jong-Il as supreme commander of the Korean People’s Army (KPA) in December 1991; 2) presenting a title of martial to his son in April 1992; and 3) instating his son as chairman of the National Defense Commission (NDC)—the most powerful supreme command of the DPRK (Baek, 2004: 254-270; Lee, 2004: 344-365; Baek, 2007: 36-70).

Summary of NK’s Domain of Actions, 1953-2009

Based on these three factors, a general picture regarding North Korea’s strategic domain can be drawn, starting from the mid-1950s to the latter 2000s (see Figure 3-9). According to this figure, North Korea’s domains or strategic locations relative to South Korea have showed some ups-and-downs, but in general was in the domain of gains until the early 1980s. In terms of internal stability, Pyongyang was surely in the upper-hand vis-à-vis Seoul, just as described in the previous part. With regard to economic power, the DPRK appears to have prevailed over the ROK until late 1960s, but have surely lagged behind Seoul since early 1970s. Diplomatic and security alliances seem to have followed the same patters as economy during this period. In the middle of Cold War period, North Korea had dominated South Korea in terms of diplomatic power by aggressively participating in the “Non-Alliance Coalition” endorsed by most “Third-World” nations inside the United Nations until the early 1980s. After the emergence of Michael Gorvachev in 1985, Pyongyang began losing its ground against its arch-rival, Seoul, further aggravating its status after President Roh’s aggressive moves to engage its influential patrons, know as “Nordpolitik,” in early 1988.
After the end of Cold war, however, North Korea appeared to have been in the domain of losses for most of periods except some cases. For example, North Korea has moved toward the direction of losses since the early 1990s due to several strategic difficulties—the UN sanctions against North Korea’s nuclear program in the early 1990s, the death of the ‘Great Leader’ Kim Il-Sung in 1994, and the consecutive severe drought and flooding in 1995 and 1996, respectively. On the other hand, Pyongyang appeared to have moved toward the gain domain relative to the previous status shortly after reaching the Agreed Framework with the US in October 1994 and initiating diplomatic initiatives in the early 2000s (e.g., hosting the historic summit talks with the South in June and Japan in September and exchanging high-level diplomatic officials with then Clinton administration in October). But again Pyongyang appears to have started moving toward the domain of losses since its second nuclear crisis in October 2002 and reached its lowest point in late 2008 and early 2009 when North Korea faced serious leadership crisis by Kim Jong-Il’s deteriorating health condition and economic crisis by a horrific failure of its aggressively launched capitalistic reform plan.

Figure 3-9: General picture of North Korea’s domains on its subjective value function
Two Hypotheses regarding NK’s behaviors

Case Selection Criteria
To obtain an explicit idea regarding any causal relationship between North Korea’s strategic domain and its risk propensity, North Korea’s past strategic moves are superimposed on its subjective value function, as shown in Figure 3-9. Even though there had been several North Korean provocations since the end of Korean War in 1953, this dissertation selects North Korea’s nuclear-related provocations after the 1990s in an attempt to narrow down the scope of research based on several criteria: 1) being able to identify key parameters (variables) of two decision making models mentioned before, 2) being able to explicitly identify North Korea’s national objectives or goals, and 3) being able to influence one of three factors affecting North Korea’s perceptions of its domain.

General Observations / Motivation for establishing Hypotheses
In the former period between the mid-1950s and 1990s, North Korea seems to have made several provocations depending on the results of the net expected utility and whether or not it felt relative deprivations against South Korea. In each principal provocation of that period, North Korea’s relative advantages in three key factors appear to have been significantly visible, as were mentioned before. But there were some cases where North Korea lost its relative advantages toward South Korea due to Seoul’s temporary and limited progresses in terms of economic and diplomatic achievements.

In general, North Korea’s provocations seem to have been initiated to maximize its strategic gains based on strict calculation of the costs and benefits of its options at a time when its relative power was prevailing over South Korea. For instance, Pyongyang seems to have conducted provocative moves: 1) attempting to assassinate then South Korean authoritative president Park Jeong-Hee and hijacking the US Navy intelligence ship—Pueblo—in the early 1968; 2) infiltrating a team of special operation forces into the eastern coast of South Korea in the late 1968; 3) shooting down the US EC-121 in April 1969; and 4) killing US soldiers with axes in the Joint Security Area within the DMZ in 1976.

All those provocations seems to have been conducted to maximize its strategic gains by fomenting social unrest in the South and undermining security alliance between the ROK and US, on the basis of its calculation that the ROK and US would not significantly react to these hostilities given the US had been heavily involved in the
Vietnam war by that time and domestic situation in the South had been unstable due to President Park’s initiative to revise Constitution for his permanent rein in power and ensuing harsh crackdown on democratic movements by then Seoul regime (Go, 2001:141-142; Kim, 2007: 446-447). This dissertation could endorse this argument—*Pyongyang is likely to adopt the rational choice model (where a decision-maker would like to maximize its expected utility given its strategic constraints) in the domain of gains*—by analyzing then North Korea’s behaviors with the rational choice model mentioned before (See Figure 3-10).

![Figure 3-10: Analyzing NK’s behaviors before 1990 under the rational choice model](image)

Figure 3-10: Analyzing NK’s behaviors before 1990 under the rational choice model

On the other hand, North Korea’s provocative behaviors in the 1980s—the 1983 Rangoon bombing where several of President Chun’s cabinet members were massacred in Myanmar and the 1987 Korean Air bombing where all passengers on board were killed over the Indian Ocean—seems to have been derived from *Pyongyang’s relative deprivation vis-à-vis its arch-rival*—South Korea—because by that time Seoul was gaining the upper-hand against Pyongyang by accomplishing domestic and economic stability in the early 1980s and achieving international status by hosting the 1988
Analyzing North Korea’s Decision-Making Process on its Nuclear Weapons Programs
with the Rational Choice and Cognitive Choice Models

Chapter 3: Methods of Analysis

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Olympics (Go, 2001: 142-144). This dissertation could also support this argument—Pyongyang is likely to adopt the cognitive choice model (where a decision-maker would like to satisfy his subjective reference point by adopting risky choices) in the domain of gains—by analyzing then North Korea’s behaviors with the cognitive choice model mentioned before (See Figure 3-11).

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Figure 3-11: Analyzing NK’s behaviors before 1990 under the cognitive choice model

Since the early 1990s, however, North Korea’s relative positions have been rapidly moving toward a significant loss domain due to several systemic and structural factors mentioned before. Under this condition, North Korea might have felt significant relative deprivation against South Korea and absolute dissatisfaction with the status quo. Its actions seem to have been more severe and hostile than rational choice theorists have anticipated, even though the number of provocations has been significantly reduced relative to the previous period. As a result, cognitive characteristics of an individual decision-making process—the loss aversion, framing effect, and relative deprivation—
Analyzing North Korea’s Decision-Making Process on its Nuclear Weapons Programs with the Rational Choice and Cognitive Choice Models

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seem to have become key determinants in North Korea’s provocative behaviors since the end of the Cold War in the early 1990s, as will be analyzed in the next chapter.

**Hypotheses to be tested**

Combining key arguments of two decision-making models (rational choice and cognitive choice) and North Korea’s strategic domains mentioned before, two hypotheses on North Korea’s behaviors in its nuclear weapons programs could be established as follow:

**Hypothesis #1**: North Korea would take risk-averse behaviors in its nuclear weapons programs when it is in the domain of gains, while risk-acceptant behaviors when it is in the domain of losses relative to its status quo.

**Hypothesis #2**: North Korea might take risk-averse behaviors when the chance of success is extremely low and the ensuing result is catastrophic to its regime, even though it is in the domain of losses (the certainty effect where an actor prefer a sure thing to probable one when it comes to dealing with critical things to its survival).

3. **Hypothesis Testing Method**

**RCM: Net Expected Utility**

Measuring North Korea’s net expected utility is another important step before testing hypotheses because it is a key reference point to identify whether North Korea’s behavior is based on the rational choice model or the cognitive choice model. If North Korea’s net expected utility for a certain provocative action is positive and North Korea is in the domain of gains in that period at the same time, for instance, it is theoretically possible to argue that North Korea is following the rational choice model. Of course, there could be one controversy over the assumption that North Korea’s domain influences the selection of decision-making model. Given our theoretical assumption that rational actors would not take risky choice in the domain of gains, however, waging some risky provocations under strategically advantageous situation would be considered the behavior to maximize its net expected utility.
Step-by-Step Calculation

To calculate North Korea’s net expected utility, available options it could select should be first identified. To make the model simple, two options are suggested—maintaining the status quo versus breaking the status quo (the case study itself). Next step is to calculate the cost and benefit of each option on the basis of subjective value, as well as some objective factors—the external, the internal and the ROK factors. Finally, the subjective probabilities of each outcome of a certain option are employed on the calculation of the net expected utility. As a result, mathematical formula could be established to express all key arguments and operational logic of the rational choice model as follow:

1) The expected utility of breaking the status quo, \( E(U_1) = f(p_1)u(B_1) - f(1-p_1)u(C_1) \), where \( p_1 \) denotes the probability of benefit’s occurring, \( B_1 \) denotes the benefits of this provocative action and \( C_1 \) denotes the cost of this action.

2) The expected utility of maintaining the status quo, \( E(U_2) = f(p_2)u(B_2) - f(1-p_2)u(C_2) \), where \( p_2 \) denotes the probability of benefit’s occurring, \( B_2 \) denotes the benefits of maintaining the status quo and \( C_2 \) denotes the cost of maintaining the status quo.

3) The net expected utility is the difference between two options, \( E(U) = E(U_1 - U_2) \)

CCM: Net Prospective Utility

To analyze North Korea’s provocative actions on the basis of the cognitive choice model, it is needed to calculate a different type of the net expected utility, what this dissertation calls “the net prospective utility.” A general procedure of calculating such prospective utility is very similar to that of the rational choice model because both are applied to the decision-making process under risky conditions, except some key differences—the practice of transforming subjective probability and the “framing effect” which are key axioms in the cognitive choice model.

Measuring Variables
In each case study, North Korea’s domains—either gains or losses on its subjective value function—should be identified in the first place. Since it is highly subjective perception, some efforts to investigate the psychological status of North Korean leadership would be recommended. Also, objective data representing the relative capabilities between two rivals—North Korea and South Korea—would be helpful in identifying North Korea’s domains of actions. So, North Korea’s repeated propagandas would be able to reveal some information regarding its psychological perception and status, while economic performance, diplomatic and security alliance and the stability of South Korean society would constitute the objective and qualitative data affecting North Korea’s domain on its subjective value function.

1) Domain (of the decision-maker)

For example, there would be several indicators representing North Korea’s domain of losses: 1) repeated propagandas indicating its hostility and denying inter-Korean dialogues; 2) growing economic difficulties, resulting in significant problems in feeding its general populace; 3) North Korea’s deepening diplomatic isolation from the world; and 4) growing military imbalance unfavorable to North Korea. Of course, there would be some cases in which all three elements do not operate in the same direction to determine North Korea’s domain of losses. In that case, some contexts surrounding North Korea at that time should be based on its final decision.

2) Reference Point (of the decision-maker)

In conjunction with North Korea’s domain, its reference point would be able to be identified by observing its national objectives or goals at that period: 1) pursuing reunification of Korean Peninsula under its terms or 2) maintaining the status quo for its regime survival. Identifying a reference point also plays an important role in the cognitive decision-making process by providing a decision point upon which North Korea’s relative gains and losses are measured. That is, the “framing effect” could happen or not, depending on where a reference point is located on the subjective value function. For instance, if North Korea is satisfied with the status quo and therefore it is North Korea’s reference point, there would not be any incentives for North Korea to move away from its current position. On the other hand, if there is distinct discrepancy between a North Korea’s subjective reference point and the status quo, there would be a strong motivation
to disrupt current status quo in order to move toward the direction in which North Korea could have more psychological gains.

**Step-by-Step Calculation**

As a result, there should be some reconfiguration in the value of key variables used in the rational choice model. In other words, the value of cost and benefit in each option should be weighted differently depending on North Korea’s domain, and each probability is recalibrated by the probability-weighting function. For instance, if North Korea is in the domain of gains and the probability of each option is extremely small or high, more weight would be given to the safer choice (status quo) than risky one (provocative action) because North Korea is framed with the domain of gains. In contrast, more weight would be given to the riskier choice than the safer one if it is in the domain of losses with the probability of success being moderate and the expected damage being manageable.

Like the case of the rational choice model, a mathematical formula could be set up to represent all key arguments and operational logics of the cognitive choice model as follow:

1) The prospective utility of breaking the status quo, \( E(U_3) = w(p_3) \cdot u(B_3) - (1-w(p_3)) \cdot u(C_3) \), where \( w(p_3) \) denotes the weighted-probability of benefit’s occurring, \( u(B_3) \) denotes the framed-benefit of this provocative action and \( u(C_3) \) denotes the framed-cost of it

2) The prospective utility of maintaining the status quo, \( E(U_4) = w(p_4) \cdot u(B_4) - (1-w(p_4)) \cdot u(C_4) \), where \( w(p_4) \) denotes the weighted-probability of benefit’s occurring, \( u(B_4) \) denotes the framed-benefits of the status quo and \( u(C_4) \) denotes the framed-cost of it

3) The net perspective utility is the difference between two options, \( E(U) = E(U_3) - E(U_4) \)

**Evaluating Case Results**

**Qualitative Analysis**

To determine which type of decision-making model was employed in a specific case study, there is a strong need to create **indicators** upon which each behavior of North Korea would be evaluated. Since these indicators are key reference points in determining
the specific decision-making model, they should include the key arguments and logics of two models, as well as the key variables or parameters previously identified. Based on these indicators of two decision-making models, this dissertation could determine which decision-making model was employed in each specific North Korea’s behavior:

1) **Indicators of the rational choice model**
   - The net expected utility of a certain option is the key determinant in an actor’s decision
   - North Korean leadership will search extensively for options (at least two) and make probabilistic judgments about their consequences
   - North Korean leadership will update their preferences and adjust their strategies in light of new information
   - North Korean leadership will display consistent risk propensities across different representations of the same choice problem
   - North Korean leadership will be sensitive to marginal costs and diminishing returns

2) **Indicators of the cognitive choice model**
   - The net prospective utility of a certain option is the key determinant in an actor’s decision
   - North Korean leadership will display a strong bias toward risk-seeking strategies to avert losses relative to the reference point
   - North Korean leadership will evaluate options vis-à-vis their reference point and ignore other pertinent information about the choice problem
   - North Korean leadership will systematically change risk propensities with the adoption of a new reference point, despite the absence of new information
   - North Korean leadership will accommodate very quickly to gains (at or above their reference point); conversely, decision makers do not accommodate quickly to losses

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**Quasi-empirical Analysis**

In an effort to empirically compare two models in each case, this dissertation employs a quasi-empirical analysis where author arbitrarily specifies subjective values and probability (thus, being considered weighted probability) to each outcome of a North Korea’s certain option based on qualitative analysis proceeded shortly before this analysis. In this empirical analysis, this dissertation would use following equations for each model:

For the rational choice model, \( Y=1,200*(\text{LOG}(50*X+7,000)-\text{LOG}(7,000)) \),

Where North Korea is assumed to be risk-averse (concave) across all domains of actions;

For the cognitive choice model,

\[
Y = 1,200*(\text{LOG}(50*X+7,000)-\text{LOG}(7,000)) \quad X \geq 0 \\
= -200*(\text{LOG}(-20*X+30)-\text{LOG}(30)) \quad X < 0,
\]

where North Korea is assumed to be risk-averse (concave) in the domain of gains and risk-seeking (convex) in the domain of losses, known as the “S” curve, and individual’s loss-aversion bias is represented by more steepness in the loss area than gain area.

Based on North Korea’s risk propensities and equations in each model, this dissertation could draw following North Korea’s subjective value function where this dissertation assumes the status quo and reference point are identical, thus providing flexibility in conducting quasi-empirical analysis (See Figure 3-12).

![Figure 3-12: North Korea’s subjective value function for quasi-empirical analysis](image-url)
Summary of Hypothesis Testing Procedures

Based on key arguments and indicators of two decision-making models, the general procedure for testing two hypotheses could be drawn as follow (see Figure 3-13):

![Figure 3-13: General Flow Chart for Testing Hypotheses](image-url)

NK’s past provocative actions (From the early 1990s to 2009) → Setting up three criteria to select case studies (Able to identify variables, goals, Status Quo)

Identifying NK’s general domains (From the early 1990s to 2009) → Selecting three factors affecting nK’s domain (External, Internal, and ROK factors)

Establishing two hypotheses regarding nK’s decision making processes in its nuclear program:

**Hypothesis 1:** North Korea would adopt risk-averse behaviors in its nuclear weapons program when it is in the domain of gains, while risk-seeking behaviors when it is in the domain of losses.

**Hypothesis 2:** North Korea might take a risk-averse action when the chance of success is extremely low and the ensuing result is catastrophic to its regime, even though it is deep in the domain of losses.

Rational Choice Model: the net expected utility → Testing HYPs’ and identifying implications

Cognitive Choice Model: the net prospective utility → Predicting North Korea’s future behaviors

Indicators of the rational choice model → Suggesting effective deterrence strategies

Indicators of the cognitive choice model → Setting up three criteria to select case studies (Able to identify variables, goals, Status Quo)

Figure 3-13: General Flow Chart for Testing Hypotheses
Case Studies on North Korea’s Decision-Making Processes on its Nuclear Provocations

Chapter 4: Case Studies

“You may advance and be absolutely irresistible, if you make for the enemy's weak points; you may retire and be safe from pursuit if your movements are more rapid than those of the enemy.”

Chapter 6 (Weak Points and Strong) in *the Art of War*, Sun Tzu

Introduction

General Description of Analytical Method

In this part, case studies would be conducted to prove hypotheses derived from two decision-making models in accordance with the analytical framework suggested in the previous chapter. To begin with, a short description about this case will be presented to provide a general idea, such as North Korea’s actions and reactions from neighboring countries. And then, North Korea’s “domain” or strategic status should be identified to determine its impact on the decision environment upon which the DPRK (Democratic People’s Republic of Korea) chooses an option employing two decision-making models—the rational choice and cognitive choice models. Along with North Korea’s domain, its goal or a “reference point” is also an important parameter to be identified before testing hypotheses because it would be used as a reference point. The existence of a “reference point” provides a significant difference in analyzing a certain decision between two selected models.

According to the rational choice model, the key determinant in Pyongyang’s choice is the variation of the expected utility of each option from current total level of assets in maintaining the status quo: whether the value of a certain expected utility is positive or negative from that of the status quo and how much each value is. That is, each option would be evaluated against current asset value of maintaining the status quo, and one option would be selected when it offers the maximum expected utility out of options available: 

\[ E(U/V) = f(p_1)u(B_1 - C) + \ldots + f(p_n)u(B_n - C) = \sum_{i=1}^{n} f(p_i)u(B_i - C) \]

where \( p_i \) denotes the probability assigned to each outcome \( 1.0 = p_1 + p_2 + \ldots + p_n \), \( B_i \) denotes the benefit assigned to each outcome, and \( C_i \) denotes the cost assigned to each outcome of a certain option.
For the simplicity of calculating expected utility, this dissertation assumes that the subjective probability assigned to each case of benefit and cost for a certain option are measured with qualitative term, such as “the probability of benefit for a certain option is greater or less than that of cost.” Also, the values of benefit and cost for a certain option are defined as qualitative term such that “the value of benefit for a certain option is greater or less than that of cost.”

According to arguments of the cognitive choice model endorsed by prospect theory, the key determinant for choosing a certain option would be the variation of the prospective expected utility toward or from North Korea’s current reference point of “becoming a nuclear power”. That is, if the value of the prospective utility for a certain option is greater or higher than that of the reference point, that option could be surely considered as an alternative. On the other hand, if the prospective utility is less or lower than that of the reference point, that option would be eliminated from a list of alternatives.

There are two important things to be considered in applying the cognitive choice model to this case study. A reference point may be often the status quo itself, but they may not be necessarily the same with each other. They appear different in this case. The second thing is about the relationship between the domain of North Korea and the calculation of prospective utility for a certain option. Just as mentioned in the previous chapter, the strategic domain of an actor significantly influences the cognitive patterns of a decision-making process. As a result, this dissertation could assume that the calculation of prospective utility is highly influenced by the domain of an actor, and it is seriously considered that North Korea is now in the deep domain of losses as mentioned before.

**Hypotheses to be tested**

This dissertation has already set up two hypotheses in the previous chapter regarding North Korea’s decision-making processes employing two decision-making models—the rational choice and cognitive choice. The first hypothesis reflects the impact of decision environments (e.g., North Korea’s domain and its reference point) on the North’s choice of a specific decision model. Meanwhile, the second hypothesis would be
designed to emphasize that the “preference reversal”\(^\text{18}\) predicted by the standard prospect theory may not occur in a specific condition, where the chance of success is extremely low and the ensuing result is tremendously painful.

**Hypothesis 1**: North Korea would take risk-averse behaviors in its nuclear weapons programs when it is in the domain of gains, while risk-seeking behaviors when it is in the domain of losses relative to the status quo.

**Hypothesis 2**: North Korea might take a risk-averse action when the chance of success is extremely low and the ensuing result is catastrophic to its regime, even though it is in the deep domain of loss.

From these two hypotheses, this dissertation has to elicit several independent variables constituting the rational choice model and cognitive choice model. In the case of the rational choice model endorsed by expected utility theory, two variables should be identified: subjective probability \(f(p)\) and value \(u(x)\) assigned to each outcome of options available to North Korea in a specific period. On the other hand, weighted probability \((w(p))\) influenced by North Korea’s domain and its propensity toward risk should be extracted in the case of the cognitive choice model employing a **rule of thumb**\(^{19}\), which is conceptualized by prospect theory.

### North Korea’s Nuclear History, 1953-1993

**1953: Original motivation for pursuit of nuclear weapons**

To understand North Korea’s such an adamant pursuit for nuclear weapons, a brief history of its nuclear weapons development program should be discussed before analyzing Pyongyang’s decision-making process regarding this first nuclear crisis.

Shortly after the end of Korean War in 1953, North Korea is believed to have started its

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\(^{18}\) In general, an individual’s preference for a certain option is affected by the expected value of that option according to rational choice model. That is, if a certain option is expected to have greater value relative to another, an actor is likely to have a greater preference on that option so that its decision would be consistent with the logic of rational choice model, in which the expected utility affected by preferences is the key determinant for a certain choice. On the other hand, a reversal of choice could happen when an actor is in the domain of losses. In other words, an actor could take a risky choice which is not the optimal one, instead of taking a safe choice which is better in terms of the expected value, under a certain circumstance. Since he often reverses his choice under the domain of loss, consequently, the prospect theorists call this phenomenon as a “preference reversal.”

\(^{19}\) For simplicity and availability for this quasi-empirical analysis, this dissertation uses a **rule of thumb** to generate weighted probabilities \((w(p))\) to be used in the Cognitive Choice Model (CCM), instead of the probability weighting function suggested by Kahneman and Tversky (1979). In general, the risk-taking player discounts the probability of negative outcomes and overvalues the probability of positive outcomes due to the loss-aversion bias. Thus, **Probability (CCM)** or \(W(p) = 0.5 \times \text{Probability(RCM)}\) for outcomes where \(EU(\text{outcome}) < EU(\text{status quo})\). The positive outcomes then absorb the remainder of the probability.
nuclear program. During the Korean War, the US explicitly or implicitly threatened to use its nuclear weapons to prevent the People’s Liberation Army (PLA) from intervening in the Korean War in the early stage of the conflict and force the communist alliances to sign an armistice pact to end the prolonged Korean War in the final stage of the conflict.

For instance, in his meeting with Indian foreign minister in the late 1950s, John Foster Dulles, then the Secretary of State in the Truman administration, hinted that the US will seriously consider a ‘drastic measure’ to end the Korean War as soon as possible. The Indian official, Jawaharlal Nehru, who heard this ‘implicit’ threat of nuclear weapons use by the United States, relayed this to then Chinese foreign minister, Zhou Enlai. This kind of implicit threat appears to have aroused a lot of debates inside the Chinese leadership on whether intervening the Korean War is strategically necessary at a time when the country is still unstable from the inception of the country one year ago and the US is growing its threat to use nuclear weapons. Although Mao’s forceful personality won out at that time and the Chinese People’s Volunteer (CPV) force crossed the Yalu River on October 19th 1950, a nuclear ‘blackmail’ by the US thereafter continued to coerce the Chinese and DPRK leadership into concession of reaching the armistice agreement for the remainder of the conflict. According to Dulles and Eisenhower’s memoirs, for example, this ‘blackmail strategy’ played an important role in precipitating signing the armistice pact in July 1953.

In terms of strategic nuclear parity, the Soviet Union was not in a position to compete with the US by this time, though it succeeded in testing its first nuclear device in September 1949. The behavior of the Soviet Union during the Korean War could well explain how seriously it considered the nuclear dominance of the US at that time. That is, Joseph Stalin, the dictator of the country, did not send its military personnel to North Korea, except for military advisers, and even declined to provide military equipment in the latter half of the Korean War in an effort to send a signal to both the US and its communist allies—China and North Korea— involving the Korean War that it does not want to extend this conflict any longer. But he had provided Kim Il-Sung with a huge amount of military aide enough to conquer the entire Korean peninsula in the preparation

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20 Andrew Scobell, China and North Korea: From Comrades-in-Arms to Allies at Arms Length (Strategic Studies Institute: US Army War College, April 2004), 1-2.
phase for this war. Observing its powerful allies’ inability to aggressively confront with the US during this period of the war, when the communist allies had a relative advantage against the US-led UN forces, Kim Il-Sung is believed to have decided to build a nuclear bomb on its own to defend itself and not to be blackmailed in the future.22

1950’s-1960’s: Ongoing US Aggravation

The US deployment of tactical nuclear weapons to South Korea in the mid-1950s appears to have aggravated North Korea’s security concerns, further strengthening Pyongyang’s pursuit for nuclear weapons. For instance, the US began deploying 280-mm nuclear artillery and Honest John nuclear missiles in 1958 and this effort has continued throughout the 1960s by diversifying the types of nuclear arsenals: in 1959, US Air Force (USAF) fielded Matador cruise missiles with a range of 1,100km; in 1961, Mace with an enhanced range of 1,800km was introduced to the peninsula; and in the mid-1960s, US military brought tactical nuclear weapons fitted for specific military purposes, such as Atomic Demolition Munitions (ADM) of land mines, aimed at slowing North Korean advance toward Seoul after North Korea’s penetrating the defense line of the ROK-US combined forces north of the South Korean capital, and nuclear-tipped Nike Hercules surface-to-surface missiles.23

1960’s-1980’s: Efforts to reduce North Korea’s nuclear ambitions

Even though North Korea experienced diplomatic disputes during the 1960s and 1970s with its two strong allies (the Soviet Unions and the People’s Republic of China) over domestic and economic policy lines,24 it continued its efforts for developing its own nuclear weapons and had one big achievement in its history of nuclear program—receiving its first nuclear research reactor from the Soviet Unions in 1965. In the mid-1980s, there was another big milestone in North Korea’s nuclear development history.

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22 Mazarr, op.cit., 19-21.
24 Shortly after the Korean War, a faction in the North endorsed by the Soviet Unions publicly challenged Kim Il-Song’s policy of making himself mystified in conjunction of demystifying Stalin after his death in Moscow. During the “Cultural Revolution” of China in the latter 1960s, the “Red Guard” criticized Kim Il-Song’s personal idolization. Kim Il-Song responded to these challenges by purging factions in the North supported by his patrons, but had to reinstate them from their pressures, thus seriously undermining his leadership. As for influences of the Soviet Unions and PRC during the 1960s and 1970s, see Baek Jun-Gi, “The Change of North Korean Politics and Power Distribution after the Armistice Pact,” North Korea Contemporary History-I (Kyeongnam University: Seoul Korea, 2007), 254-258.
The DPRK signed the nuclear Non-Proliferation Treaty (NPT) in 1985 at the strong urge from the Soviet Unions, the only ally that could have provided Pyongyang with its urgently-needed nuclear technology by that time. This, in turn, was the result of a strong request of the US toward the Soviet Unions, then controlled by a reform-minded leader, Michael Gorbachev, shortly after satellite images showing North Korea is building its second and even larger Soviet-style nuclear reactor (50-Mw) at Yeong-byeon nuclear complex in 1984.25

1988: Evidence of North Korea’s nuclear progress

Unfortunately, a regular inspection of North Korea’s declared nuclear facilities was not achieved until the end of 1988 due to the administrative mishap26 on the part of the IAEA and Pyongyang’s intentional delay tactics. Such a regular inspection is usually supposed to be completed within 18 months after singing the NPT. In the late 1988, a US satellite detected several significant developments at the Yeong-byeon nuclear complex: the North was building two large nuclear reactors with the capacity of 50-Mw and 200-Mw, respectively; constructing 5 stories’ large-scale reprocessing facility, known as a ‘radio-chemistry laboratory’ in North Korean term; and conducting high-explosive experiments aimed at designing various types of a nuclear warhead. Considering the size of nuclear facilities Pyongyang was building, it was surely estimated that North Korea could produce weapon-grade plutonium enough to make 30-40 warheads every year, if normally operational.27

1989-1990: Intensified US/ROK Efforts

25 According to Mack, there are several reasons for the North to sign the NPT in 1985, even though signing the NPT seems contradictory given the fact that North Korea was aggressively pursuing for nuclear weapons at that time. The first reason was the strong urge from the Soviet Unions, then the only nation that could provide the nuclear technology to North Korea. The Soviet Unions had its national interests in preventing its ‘satellite’ countries like North Korea from acquiring ‘political weapons’ and enjoying international influence with the US as a superpower. The second reason was to mitigate international suspicion of Pyongyang’s secret nuclear programs so that it could acquire an official technical assistance of nuclear technology from the IAEA. For detailed accounts about North Korea’s signing the NPT in 1985, refer to Andrew Mack, “The Nuclear Crisis on the Korean Peninsula,” Asian Survey, Vol.33, No. 4 (April, 1993), 346.

26 There are two kinds of document to be sent to a signatory country to reach the IAEA safeguard agreement: one for specific nuclear facility inspection and the other for general nuclear complex in one country. In this case, the latter should have been sent to North Korea, but the former was sent to Pyongyang by administrative mistakes of the IAEA. For details, see Michael J. Mazarr, “Going Just a Little Nuclear: Nonproliferation Lessons from North Korea,” International Security, Vol.20, No.2 (autumn, 1995), 94.

27 Ibid., 93-94; and Scott Snyder, North Korea’s Nuclear Program: The Role of Incentives in Preventing Deadly Conflict (USIP: Washington D.C., 1996), 57.
Perceiving serious threats both to the NPT regime for the US and to security concerns for South Korea, Washington and Seoul began persuading North Korea to sign the IAEA safeguard agreement in the early 1990 as a first step toward ending North Korea’s nuclear program. Both countries offered several incentives to persuade Pyongyang to scrape its nuclear programs in September 1991: withdrawing all US tactical nuclear weapons deployed on South Korea since the mid-1950s; suspending the annually-held ROK-US combined joint exercise, know as “Team Spirit” in ROK-US terms or ‘Nuclear exercise for invading North Korea’ in North Korean terms, from 1992; and suggesting a high-level talk for normalizing diplomatic ties with the US. These offers from both ROK and the US seemed a revolutionary offer to the North, given decades of impasses in inter-Korean dialogues where US nuclear weapons on South Korea and the combined military exercises had been ‘hot and non-negotiable’ issues to both opposing rivals.

1991-1992: Illusions of Progress

Pyongyang responded positively to this initiative and reached two historic agreements both with South Korea in December 1991 and with the IAEA in May 1992, respectively. The first agreement was a “Basic Agreement between South and North Korea” and it included two important attachments: 1) Accord on Nonaggression and Reconciliation for conducting cooperation and reconciliation as a first step toward the final goal of reunifying the separate nation and 2) South-North Compact on Denuclearization on the Korean peninsula, which is independent of the international non-proliferation regime from the IAEA and was intend to seek more intrusive and extensive inspections in suspected sites from both countries.

28 To obtain diplomatic acquiescence from the Soviet Unions and China in imposing sanctions on the North in case of its defiance, the Bush administration intended to proclaim a withdraw of all land and sea-based tactical nuclear weapons around the world, including from South Korea, in the early 1990. Since it was on the verge of waging war against Iraq, however, proclaiming this initiative at this time was considered to weaken the US deterrence power against Iraq, which was assumed to have acquired weapons of mass destruction, including chemical agents. As a result, the US officially proclaimed a withdrawal of tactical nuclear weapons in September 1991, several months after the first Gulf war ended. For the background regarding US’s decision to withdraw tactical nuclear weapons around the world, refer to Snyder, ibid., 56-57; Oberdorfer, op.cit., 256-260.

29 Mazarr, op.cit., “Going Just a Little Nuclear…” 95.

30 This is one of the most important agreements between two Koreas since the end of Korean War in 1953. According to this accord, both countries are not allowed “to test, manufacture, produce, receive, possess, store, deploy or use nuclear weapons, possess nuclear reprocessing and uranium enrichment facilities.”
In the meantime, an effort to conduct a regular inspection between North Korea and the IAEA began in the early 1992. In the February, both parties met in Geneva to sign the draft version of an inspection agreement and, thereafter, North Korea’s Supreme People’s Assembly (SPA) ratified this agreement in April. Shortly after director General of the IAEA, Hans Blix, visited Pyongyang in May 1992 for laying out ground rules for this inspection, a long-waited regular inspection started at the end of May 1992.

This smooth start for denuclearizing North Korea did not last long. The first rift came from the talks between South and North Korea for setting up the procedures to conduct extensive and intrusive inspection regime, as stipulated on the previous basic agreement. The South wanted to conduct extensive and contingent inspections with a short notice against all suspected sites to avoid the possibility of North Korea’s cheating, while the North sustained a limited and regular inspection, in which only declared sites would be inspected. As a result, there have not been any progress until the mid-1992 and this dispute between two Koreas nearly approached the point of unraveling as significant suspicion of the IAEA against North Korea surfaced in June 1992. The IAEA inspection team found a significant discrepancy between the amounts of plutonium North Korea declared to have extracted from the current operating experimental reactor and the expected amount of plutonium based on scientific analysis by the inspection team. To understand this significant difference, the inspection team requested the Pyongyang regime to permit contingent visits to two undeclared ‘suspicious’ facilities within Yeongbyeon nuclear complex. North Korea rejected this offer, saying “they are military facilities irrelevant to its nuclear program and it would undermine its sovereignty.”

In the fall of 1992 and early 1993, tension on the Korean peninsula was growing high with several actions and reactions among players: Seoul and Washington declared they would resume the “Team Spirit” exercise in 1993; the IAEA officially requested a

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Based on these provisions, South Korea and the United States have been requiring Pyongyang to dismantle its plutonium reprocessing and uranium enrichment facilities, though there had not been any direct provision preventing North Korea’s uranium enrichment activity in the 1994 Agreed Framework. See Oberdorfer, *op.cit.*, 264.

31 North Korea told the IAEA inspection team that they had extracted plutonium less than 100g for research purpose one time in 1989. According to the sophisticated scientific method employed by the IAEA team, however, North Korea was supposed to extract plutonium three times in 1989, 1990 and 1991. For detailed accounts regarding the discrepancy of extracted plutonium, refer to Mazarr, *op.cit.*, *North Korea: The Bomb*, 94.
“Special Inspections” against all suspicious sites and revealed its intention of referring this issue to the UN Security Council in case of North Korea’s defiance; and North Korea responded with traditional rhetoric, saying that “it will consider any UN-led sanctions as a declaration of war on the peninsula and be ready to conduct any kinds of war with determined resolute under the leadership of the ‘Great Leader,’ Kim Il-Sung, and the ‘Dear Leader,’ Kim Jong-II.”

32 Vice Marshal Choe Kwang, Chief of the General Staff of the North Korean military declared that the military “has the heavy and honorable task of reunifying the fatherland with guns in the nineties without failure.” See the December 23rd statement of the Korean Central News Agency (KCNA).
Case 1-North Korea’s First Nuclear Crisis (2/1992-10/1994)

1. General Description

North Korea’s first nuclear crisis on the peninsula started in the late 1992, when inspectors of the IAEA (International Atomic Energy Agency) found a significant discrepancy between the amount of plutonium declared by Pyongyang and the one scientifically estimated by the IAEA. To identify the difference, the IAEA inspectors, in early February 1993, requested a “special inspection” to two undeclared- and- ‘suspicious’ facilities inside Yeong-byeon nuclear complex and North Korea flatly rejected that offer, saying “they are military facilities irrelevant to its nuclear program and this abrupt request by the IAEA represents a new plot to impair the prestige of the DPRK and isolate it. This also constitutes an unpardonable provocation aimed at infringing on and violating its sovereignty and dignity.” After this incident, a nearly two-years’ tug of war between Pyongyang and Washington began and finally culminated in reaching a historic “Agreed Framework (AF)” between two countries on October 21 1994, though, during this period, there had been a highly charged confrontation just short of war in the early May 1994, when the DPRK rapidly stepped up an escalation rung by defueling its controversial 5-Mw nuclear reactor.

March 1993: North Korea withdraws from NPT

In March 1993, Pyongyang raised an escalation rung to its highest level available by declaring a withdrawal from the NPT in response to the IAEA’s moves of referring this issue to the UN Security Council and achieving a resolution to punish Pyongyang’s uncooperative behaviors. This action by North Korea was an unprecedented provocation in the history of the IAEA since its foundation in 1958. After this time, the negotiating partner with North Korea changed from the IAEA to the United States, which was one of the most long-standing requests from Pyongyang since the beginning of this nuclear crisis in the early 1990. Receiving a promise to hold a high-level talk to resolve this nuclear confrontation from Washington, Pyongyang declared it would suspend the withdrawal from the NPT on June 11th, the official day when North Korea’s withdrawal from the

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NPT regime was supposed to be taken effective unless it retract its original declaration, during a negotiating process.

1993-1994: Negotiations Fail

In the subsequent one year after the US began negotiating with Pyongyang, confrontations were growing higher than ever anticipated because two sides had strategic demands which were totally incompatible with each other: Washington demanded a complete dismantlement of North Korea’s nuclear program as a precondition for subsequent developments, while Pyongyang adamantly rejected that offer and requested several key conditions be satisfied before abandoning its nuclear program. These standoffs were running high without any concession from other party and appeared to plummet into catastrophic consequences in the early June 1994, when a rumor Washington is planning a surgical strike against Yeong-byeon nuclear facilities circulated around local mass media in Seoul and Washington in response to Pyongyang’s latest provocations: defueling the experimental reactor in the absence of IAEA inspectors and expelling them from North Korea in revenge of the IAEA’s decision to withdraw technical assistance to Pyongyang during May in 1994. According to Don Oberdorfer, then the Clinton administration actually augmented military capabilities in preparation for a possible North Korean invasion during this period.34

June 1994: Carter Intervenes

It was Jimmy Carter, former US President, who deflected this ‘head-on’ collision between ‘two chickens’ and reset a negotiation table. On June 21, he visited Pyongyang as personal status without getting any authority from then the Clinton administration and met with Kim Il-Sung, the North Korea’s ‘Great Leader,’ who is the only person in the Pyongyang regime to be able to make such a significant decision as suspending or dismantling its nuclear program. After several hours’ meeting with him,

34 In April 1994, the US forces in Korea began deploying Patriot Air Defense system, which was proven to be marginally effective in intercepting an incoming ballistic missile during the first Gulf War in 1991, to US Air Force bases in Korea. In addition, a battalion of Apache (AH-64) attack helicopters was introduced to the US army bases in Korea to replace an old helicopter fleet, Cobra (AH-1), Bradley heavy tanks were brought to Korea as a replacement of old armored personnel carriers, and in particular advanced radar tracking systems were fielded to counter North Korea’s long-range artillery pieces located close to north of the DMZ. For detailed accounts regarding the US military efforts to augment its forces in South Korea during this period, see Oberdorfer, op.cit., 311-316.
Carter sent back a message that the DPRK would freeze its nuclear program in exchange for a package of benefits. With this historic breakthrough, both parties resumed its negotiation to reach a final deal.


Despite several ups-and-downs in the subsequent meetings, the general procedure and mood of negotiations were smoother and more cooperative than the previous ones. On the way of reaching a final deal, there was one phenomenon event—the death of Kim Il-Sung due to sudden heart failure on July 8th, 1994. Even though there had been some reasonable expectations that his sudden death would provide significant negative impact on this nuclear negotiation, it was proved to be so exaggerated. After two weeks’ mourning session, the DPRK returned to a negotiation table and signed a historic ‘Agreed Framework (AF)’ with the US on October 21, 1994, at Geneva, Switzerland. Considering North Korea’s previous negotiation behaviors utilizing some tactics of delaying and intimidating, this attitude was considered extremely rare and unfamiliar to observers studying North Korea for years.

**Overview**

In general, this AF is considered an ad hoc solution to Pyongyang’s nuclear program because it did not stipulate an instant dismantlement of North Korea’s nuclear activities, instead freezing its nuclear program for the time being and eventually achieving its final goal after taking several steps. That’s reason why this AF is called as a ‘package deal’ where each party should implement its own obligation assigned at the current phase in order to go to the next phase. It was an explicit result that each party had had grave suspicion on the other party’s credibility to keep its words. This AF is composed of three phases and some provisions in each phase contain ambiguous contents to provide a room for flexibility to each party.36

35 Former US president Carter was very cautious and careful not to provoke Kim Il-Sung during the meeting with him. He tried not to use ‘Sanction, Special Inspection, and Deterrence Measures,’ and instead, choose ‘Misunderstanding, Peaceful Resolution, and Cooperation.’ For his part, Kim Il-Sung was very pleased with Carter’s visit to defuse this heightened tensions and it was well reflected by his rapid decision to resume talks with the US without any precondition. For details of Carter’s meeting with Kim Il-Sung, see ibid., 326-336.

36 The AF between Pyongyang and Washington obtained a lot of criticisms from conservative circles in Washington, as well as Seoul, because they argued “it rewarded the North for its provocative and intransigent behaviors and will therefore severely undermine the credibility of the NPT regime and
Phase 1
In the first phase, which lasts until the end of 1990s, Pyongyang should conduct several assigned obligations to get benefits from the US: 1) freezing nuclear activities at its current nuclear reactor and reprocessing facility; 2) promising not to build any new nuclear facilities; 3) storing its 8,000 spent fuel rods extracted from the 5-Mw reactor in a secured place with seals; and 4) resuming inter-Korean dialogues to implement the provisions of the ‘Basic Agreement between Two Koreas.’ In response, the US should implement its obligations to Pyongyang to go to the second phase of non-proliferation: 1) promising not to use its nuclear weapons against North Korea unless Pyongyang builds nuclear weapons (negative security assurance); 2) lifting trading barriers imposed on North Korea and suggesting a high-level talk for normalizing ties; 3) organizing an international consortium to provide the DPRK with two light-water reactors with capacity of 200-Mw by the end of 2003; and 4) providing annually 500,000 tons of heavy fuel oils to North Korea in an effort to compensate for the lack of electricity due to the shut down of its nuclear power plant.37

Phase 2
The second phase lasts from 2000 to 2003, when the first light-water reactor is supposed to be completed. Once the key components of the first nuclear reactor arrive in North Korea, North Korea should allow the IAEA to inspect its two undeclared waste sites and begin to ship its 8,000 spent fuel rods to a third party. When the first nuclear reactor is completed to be built, all spent fuel rods should be completely transported to a third party. The final phase will end when North Korea dismantles all nuclear reactors

authority of the US government in the later potential negotiation with other proliferants.” On the other hand, the US administration officials involved in this negotiation claimed that “it was optimal solution, though not maximal one, given the complexity involving this nuclear crisis.” They additionally argued that “stopping North Korea’s future nuclear capability had been more significant policy consideration than spending efforts to investigate Pyongyang’s past nuclear activities at that time.” For controversies and details regarding the AF, see Snyder, op.cit., 70-73; The White House, Office of the Press Secretary, “Statement by the President” and “Press Briefing by Ambassador Robert Gallucci,” October 18, 1994; Michael R. Gordon, “US-North Korea has a 10-year timetable,” The New York Times, October 21, 1994, Section A; and “Where has the transparency of North Korea’s nuclear program gone?” Chosun Ilbo, October 15, 1995, A1.

under construction and its reprocessing facility in response to the completion of second light-water reactor.\footnote{Ibid, 3-4.}

2. Case Analysis

Overview

Just as mentioned in the previous methodology chapter, two parameters influencing North Korea’s decision environment should be measured before analyzing North Korea’s decision-making process regarding this first nuclear crisis on the basis of two decision-making models—the rational choice and cognitive choice models. The first parameter is Pyongyang’s domain of action, or its strategic position under which North Korea would be framed when making a strategic choice. The second one is about Pyongyang’s perception on the status quo, or a reference point with which North Korea would compare its expected utilities when choosing a certain option.

Both of them would constitute decision environments which would provide a significant impact on Pyongyang’s choice of its alternatives available. By comparing the predicted behaviors derived from two decision-making models with the actual North Korea’s course of actions, it would be possible to determine which model would have more explanatory power in explaining North Korea’s strategic behaviors and specific conditions under which each model could have unique explanatory power in explaining the North’s decision-making process.

Domain of Action

Overview

To identify North Korea’s domain, or strategic location on its subjective value function, three elements are explored, as mentioned in the previous chapter: internal factor, mainly composed of Pyongyang’s political, economic, and military capabilities; South Korean factor, meaning the country’s strength or power relative to North Korea; and external factor, consisted of the influence of other key foreign players (e.g., US, China, Russia and Japan) on Pyongyang’s policy choice.
Internal Factor
Security and Stability
Unlike the unfavorable conditions from the external and South Korean factors, North Korea seems to have had no problem in maintaining strong internal security. In the early 1990s, Pyongyang completes the final stage of power transition from Kim Il-Sung to Kim Jong-II by taking some steps for solidifying Kim Jong-II’s power base: Kim Jong-II was installed as a supreme commander in North Korea’s Peoples’ Army (KPA) in December 1991 and as a chairman of defense commission in April in 1993, elected as a general secretary of North Korea’s Workers Party (KWP) in August 1993, and finally appointed young military generals loyal to him to the key posts in KPA during this period. All these moves have been choreographed by his father, Kim Il-Sung, with long term plan for the last three decades starting in the mid-1970s. North Korea’s pursuit for strict internal security control has ever strengthened by aggressively adopting the ‘Military First’ politics, in which the military holds all powers in controlling North Korean society and would be exclusively given all kinds of precious benefits and perks the North Korean regime could provide in an effort not to undergo the same experience of regime collapses in the Eastern Europe since the late 1980s. Accordingly, the internal factor influencing the decision environment of North Korea is believed to have been the only element Pyongyang could have felt some sense of stability or advantage during this period.

Economy
The year of 1985 would be the last one when the DPRK observed positive growth in its economy. After that year, Pyongyang experienced a steady decline in its growth rate and plummeted to its record negative growth rate of nearly an 8% in 1993, causing the start of vicious economic recession cycle by incurring a sharp decline in industrial merchandise production. This negative growth rate has continued for the next decade due

39 For the process of strengthening Kim Jong-II’s power base, see Lim Jae-Hyeong, “The characteristics of North Korea’s foreign policy decision-making process and the role of its military: Focusing on Kim Jong-II’s era,” The North Korean Institute, Vol.6, No.1 (2002), 44-47.
40 North Korean regime adopted a new governing guidance, called as ‘Military First Politics,’ in an effort to aggressively confront three crises facing Pyongyang during this period: food, energy, and security crises. This policy was devised to hold tight control on internal security by employing KPA’s power, rather than KWP and security forces, which were key security apparatus for the last three decades in the North. For details regarding North Korea’s ‘Military First Politics,’ see ibid., 55-58; and Jang Sung-Jang, “North Korea’s military first policy of Kim Jong-II era and the relationship between party and military,” National Strategy, Vol.7, No.3 (Sejong Institute: Seoul, 2001).
Analyzing North Korea’s Decision-Making Process on its Nuclear Weapons Programs
with the Rational Choice and Cognitive Choice Models

Chapter 4: Case Studies

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The Pardee RAND Graduate School

to consecutive years of natural disaster—flood and drought—in North Korea during the
period of 1995-1996. Also, in 1998 when financial crisis spread across Asia, North Korea
again marked a record negative growth rate of about a 7 %, though Pyongyang had not
extensively connected to international financial institutions since the early 1990s (See
Figure 4-1).

![North Korea's Trends in Economic Growth Rate, 1970-2000](image)

Figure 4-1: Trends in North Korea’s Economic Growth Rate, 1970-2000
Source: Author’s reconfiguration from Statics Korea, *Socio-economic comparison between two Koreas* (Seoul: 2000.12).

Especially, most prominent economic indicators were getting worse sharply in the
early 1990s when the Eastern communist blocs, one of the most important North Korean
trading partners, began to collapse. For instance, North Korean GNP (Gross National
Product) dropped by about 4 % in 1990, 5 % in 1991 and 8 % in 1992, respectively. By
contrast, South Korea, during the same period, made a great progress in its economic
growth rate by achieving 7.5 % positive rate on average, which might have further made
Pyongyang feel severe relative deprivation against its arch-rival, South Korea (See Table
4-1). North Korea’s trade volume was also severely hit by the collapse of its communist
allies in Eastern Europe by marking a sharp drop from $4.64 billion in 1988 to $2.72
billion in 1991 and, thereafter, this sharp decline in trade continued to maintain until the
end of the 1990s (See Figure 4-2).
Table 4-1: Macro Economic Indicators of North and South Korea, 1991-1994

<table>
<thead>
<tr>
<th>Fiscal Year</th>
<th>GNP ($ billion)</th>
<th>Per-capita GNP ($)</th>
<th>Growth Rate (%)</th>
<th>Total Trade ($ billion)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>North Korea</td>
<td>South Korea</td>
<td>North Korea</td>
<td>South Korea</td>
</tr>
<tr>
<td>1991</td>
<td>22.9</td>
<td>281.7</td>
<td>1,038</td>
<td>6,518</td>
</tr>
<tr>
<td>1992</td>
<td>21.1</td>
<td>305.7</td>
<td>943</td>
<td>7,007</td>
</tr>
<tr>
<td>1993</td>
<td>20.5</td>
<td>330.8</td>
<td>904</td>
<td>7,513</td>
</tr>
<tr>
<td>1994</td>
<td>21.2</td>
<td>376.9</td>
<td>923</td>
<td>8,483</td>
</tr>
</tbody>
</table>


Figure 4-2: Trends in North Korea’s Trade Volume, 1965-1994


Even though the collapse of socialist trading partners in the Eastern Europe appeared to be a direct cause for its bad economic performance, Pyongyang had also some detrimental and structural factors inherent in its economy for the last several decades and they might have further exacerbated its already-ailing economy, coupled with outside factors mentioned before. The first structural factor to impede Pyongyang’s economic development was the centrally-commanded economic planning system where all economic planning and execution would be conducted by central government directives independent of the supply and demand law from the market. Accordingly, a lot
of inefficiencies and structural bottlenecks in running economy have permeated into the Pyongyang’s economy system for the last several decades.\textsuperscript{41}

The shortage of oil imports has also played a significant role in North Korea’s severe economic recession during this period. Since the early 1990s, two key oil suppliers to North Korea—Russia and China—have requested Pyongyang to pay their oil supplies with hard currency, instead of the barter trading, which had been a main trading way conducted among them until the end of Cold War. With this shift in trading policy, North Korea has felt a sharp decline in oil imports from two countries due to the lack of foreign currency. For instance, Russia dropped its oil supplies to Pyongyang by 10\% in 1991 compared to the previous year and completely stopped its export by October 1992. China has also taken the same step in exporting its oil to North Korea, resulting in a sharp drop of its oil supply to Pyongyang by more than half from 1.2 million tons in 1991 to 550,000 tons in 1992. This trend continued thereafter and resulted in a record of less than million ton in oil imports in 1994 (See Table 4-2).

<table>
<thead>
<tr>
<th></th>
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<th></th>
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<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Coal Production</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Million tons)</td>
<td>43.3</td>
<td>33.1</td>
<td>31.1</td>
<td>29.2</td>
<td>27.1</td>
<td>25.4</td>
</tr>
<tr>
<td>Index</td>
<td>100</td>
<td>76.4</td>
<td>71.8</td>
<td>67.4</td>
<td>62.6</td>
<td>60.1</td>
</tr>
<tr>
<td>Crude oil imports</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Thousand tons)</td>
<td>2,600</td>
<td>2,520</td>
<td>1,890</td>
<td>1,520</td>
<td>1,360</td>
<td>910</td>
</tr>
<tr>
<td>Index</td>
<td>100</td>
<td>96.9</td>
<td>72.7</td>
<td>58.5</td>
<td>52.3</td>
<td>35</td>
</tr>
<tr>
<td>Electricity generation</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Billion kilowatt-hours)</td>
<td>29.2</td>
<td>27.7</td>
<td>26.3</td>
<td>24.7</td>
<td>22.1</td>
<td>23.1</td>
</tr>
<tr>
<td>Index</td>
<td>100</td>
<td>94.9</td>
<td>90.1</td>
<td>84.6</td>
<td>75.7</td>
<td>79.1</td>
</tr>
</tbody>
</table>


\textsuperscript{41} According to Mack, there were two systematic factors leading to North Korea’s economic crisis during this period: the centrally-controlled economic planning system and Moscow’s decision to normally trade with Pyongyang based on the principle of market economy, thus requiring North Korea to pay hard currency for its exports. He put more emphasis on Russia’s decision because most factories in North Korea were being operated with parts imported from Russia and the suspension of them resulted in nearly disruption of factory operations in North Korea. For details on Russia’s economic policy change toward Pyongyang and its implications, see Andrew Mack, “The Nuclear Crisis on the Korean Peninsula,” \textit{Asian Survey}, Vol.33, No.4 (April, 1993), 347-349.
A shortage of coal production in the early 1990s also appears to be a key contributor to bad economic performance of North Korea. In general, the DPRK was reported to have a lot of coal reserves in its territory and that coal had been a key energy source to drive North Korea’s economy for the last 4 decades. The significance of coal in its economy is well illustrated with the following fact that coal accounts for 82 percent of primary energy source and 75 percent of final consumption. Since the early 1990s when North Korea faced a sharp decline in oil import, however, the production of coal has simultaneously dropped to the level of 60 percent from where it could have produced at a maximum level due to strategic linkage between coal mining and oil consumption.

For instance, the DPRK might have become difficult to extract enough coal necessary for satisfying its energy need since the depth of coal deposits becomes deeper as time passes and North Korea faced the shortage of oil supply to mining machines due to a sharp decline in oil import. This sharp decline in coal production caused in turn a great impact on the generation of electricity since coal accounted for about a 22% in producing electric power in North Korea by the early 1990s (See also Table 4-2).

This severe shortage of oil imports and coal production provided the first phase of vicious cycle of economic recession by getting industrial factories idle in the first place. Pyongyang, in return, could have not produced export merchandize enough to earn foreign reserve due to the low operation rates of its factories and lack of raw materials, thereby significantly reducing its foreign reserve acquisition. The lack of foreign exchange reserves again caused the shortage of oil import and then the oil shortage made its amount of agricultural product diminish sharply due to the inability to use its machinery and artificial fertilizers, most of which are highly dependent on oil and coal consumption in their production. Finally, this vicious cycle of recession quickly spread across the whole sectors of North Korea’s economy and then its economy in the early 1990s has nearly collapsed, ultimately resulting in severe shortage of food, energy, and growing gaps in terms of economic power between two Koreas, a key source of North Korea’s relative deprivation against its southern neighbor (See Table 4-3).
Table 4-3: Comparison in socio-economic indicators between two Koreas

<table>
<thead>
<tr>
<th>Item</th>
<th>Unit</th>
<th>Year</th>
<th>North KOREA</th>
<th>South Korea</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population</td>
<td>1,000 persons</td>
<td>1995</td>
<td>23,261</td>
<td>44,851</td>
</tr>
<tr>
<td>Per-capital GNP</td>
<td>US dollar</td>
<td>1994</td>
<td>923</td>
<td>8,483</td>
</tr>
<tr>
<td>Defense Budget (share in GNP)</td>
<td>$ billion (%)</td>
<td>1994</td>
<td>5.66 (26.7)</td>
<td>13.03 (3.5)</td>
</tr>
<tr>
<td>Foreign Trade</td>
<td>$ billion</td>
<td>1994</td>
<td>2.11</td>
<td>198.36</td>
</tr>
<tr>
<td>Electricity Generation</td>
<td>Billion Kw/h</td>
<td>1994</td>
<td>23.1</td>
<td>165.0</td>
</tr>
<tr>
<td>Crude Oil import</td>
<td>1000 bbl</td>
<td>1994</td>
<td>6,670</td>
<td>577,969</td>
</tr>
<tr>
<td>Steel Output Capacity</td>
<td>1,000 tons</td>
<td>1994</td>
<td>5,980</td>
<td>35,320</td>
</tr>
</tbody>
</table>


External and ROK Factors

In terms of diplomatic power, constituting one of external factors, Pyongyang faced strong challenges from its rival, South Korea, during this period. South Korea’s diplomatic initiatives to engage its Cold War foes—Russia and China—have begun in the wake of the collapse of the ‘bi-polar system’ by the Roh Tae-Woo administration of South Korea. Exploiting the transitional nature of international politics at that time, President Roh initiated a diplomatic overture (known as ‘Nordpolitik,’ German for ‘Northern Policy’) to make a normal tie with the Soviet Unions, then run by reform-minded Michael Gorbachev shortly after his inauguration in the early 1988.42

This Nordpolitik was originally designed to boost economic trades between South Korea and Communist block in Eastern Europe and isolate North Korea diplomatically so that Pyongyang would be forced to open its door to the outside world. President Roh’s endeavors culminated in South Korea’s diplomatic normalization with

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42 The most important drive for the Soviet Unions to normalize diplomatic ties with South Korea was the economic need in the latter 1980s when it faced a serious economic recession: a skyrocketing increase in unemployment rate, an increasing rate of foreign debt due to growing deficit in trading with foreign countries, and a growing decrease in factories’ operational rates due to the lack of raw materials and basic industrial goods needed for operating factories. In return for normalizing ties with South Korea in 1991, the Soviet Unions and later Russia was given nearly $ 3 billion from the Republic of Korea. After this historic event, the only remaining North Korea’s ally—China—decided to follow Russia’s path in 1992, one year after the former normalized its tie with South Korea. According to Oberdorfer, the Soviet Unions’ change in its policy toward South Korea was one of the most significant factors pessimistically affecting North Korea’s perception of its regime survival during this period. For details regarding the negotiating processes for normalizing ties between the Soviet Unions and South Korea and its implications on North Korea’s perception on its security concern, see Oberdorfer, op.cit., The Two Koreas, 197-228.

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Russia in 1991 and China in 1992, thereby causing Pyongyang to feel more serious isolation and the ensuing concern of ‘regime collapse.’ In response to South Korea’s diplomatic overtures, North Korea has also started its own initiative to engage its one-time foes—the US and Japan—in the early 1990s but failed to produce some fruitful results due to Pyongyang’s persistence on its nuclear program. As a result, the DPRK has begun feeling a total isolation in the international politics since the early 1990s.

**Summary**

In a conclusion, North Korea might have felt serious setbacks in its status of power and the fear of ‘regime collapse’ between the periods of the late 1980s and the early 1990s due to the deterioration of three elements constituting its decision environments—external, internal, in particular economic performance, and South Korean factors. In term of subjective value function, Pyongyang was believed to have been moving toward ‘the domain of losses’ from ‘the domain of gains.’ (See Figure 4-3)

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**Figure 4-3: Changes in North Korea’s Domain of Action during its First Nuclear Crisis**
Reference Point

For the last several decades, both Pyongyang’s national goal and reference point seem to have been identical: a unification of two Koreas under its term, which is “the final stage of a complete revolution of proletarian classes on the peninsula.” Still, North Korea maintains such a national goal at the top of its constitution, even though it appears to be impossible to achieve that goal given its current strategic domain of severe losses. But it seems easy to identify some departure in North Korea’s reference point from a traditionally-revered reunification to “regime survival” through a variety of sources published not only from North Korea itself, but also foreign countries involved in North Korean matter. This nuclear card would be considered one of the key assets to support its current reference point of regime survival and more specifically, there seems to be several strategic advantages on the Kim’s regime by acquiring nuclear bombs: offsetting conventional military inferiority against the ROK military, securing countervailing deterrent against potential nuclear attacks from the US, insurance against the loss of its former allies, boosting its international status, using as a bargaining chip, exploiting this nuclear weapons as shield of its limited military provocations against South Korea.

It was the early 1990s when North Korea changed its reference point to “regime survival.” After a series of failures in long term economic development plans during the previous two decades (1970s-1980s), Kim Il-Sung, the ‘Great leader,’ ordered his cabinet members to change its economic emphasis from heavy-industry to light-industry to reinvigorate its nearly collapsed economy. For the last decades, he assigned all important national affairs to his elder son, Kim Jong-Il, an heir apparent, except for some key issues, including its South Korean and US policies. Observing some inability of his son’s management in managing economy and the most unfavorable security environmental change to its regime, the ‘Great leader’ again undertook the task of controlling the regime. He implemented some key changes in North Korea’s economic policy when he regained

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43 Until the 1998 constitution revision, Pyongyang explicitly stipulated the unification of the entire Korean peninsula under its rule as its national goal in its constitution and Korean Workers’ Party platform. For detailed analysis regarding North Korea’s constitution revision and its characteristics, see Kim Dong-Hwan, “North Korea’s Constitution,” in North Korea’s Party/National Organization/Military, edited by North Korea Research Center (Sejong Institute: Seoul Korea, 2002),229-260.

the power of controlling the Pyongyang regime: a change in the emphasis of economic policy to light industry, an increase in foreign reserve by exporting its products to the world market, and initiatives to boost foreign direct investments on North Korea.

Also, Kim Il-Sung often conveyed his serious concerns about the fate of its regime to the Chinese leadership when he visited Beijing in the latter of 1980s and in the early 1990s in an effort to ensure economic and security guarantee from China. Unlike the previous visits to Beijing and Moscow, where he had been very confident and always assertive of the need for reunifying the separate two Koreas under its terms, he was desperate in getting economic and security assurance to keep its “red flag” continuously afloat.45 Even though there has not been any move to change its constitution to include some key ideas of boosting cooperation and conciliation with South Korea, a lot of efforts to boost its sagged economy through making some revisions in its economic policy and foreign policy have been identified. Accordingly, there has been a significant mismatch during this period between North Korea’s national goal (reunification of two Koreas under its control) and reference point (regime survival), both of which would be used as a reference point to analyzing North Korea’s decision-making process.

3. Predicting North Korea’s Behaviors

Options

Given the current North Korea’s domain and its reference point, several courses of actions could be explored, including 1) the status quo where Pyongyang maintains the balance of power on the peninsula, not provoking any tensions against its opponents but continuing to maintain its hostile behaviors as it did for the last several decades. The second option is to 2) escalate tensions for ensuring economic and security concessions from its opponents by increasing its nuclear capability. The third one is to pursue a

45 As South Korea’s “Norpolitik” began to launch in the early 1988, North Korea’s ‘Great leader’, Kim II-Sung felt a serious isolation and betrayal from its former two allies—the Soviet Unions and China. To delay or impede diplomatic normalizations between South Korea and its two allies, he took several visits to Beijing and Moscow in the latter 1989 and in the early 1990s and sometimes exchanged harsh verbal criticisms with its former patrons. For Kim II-Sung’s efforts to secure security assurance from its allies, refer to Oberdorfer, op.cit., The Two Koreas, 218-225.
different approach to ensure its regime survival—3) engaging Pyongyang’s foes by dismantling its ambitious nuclear program. The last option is 4) to employ a joint strategy combining escalating and engaging policies to maximize its strategic gains.

The next step is to calculate the expected values of each option based on the key concepts and arguments of two decision-making frameworks—the rational choice and cognitive choice models. The decision criteria of two models would be employed to predict North Korea’s ideal course of actions once the expected values of each option are determined.

1) Qualitative Analysis for North Korea’s First Nuclear Crisis

Rational Choice Model

Decision Rules
A key determinant in the rational choice model is the variation of the expected values of each option relative to the current value of the status quo. That is, the largest positive variation from the status quo would be selected as a key decision criterion in this model, regardless of whether the expected values are positive or negative. There should be one forceful assumption in employing this model, which is the assumption of rationality in general, and bounded rationality in particular: North Korea would be able to search/identify/adopt an alternative that maximizes its expected utility (value) to meet its national goal or current reference point of ‘regime survival’.47

Option #1: Maintain Status quo

Option #2: Escalate Tensions
The option of escalating tensions is the strategy for attracting attention from the outside world and then ensuring economic and security benefits by trading off its military provocations. To maximize its strategic benefits of obtaining the most needed economic

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46 According to expected utility theory, an actor’s utility of a particular good is a function of net asset levels of that good. Therefore, current assets could not affect preference over outcomes or terminal states, but rather marginal utilities and preference over strategies. For the basic principle of expected utility theory, see Jack S. Levy, “Prospect theory, Rational Choice, and International Relations,” International Studies Quarterly, Vol.41, No.1 (Mar, 1997), 88-89.

47 There are several other indicators suggesting that North Korean leadership are following the rational choice model: 1) North Korea will update their preferences and adjust their strategies in light of new information; 2) North Korea will display consistent risk propensities over strategies regardless of different representation of the same choice problem; 3) North Korea will have a set of consistent and transitive preferences over outcomes; and 4) North Korea will be sensitive to marginal costs and diminishing returns relative to the value of the status quo. For more details about hypotheses and indicators showing North Korea’s bounded rationality, see the previous chapter-3.
aides while maintaining its current system of the ‘dictatorship’ by the Kim’s regime, Pyongyang needs to set up an optimum threshold point, which is the maximum level of tolerance its opponent players could sustain. Beyond this threshold point, this option would produce an enormous loss to North Korea due to the potential of spiraling into a limited or all-out war on the peninsula, rather than extorting strategic benefits in the form of economic aides and security assurance. In this case, such a threshold point appears to be North Korea’s withdrawal from the NPT (Nuclear non-Proliferation Treaty) or defueling its experimental nuclear reactor\textsuperscript{48}, given the significance of preventing nuclear proliferation in the US national interests shortly after the end of Cold War.

Accordingly, this option would produce a positive expected value relative to the status quo, a reference point in the rational choice model, until reaching a certain threshold point, while rapidly resulting in a negative expected value once it goes beyond them. Also, the probability of North Korea’s obtaining benefits is growing in a linear manner until the threshold point as it steps up its tensions, while it will exponentially go down to near zero once North Korea go beyond this threshold point. So, this option will not provide stable and reliable benefits to the North without managing skillful escalation strategies and setting out an explicit ‘red line’ to which its opponent players all could agree.

**Option #3: Engage Adversaries**

The third option of engaging its adversaries, including Seoul and Washington, is to abandon its traditional hostile policy and take conciliatory policies to ensure economic aides and security assurance from them. This option could produce two conflicting outcomes in the form of cost and benefit. Its potential cost would be a total loss of its regime in a long term manner because this policy will require opening its door to the outside world and mitigating its grip on internal control to boost its efforts for economic cooperation. In the short term, it will help Pyongyang obtain the most needed aid,

\textsuperscript{48} On June 2\textsuperscript{nd}, 1993, the US and North Korea held its first high-level talks in New York to defuse current tensions occurred shortly after Pyongyang proclaimed its withdrawal from the NPT regime on March 12\textsuperscript{th}, 1993. The chief negotiator of the US, Robert Galluci conveyed to Kang Seek-Ju, head of North Korea’s delegation, a ‘red-line’ that Pyongyang should not cross: defueling experimental nuclear reactor in Yongbyon Nuclear complex and then reloading new fuels; reprocessing spent fuel rods rife with uranium materials to obtain plutonium; and continuing to build large-sized nuclear reactors (50Mw and 200Mw). For detailed accounts on the first high-level talks between the US and the DPRK in June, 1993, see Mazarr, \textit{op.cit., North Korea and The Bomb}, 120-122.
including oil and grains, to keep its regime continuously afloat, by taking conciliatory policies against its adversaries. Given tight and comprehensive control on its system, it seems impossible that this policy would pose a serious threat to its internal security instantly. Rather, it will cause a longer term impact on which the Pyongyang regime may find it extremely difficult to maintain its current guiding ideology of the ‘Juche’ or self-help while aggressively taking some innovative economic initiatives with ‘capitalist’ adversaries.

Also, this option will seriously undermine its strategic consideration of making its regime look empowered by adopting aggressive provocations. For the last five decades of Pyongyang’s provocations, several were conducted for that purpose: the hijacking of US navy intelligence ship (Pueblo) in January 1968 and the shoot-down of US intelligence aircraft (EC-121) in April 1969. As a result, the policy of engagement with its adversaries would not meet its national goal of reunifying two Koreas under its terms and defending its regime for a long period, but rather it will work for short period to avoid pending difficulties.

**Option #4: Engage Adversaries and Escalate Tensions**

The last option seeking a joint strategy is to employ two conflicting policies—engagement and escalation—to maximize its strategic gains by combining two options. This option would require North Korea to establish a threshold point in a strategically well-managed way so that it would not cross this ‘red line’ set by its opponents, beyond which its adversaries can no longer sustain their tolerance toward Pyongyang. In this case, a withdrawal from the NPT or defueling/refueling its nuclear reactor would constitute a threshold point its western adversaries set as a ‘red-line.’ Since these behaviors would seriously undermine the credibility of the NPT regime globally and strategic stability in northeast Asia, North Korea would not be recommended to go beyond this point in the process of escalating tensions if they are a rational actor. Under this circumstance, they could achieve their strategic goal of obtaining economic aid and security assurance while not exposing its internal security to the outside world.\(^49\) In addition, this would be helpful

\(^{49}\) From the perspective of a rational choice model, most experts on North Korea estimated that Pyongyang would employ an eclectic option composed of escalation and cooperation. An initial escalation was needed to draw attentions on its nuclear program from an international community and raise its nuclear stakes against the countries involved. On the other hand, cooperation played a certain role in avoiding a ‘head-on’
for North Korea to abide by the basic rule of the rational choice model that a decision maker has to update its strategies and adjust preferences over options in light of new responses from its opponents.

Conclusion
In a conclusion, the DPRK, if it is rational actor, would select the last one as an alternative that could maximize its strategic gains—reunifying the two Koreas under its control in a long term manner, while defending its regime against external threats in a short term manner (See Figure 4-4).

![Figure 4-4: North Korea’s Subjective Value Function by the rational choice model in its First Nuclear Crisis, 2/1992-10/1994](image)

*In most rational choice models, an individual is generally supposed to be risk-averse across whole domains (concave) and the status quo is used as a reference point to be compared with alternatives available, thus creating a subjective utility function above*[^50]

There are three alternatives for North Korea to face: maintaining cooperation, escalating tensions in desperation, and escalating tensions with calculation.

1. Maintaining cooperation (The value is positive in the short-term, but it will become negative in the longer term)
2. Escalating tensions in desperation (Negative)
3. Escalating tensions with calculation

Cognitive Choice Model

Differences from RCM

In this model, the change in prospective value of each alternative relative to a reference point—North Korea’s perception of the current status quo—would be the most significant factor in North Korea’s choice problem. If a certain choice would produce a positive prospective value toward a reference point, for instance, it will be included to a list of alternatives. In addition, the strategic domain of an actor should be seriously considered in the process of calculating the expected values of options available as an individual actor is psychologically framed with this domain when he makes a decision. The remaining processes or procedures of calculating prospective expected values are the same as in the rational choice model, except for the way of incorporating the weighted probability of each option (certainty effect) and risk propensities (risk-acceptant in the domain of losses, and risk-averse in the domain of gains) of an actor into the calculation of prospective value of each alternative.\(^{51}\)

Reference Point

In the previous part of this chapter, North Korea’s current reference point is identified to be ‘regime survival.’ According the editing phase of prospect theory, Pyongyang is supposed to establish its reference point using various factors surrounding its regime: its expectation about others (e.g., allies, adversaries and a third party), domestic political pressure, behavioral commitment to particular policies, and the behaviors of its leadership. All these factors will frame its strategic problem when it chooses a certain alternative and then this framing effect will cause the North to take risk-dependent choices\(^ {52}\), in which Pyongyang will be risk-acceptant in the domain of losses

\(^{51}\) Unlike the rational choice model where a probability is linearly applied, probabilities are weighted differently depending on the level of probability in cognitive choice model. For instance, if a probability of a certain alternative is extremely low or high (e.g., less than 0.15 or nearly 1.0), an individual is inclined to add more weight to probability than value or payoff due to a certainty effect. Risk propensity, seriously affected by the domain of an actor, also plays a significant role in an individual’s decision in the form of ‘reflection effect’ on the subjective value function, in which personal preference over a certain alternative changes dramatically depending on the risk propensity of an actor (e.g., risk-acceptant in the domain of losses and risk-averse in the domain of gains). In the process of calculating prospective expected value of a certain alternative, these two elements often seems to play a more influential role than outcome payoff or value itself as an individual is highly framed with such psychological decision environments. See Jack S. Levy, “Prospect theory, Rational Choice, and International Relations,” International Studies Quarterly, Vol.41, No.1 (Mar, 1997), 87.

\(^{52}\) Based on various laboratory experiments, prospect theorists concludes that “decision makers do not maximize in their choices, are apt to overweight losses with respect to comparable gains, and tend to be
and be risk-averse in the domain of gains relative to its reference point. For instance, Pyongyang’s choice would be more risk-seeking when an expected outcome is short of meeting its reference point, given North Korea is currently framed with the loss-aversion bias due to being in the deep domain of losses. Even though a certain option would produce a more negative value in expected utility term than other alternatives, the DPRK will take that option only if it could give a slim chance to return to its previous and acceptable status quo ante.

**Option #1: Maintain Status quo**

Given North Korea is in the domain of losses, the first option of maintaining the status quo would not provide any positive expected value to Pyongyang not only from the long-term, but also short-term perspective. It will further deteriorate its status due to all detrimental factors surrounding North Korea: worsening economic situation, getting worse in ensuring its security, widening power gap with its arch-rival South Korea, and growing possibility of social unrest due to the collapse of food rationing system by this time. Under the strategy of maintaining the status quo, accordingly, the North could not obtain any of strategic objectives mentioned above since the current North Korean regime could not pose serious leverage or strategic pressure on its opponent players. Furthermore, it will not get North Korea return to its previous reference point of unifying Koreas on its terms and might provide a huge potential cost of gradually aggravating its status and eventually collapsing its regime. Therefore, the option of maintaining the status quo will not satisfy Pyongyang’s current reference point of regime survival and North Korea will not take this option as its best since it is deeply framed with the loss-aversion and status quo bias.

**Option #2: Escalate Tensions**

Escalating tensions by strengthening its nuclear capability might provide some chance of returning to its current reference point of regime survival or a higher position of being respected as a nuclear power. Well-managed escalation tactics with nuclear program could attract a lot of attention from the international community, in particular, from the United States, because it has a great stake in preventing the proliferation of risk averse when confronted with choices between gains while risk acceptant when confronted with losses.” See Jeffery D. Berejikian, “A Cognitive Theory of Deterrence,” *Journal of Peace Research*, Vol.39, No.2 (Feb, 2002), 165.
WMD, especially nuclear arsenals. Ascending to the status of becoming the only ‘hegemonic’ power since the end of Cold War in the early 1990s, the US has thought maintaining the NPT regime for preventing nuclear proliferation is one of the most important national security issues in order to continue its ‘hegemonic’ status and ensure its national interests around the globe.

On the other hand, NK could have severe punishment in the form of surgical and preemptive strikes from the US by adopting this risky choice. Given this period is shortly after the end of Cold War, it could have been impossible for Pyongyang to fully obtain military and diplomatic supports from its two allies—China and Russia—when it is attacked by the US. During this period, furthermore, Russia had been maintaining good cooperation with the US for preventing nuclear proliferation in return for obtaining a huge amount of economic aid from its “former enemy” and thus the US military move to destroy North Korea’s nuclear weapons program was considered politically feasible without strong opposition from China and South Korea. Also, North Korea witnessed a clear showcase of how modern warfare is conducted from the “Operation Desert Storm” in 1991.

But Pyongyang might have been a little confident on its deterrent power against US preemptive strikes due to its massive and well-protected asymmetric assets, including long-range artillery pieces and MLRS deployed within 10 miles north of the DMZ. Then South Korea’s Noh Tae-Woo and Kim Young-Sam administration also showed its reluctance to use preemptive strikes against North Korea’s nuclear facilities because of many of uncertainties imbedded in this operation. Devastation of major cities, including Seoul, in the South by North Korea’s retaliation was clearly visible and predictable. Perceiving and seeking to exploit this kind of strategic constraints faced by the ROK, Pyongyang might have concluded that this option of escalating with calculation could meet its newly-set reference point of securing regime survival.

In sum, this escalation strategy could allow North Korea to extort economic and political concessions from its opponent players, if well managed, while it might also incur some chance of waging all-out war, a worst case scenario for its regime. Yet, this option may be felt more comfortable to North Korea than maintaining the status quo.
because the former could provide a slim change of returning to the previous status quo, thus mitigating the fear of a ‘sure loss’ derived by taking the latter.

**Option #3: Engage Adversaries**

On the other hand, the remaining two alternatives—maintaining the status quo and engagement policy—would never give a chance of returning to North Korea’s current reference point or the previous status quo ante, given the strategic constraints North Korea is now facing.

**Option #4: Engage Adversaries and Escalate Tensions**

The last option of dismantering its nuclear program in return for some serious concessions from its opponents could not only provide some chance of returning to the previous status quo to North Korea by intimidating its neighbors, but also some possibility of preventing Pyongyang from being entangled into a limited or all-out war by bargaining off Pyongyang’s nuclear program. In this case, a well-managed escalation strategy would be needed in maximizing North Korea’s prospective strategic gains by setting up a threshold point which is the maximum tolerance point Pyongyang’s adversaries could sustain. One might argue that this strategy would be based on the rational choice model because North Korea is required to update its strategies and preferences in light of new information from its opponents under this option. But this strategy could be forced to be implemented by a rapid change in probability and the value of outcomes. For instance, Pyongyang will be risk-averse even in the domain of serious losses when perceiving that it is facing a serious catastrophic damage from an all-out war and the possibility of war is nearly certain. The certainty effect, in other words, could change North Korea’s risk propensity from risk-acceptant to risk-averse. But it seems still difficult to identify whether this option would be more apt for the rational choice model and the natural result derived from one of key assumptions in the cognitive choice model—the certainty effect.

**Conclusion**

In a conclusion, only two alternatives—escalating tensions and a combination of engagement and escalation—could become options exceeding North Korea’s current reference point of regime survival in the cognitive choice model. On the other hand, the remaining two alternatives—maintaining the status quo and engagement policy—would
never give a chance of returning to North Korea’s current reference point or the previous status quo ante, given the strategic constraints North Korea is now facing. As a result, the option of escalating tensions would be the most probable one North Korea could take given its deep domain of losses and the ensuring characteristics of ‘loss-aversion’ to an individual who is framed with the loss domain (See Figure 4-5).

Figure 4-5: North Korea’s Subjective Value Function by the cognitive choice model in its First Nuclear Crisis, 2/1992-10/1994

2) Quasi-empirical analysis for NK’s First Nuclear Crisis

In this case, this dissertation assumes that Pyongyang felt it had fallen to $X = -10$ (current status quo) in its strategic status for the former period and $X = -20$ for the latter period, and has two options available in general: 1) maintaining the status quo versus 2)

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53 Here this dissertation use the terminology of “quasi-empirical analysis” because author subjectively (arbitrarily) specifies the value and probability of each outcome of a North Korea’s certain option based on three factors influencing its domain of action by that time. For simplicity and availability for this quasi-empirical analysis, this dissertation uses a rule of thumb to generate weighted probabilities to be used in the Cognitive Choice Model (CCM), instead of the probability weighting function suggested by Kahneman and Tversky (1979). In general, the risk-taking player discounts the probability of negative outcomes and overvalues the probability of positive outcomes due to the loss-aversion bias. Thus, Probability (CCM) or $W(p) = 0.5 * \text{Probability(RCM)}$ for outcomes where $EU(\text{outcome}) < EU(\text{status quo})$. The positive outcomes then absorb the remainder of the probability.
escalating tensions. This split is recommended in an attempt to examine a dramatic shift of Pyongyang’s behavior during this conflict:

- the former period (5/1992-3/1993) when North Korea cooperated with the IAEA on its efforts to investigate Pyongyang’s nuclear facilities and might have perceived that the likelihood of the US preemptive strike against its nuclear facilities in case of defying such an international effort would not be so high due to international efforts to peacefully solve this crisis and oppositions from South Korea, as well as then the Clinton administration just starting its first term

- the latter period (3/1993-10/1994) when North Korea escalated tensions in an effort to directly talk to the US and might have thought the probability of US preemptive attack is increasing due to growing concerns and frustrations by Pyongyang’s intransigent attitudes from Seoul, as well as Washington, in particular, from department of defense

**Rational Choice Model**

Under this model, this dissertation uses the following equation to effectively reflect a key assumption that North Korean leadership would be risk-averse across all domains of actions (gain and loss areas) under the RCM: 

\[ Y = 1,200 \times (\log(50X + 7,000) - \log(7,000))^5 \]

where the shape of this function shows marginally concaved form across all areas (see Figure 3-1 in chapter 3). Based on previous parameter and equation, this dissertation could calculate the expected utility of each option in North Korea’s first nuclear crisis under the rational choice model as follow (Table 4-4/5).

**Table 4-4: NK’s Expected Utility in its First Nuclear Crisis under the RCM, 5/1992-3/1993**

<table>
<thead>
<tr>
<th>Parameter (current status quo value, X)</th>
<th>-10</th>
</tr>
</thead>
</table>

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54 This dissertation create this logarithmic function to represent a risk-averse individual whose subjective utility is supposed to marginally decline as the value increases in the domain of gain (concave).
Y = 1,200*(log(50*X+7,000)-log(7,000))

### Expected outcomes in case of NK's escalation (j1)

<table>
<thead>
<tr>
<th>(i)</th>
<th>Y(i)j1</th>
<th>Calculation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) 10% of escalating to total war, X = -100</td>
<td>Y(1)j1 = 1,200*(log(50*-100) +7,000)-log(7,000)) = -653</td>
<td></td>
</tr>
<tr>
<td>2) 20% of escalating to limited war, X = -70</td>
<td>Y(2)j1 = 1,200*(log(50*-70) +7,000)-log(7,000)) = -361</td>
<td></td>
</tr>
<tr>
<td>3) 40% of inviting US preemptive attack, X = -50</td>
<td>Y(3)j1 = 1,200*(log(50*-50) +7,000)-log(7,000)) = -230</td>
<td></td>
</tr>
<tr>
<td>4) 30% of appearing empowered without facing preemptive attack, X = 20</td>
<td>Y(4)j1 = 1,200*(log(50*20) +7,000)-log(7,000)) = 70</td>
<td></td>
</tr>
</tbody>
</table>

EU(j1) = 0.1*(-653) + 0.2*(-361) + 0.4*(-230) + 0.3*70 = -209

During this period, North Korean leadership might have thought the likelihood of US preemptive attacks would be higher than any other outcomes due to US military and political mighty by that time when the US military successfully conducted the First Gulf War and boasted its military power.

### Expected outcomes in case of NK's escalation with calculation (j2)

<table>
<thead>
<tr>
<th>(i)</th>
<th>Y(i)j2</th>
<th>Calculation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) 5% of escalating to total war, X = -100</td>
<td>Y(1)j2 = 1,200*(log(50*-100) +7,000)-log(7,000)) = -653</td>
<td></td>
</tr>
<tr>
<td>2) 10% of escalating to limited war, X = -70</td>
<td>Y(2)j2 = 1,200*(log(50*-70) +7,000)-log(7,000)) = -361</td>
<td></td>
</tr>
<tr>
<td>3) 20% of inviting US preemptive attack, X = -50</td>
<td>Y(3)j2 = 1,200*(log(50*-50) +7,000)-log(7,000)) = -230</td>
<td></td>
</tr>
<tr>
<td>4) 35% of obtaining economic and security concession, X = 100</td>
<td>Y(4)j2 = 1,200*(log(50*100) +7,000)-log(7,000)) = 280</td>
<td></td>
</tr>
<tr>
<td>5) 30% of appearing empowered without facing preemptive attack, X = 50</td>
<td>Y(5)j2 = 1,200*(log(50*50) +7,000)-log(7,000)) = 159</td>
<td></td>
</tr>
</tbody>
</table>

EU(j2) = 0.5*(-653) + 0.1*(-361) + 0.2*(-230) + 0.35*280 + 0.30*159 = 30.95

North Korean leadership might have thought the option of escalating tensions with calculation would not prompt a direct US preemptive strike, while increase the probability of obtaining economic and security concession from the ROK-US through a negotiation. But they need to exactly set the critical point beyond which Pyongyang will face serious consequence. This argument is described in the preceding qualitative analysis.

### Expected Utility of Maintaining the Status Quo (j3)

EU(SQ, j3) = 1,200 *(log(50*-10 +7,000)-log(7,000)) = -39

As a result, North Korea is supposed to take the option of escalating with calculation to maximize its expected utility in its first nuclear crisis (5/1992-3/1993):

EU(escalation with calculation, j2) = 31 >>> EU(SQ, j3) = -39 >>>
EU(escalating tensions, j1) = -209

Table 4-5: NK’s Expected Utility in its First Nuclear Crisis under the RCM, 3/1993-10/1994

For the Rational Choice Model (RCM), NK’s First Nuclear Crisis(3/1993-10/1994)
Parameter (current status quo value, X)
-20

risk-averse equation under the RCM

\[ Y = 1,200 \times (\log(50 \times X + 7,000) - \log(7,000)) \]

**Expected outcomes in case of NK's escalating**

<table>
<thead>
<tr>
<th>Case Description</th>
<th>Expected Outcome (Y)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) 15% of escalating to total war, X = -100</td>
<td>-653</td>
</tr>
<tr>
<td>[ Y(1)_{j1} = 1,200 \times (\log(50 \times -100 + 7,000) - \log(7,000)) ]</td>
<td></td>
</tr>
<tr>
<td>2) 25% of escalating to limited war, X = -70</td>
<td>-361</td>
</tr>
<tr>
<td>[ Y(2)_{j1} = 1,200 \times (\log(50 \times -70 + 7,000) - \log(7,000)) ]</td>
<td></td>
</tr>
<tr>
<td>3) 50% of inviting US preemptive attack, X = -50</td>
<td>-230</td>
</tr>
<tr>
<td>[ Y(3)_{j1} = 1,200 \times (\log(50 \times -50 + 7,000) - \log(7,000)) ]</td>
<td></td>
</tr>
<tr>
<td>4) 10% of appearing empowered without facing preemptive attack, X = 20</td>
<td>70</td>
</tr>
<tr>
<td>[ Y(4)_{j1} = 1,200 \times (\log(50 \times 20 + 7,000) - \log(7,000)) ]</td>
<td></td>
</tr>
</tbody>
</table>

**EU(j1) = 0.1 \times -653 + 0.2 \times -361 + 0.4 \times -230 + 0.3 \times 70 = -296**

During this period, North Korean leadership might have thought the likelihood of US preemptive attacks would be getting higher than any other outcomes due to growing security concerns from the US by its provocations. Also, then Clinton administration was preparing for the 1995 NPT evaluation conference in an attempt to expand treaty obligations imposed on member states. As a result, allowing North Korea to continue defying the IAEA safeguards would adversely affect the authority of the NPT, thus undermining a key US national interests since the Cold War (preventing nuclear proliferation).

**Expected utility of maintaining the status quo**

\[ EU(SQ, j3) = 1,200 \times (\log(50 \times -20 + 7,000) - \log(7,000)) = -80 \]
As a result, North Korea is supposed to take the option of maintaining the status quo to maximize its expected utility or minimize its potential losses in its first nuclear crisis (5/1992-3/1993): 

\[ EU(SQ, j3) = -80 \Rightarrow EU(ESC \text{ with calculation}, j2) = -93 \Rightarrow EU(ESC, j1) = -296 \]

According to those two analyses made under the RCM, Pyongyang should have adopted the option of maintaining the Status Quo (SQ) to maximize its expected utility, or minimize its potential losses. The level of pressure to follow the SQ by North Korea might have been growing as the US increased its signal of a potential preemptive strike by dispatching its contingent units to Northeast Asian regions during this period (e.g., a battalion of Patriot missile defense and Apache attack helicopter to South Korea, a squadron of F-15Es/F-117s to South Korea, and 12 B-2s/B-52s to Anderson AB in Quam)\(^{55}\).

That is a clear reason why this dissertation could examine a clear shift in Pyongyang’s expected utility in terms of marginal value between those two periods:

- the former period:
  \[ EU(ESC \text{ with calculation}, j2) = 31 \Rightarrow EU(SQ, j3) = -39 \Rightarrow EU(ESC, j1) = -209, D=200 \]
- the latter period:
  \[ EU(SQ, j3) = -80 \Rightarrow EU(ESC \text{ with calculation}, j2) = -93 \Rightarrow EU(ESC, j1) = -296, D=216 \]

the difference of net expected utility between two options (maintaining the Status Quo versus escalating tensions) in terms of marginal value between two periods: -16(200-216), thus implying that North Korea might have felt more pressure to adopt the SQ in the latter period after facing a serious security threat from a potential US preemptive attack.

**Cognitive Choice Model**

Under this model, this dissertation uses the following equation to effectively reflect a key assumption that North Korea is assumed to be risk-averse (concave) in the domain of gain and risk-seeking (convex) in the domain of loss, known as the “S” curve, and individual’s loss-aversion bias is reflected by more steepness of curvature in the loss domain than gain domain:

\[ Y = 1,200*(\log(50X+7,000)-\log(7,000)) \quad X \geq 0 \]

Based on previous parameter and equation, this dissertation could calculate the expected utility of each option under the cognitive choice model as follow (Table 4-6/7).

Table 4-6: NK’s Expected Utility in its First Nuclear Crisis under the CCM, 5/1992-3/1993

<table>
<thead>
<tr>
<th>Parameter (current status quo value, X)</th>
<th>-10</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reference point of North Korea</td>
<td></td>
</tr>
<tr>
<td>“Regime Survival” by appearing empowered through nuclear ambiguity</td>
<td></td>
</tr>
<tr>
<td>Risk-dependent equation under the CCM</td>
<td></td>
</tr>
<tr>
<td>Y = 1,200*(log(50*X+7,000)-log(7,000)), X&gt;0</td>
<td></td>
</tr>
<tr>
<td>= -200*(log(-20*X + 30)-log(30)), X&lt;0</td>
<td></td>
</tr>
<tr>
<td>Expected outcomes in case of NK’s escalating tensions (j1)</td>
<td></td>
</tr>
<tr>
<td>1) RCM(10%) → 5% of escalating to total war, X = -100</td>
<td></td>
</tr>
<tr>
<td>Y(1)_j1 = -200*(log(-20*-100 + 30)-log(30))</td>
<td>-366</td>
</tr>
<tr>
<td>2) RCM(20%) → 10% of escalating to limited war, X = -70</td>
<td></td>
</tr>
<tr>
<td>Y(2)_j1 = -200*(log(-20*-70 + 30)-log(30))</td>
<td>-336</td>
</tr>
<tr>
<td>3) RCM(40%) → 20% of inviting US preemptive strike, X = -50</td>
<td></td>
</tr>
<tr>
<td>Y(3)_j1 = -200*(log(-20*-50 + 30)-log(30))</td>
<td>-307</td>
</tr>
<tr>
<td>4) RCM(30%) → 65% of appearing empowered without facing US preemptive attacks, X = 20</td>
<td></td>
</tr>
<tr>
<td>Y(4)_j1 = 1,200*(log(50*20+7,000)-log(300))</td>
<td>70</td>
</tr>
</tbody>
</table>

For simplicity and availability for this quasi-empirical analysis, this dissertation uses a rule of thumb to generate “weighted probability” to be used in the CCM, instead of the probability weighting function suggested by Kahneman and Tversky (1979). In general, the risk-taking player discounts the probability of negative outcomes and overvalues the probability of positive outcomes due to the loss-aversion bias. Thus, Probability (CCM) or W(p) = 0.5 * Probability(RCM) for outcomes where EU(outcome) < EU(status quo). The positive outcomes then absorb the remainder of the probability.

### Expected Utility of Escalating Tensions (j1)

\[ E(Y_{j1}) = 0.05*(-366) + 0.10*(-336) + 0.20*(-307) + 0.65*70 \]

-68

### Expected Utility of Maintaining the Status Quo (j2)

\[ E(Y_{j2}) = 1.0*(-200*(log(-20*-10 +30)-log(30))), X<0 \]

-177

As a result, North Korea is supposed to show a risk-seeking behavior in its first nuclear crisis (5/1992-3/1993) by escalating tensions under the CCM because it could maximize its expected utility and might psychologically satisfy his reference point:

\[ EU(\text{maintaining the SQ}) = -177 << EU(\text{escalating}) = -68 \]
Table 4-7: NK's Expected Utility in its First Nuclear Crisis under the CCM, 3/1993-10/1994

For the Cognitive Choice Model (CCM), NK's First Nuclear Crisis (3/1993-10/1994)

<table>
<thead>
<tr>
<th>Parameter (current status quo value, X)</th>
<th>-20</th>
</tr>
</thead>
<tbody>
<tr>
<td>During this period, NK might have felt it had further fallen to $X = -20$ by losing its nuclear ambiguity through the IAEA’s inspection on its nuclear facilities</td>
<td></td>
</tr>
</tbody>
</table>

Reference point of North Korea

“Regime Survival” by appearing empowered through nuclear escalation

risk-dependent equation under the CCM

\[
Y = 1,200*(\log(50*X+7,000)-\log(7,000)), \quad X>0
\]

\[
= - 200*(\log(-20*X + 30)- \log(30)), \quad X<0
\]

Expected outcomes in case of NK’s escalating tensions ($j_1$) $Y(i)j_1$

1) RCM(15%) $\rightarrow$ 20% of escalating to total war, $X = -100$

\[
Y(1)j_1 = -200*(\log(-20*-100 + 30)-\log(30))
\]

\[-366\]

2) RCM(25%) $\rightarrow$ 30% of escalating to limited war, $X = -70$

\[
Y(2)j_1 = -200*(\log(-20*-70 + 30)-\log(30))
\]

\[-336\]

3) RCM(45%) $\rightarrow$ 45% of inviting US preemptive strike, $X = -50$

\[
Y(3)j_1 = -200*(\log(-20*-50 + 30)-\log(30))
\]

\[-307\]

4) RCM(15%) $\rightarrow$ 5% of appearing empowered without facing a US preemptive attack, $X = 20$

\[
Y(4)j_1 = 1,200*(\log(50*20+ 7,000)-\log(300))
\]

\[70\]

Here this dissertation could identify a significant change in NK’s valuing probability to each outcome, totally the opposite from the previous period. That is, North Korea provides a higher probability to the outcome that its escalation would surely invite a US preemptive attack. On the other hand, the probability of its getting empowered is getting down due to a clear signal of US preemptive attacks.

Expected Value of Escalating Tensions ($j_1$) $E(Yj_1)$

\[
E(Y_{j1}) = 0.2* -366 + 0.30* -336+ 0.45*-307+ 0.05 *70
\]

\[-309\]

Expected Utility of Maintaining the Status Quo ($j_2$) $E(Uj_2)$

\[
E(Y_{j2})= 1.0*(-200*(\log(-20*-20 +30)-\log(30))), \quad X<0
\]

\[-231\]

Given its domain of losses during this period, North Korea was supposed to show a risk-seeking behavior in its first nuclear crisis (3/1993-10/1994) by escalating tensions under the CCM, but adopted a risk-averse behavior of maintaining the SQ by a significant change in assigning probability to each outcome, known as the certainty effect or preference reversal derived from the clear signal of a US preemptive attack: $EU$(maintaining the SQ) $= -231 >> EU$(escalating) $= -309$

Based on analytical results made by the cognitive choice model, this dissertation could identify a clear shift of Pyongyang’s behaviors on this nuclear crisis. In the former period when the likelihood of US preemptive strike was not so high due to international
efforts to peacefully resolve this issue, Pyongyang should have adopted escalation and they exactly did so. In the latter period, however, the DPRK had been supposed to adopt the option of avoiding confrontation and exactly did the same way due to the certainty effect coming from a clear signal of US preemptive attack, though there had not been any change in value and probability of each outcome.

That is, Pyongyang abruptly changed their course of actions by altering their risk-propensity from the risk-seeking to the risk-averse after perceiving a US preemptive attack is imminent and its military operations could be effectively denied by sophisticated US military equipment previously deployed. That is a clear reason why this dissertation witnessed a clear shift in Pyongyang’s behaviors in the latter period of this conflict below:

- the former period: \( EU(\text{maintaining the SQ}) = -177 \ll EU(\text{escalating}) = -49 \)
- the latter period: \( EU(\text{maintaining the SQ or Cooperating}) = -231 \gg EU(\text{escalating}) = -309 \)

**Conclusion**

Superimposing previous empirical results on North Korea’s subjective value function, this dissertation could clearly identify that the cognitive choice model is more explanatory and predictive than the rational choice model in explaining Pyongyang’s first nuclear crisis, which is identical with the preceding qualitative analysis (See Figure 4-6). Also, a host of key arguments in two choice modes was clearly tested through this quasi-empirical analysis: 1) North Korea was surely in the domain of losses; 2) the certainty effect or preference reversal was clearly identified; 3) both models were consistent with subjective value functions; and 4) the CCM is more explanatory than the RCM when it comes to explaining a decision-maker in the domain of losses.

Consequently, this dissertation should obtain a significant implication for establishing effective/adaptive/robust deterrent measures vis-à-vis nuclear-armed North Korea in the future from the analyses made under the cognitive choice model. That is, the most effective way to deter Pyongyang is to deny its military objectives or goals through strengthening our defensive forces. That deterrence could be theoretically achieved by increasing the probability of Pyongyang’s failure in its military operations and the
probability that North Korean leadership would surely have serious punishment once it violates the status quo.

That is exactly the same way that the ROK-US decision-makers adopted to effectively deter North Korea during this period: 1) augmenting missile defense systems to effectively deny Pyongyang’s ballistic missile threats; 2) strengthening intelligence systems to identify/detect/locate/track high-valued targets of North Korea in a real-time manner; and 3) deploying striking forces (e.g., F-15Es/F-117s/B-2s/B-52s), known as “decapitation means,” to strengthen our deterrence capability.

Figure 4-6: Analyzing North Korea’s behaviors in its first nuclear crisis (3/1993-10/1994) using a quasi-empirical method

Based on expected utility of each outcome, North Korea is expected to adopt Maintaining the SQ under the RCM, while Escalating Tensions under the CCM. But this kind of a risk-seeking behavior under the CCM might be changed to a risk-averse one in a case where a decision-maker is facing a serious catastrophe and the probability of that consequence is very high.

4. Model Performance for Pyongyang’s Behaviors

Overview
In this first North Korea’s nuclear crisis, there seems to have been three significant changes in the North’s course of actions: 1) Pyongyang’s positive response to the ROK-US initiative to dissuade North Korea into abandoning its nuclear program in the early 1990; 2) North Korea’s abrupt increase in its escalation ladder by proclaiming a
withdrawal from the NPT in March 1993 and extracting spent fuel rods from its 5-Mw experimental nuclear reactor in early May 1994; and finally 3) avoiding a ‘head-on’ collision at the last minute with the US by signing a package deal, known as “the Agreed Framework” in October 1994 (See Figure 4-7).

**Figure 4-7: Actions and Reactions between the US and DPRK, 2/1993-10/1994**

**RCM Performance**

According to the basic logic and argument of the rational choice model, the DPRK was supposed to choose an alternative that could guarantee maximizing its expected utility (strategic value) to meet its current goal of regime survival. In the process of calculating its expected utility, Pyongyang was expected to display consistent risk propensities across different presentation of the same choice problem, since there had not been any change in the payoffs and probabilities assigned to each alternative. But North Korea has shown a series of variations in its choice on the basis of changing preferences over options during this period, as mentioned in the previous part: from...

In addition, North Korea is supposed to extensively search for options and adjust their strategies in light of new information under the rational choice model. Considering North Korea’s behaviors after March 1993, Pyongyang appeared adamantly reluctant to search for another option in response to growing US diplomatic and military pressure by fixing confrontational option as its only policy. This risky behavior continued until May 1994, when then the Clinton administration had allegedly planned to conduct surgical strikes against Yeong-byeon nuclear complex. This behavior would be also hard to be clearly explained by the axioms and logic of the rational choice model. So, an alternative framework is needed to better explain this change of North Korea’s behaviors as negotiations proceeded.

**CCM Performance**

One of alternative frameworks is explored in prospect theory, where some cognitive processes—the framing effect, loss aversion, and status quo (endowment effect)—play a significant role in individual’s decision-making process under condition of risk. According to prospect theory, the North is expected to take two steps—editing and evaluating phases—when it chooses a final decision on this nuclear issue. In the editing phase, North Korea would have been framed with several strategic difficulties stipulated in the previous part and, therefore, it might have felt that it was in the domain of deep losses and its reference point was to defend the Kim’s regime at the editing phase. Under this circumstance, the probability of success in each option would no longer play a significant role in its choice, but rather the payoff itself of a certain outcome and the psychological factors would have become driving forces in the subsequent evaluating

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56 As mentioned before, North Korea changed its behavior three times despite no change in the payoff and possibility of alternatives available during this period. According to the preference-invariance axiom of the rational choice model, Pyongyang was not supposed to change its behavior unless key conditions mentioned change. Instead, the North practically changed its behaviors depending on the context and decision environments, causing significant contradiction to the axioms and assumptions of the rational choice model. For change in North Korea’s course of actions during its first nuclear crisis, see Mazarr, *North Korea and The Bomb*, 55-179.
phase. As a result, a certain option that could provide some chance of getting North
Korea return to its current reference point or previous reference point would be selected
as an alternative, even though it might give fewer payoffs in expected utility terms than
other alternatives.

**Decision #1: CCM**

Based on the cognitive analytical framework above, it is understandable that the
DPRK changed its course of actions depending on the change of its position on a
subjective value function. For example, North Korea tried to take cautious and
conservative behaviors when faced a positive initiative from both the ROK and the US in
the early 1990 because it felt that it could obtain something valuable at that moment, even
though North Korea, in general, was in the domain of losses throughout this period. By
this time, North Korea could have a chance to simultaneously resolve some of its most
important security concerns—dismantling US tactical nuclear weapons on South Korea,
suspending combined joint military exercise known as ‘Team Spirit’, and beginning
official diplomatic contacts to normalize ties with the US.

**Decision #2: CCM**

It is also predictable that the DPRK stepped up its nuclear confrontation with the
international community in the early 1993, when North Korea proclaimed its withdrawal
from the NPT regime and willingness to defuel its nuclear reactor rife with spent uranium
and reprocess waste materials to extract plutonium—a sure signal to make a nuclear
bomb. North Korea has not obtained any visible and physical benefits by cooperating
with the IAEA for the last six months since it began inspecting North Korea’s declared
nuclear facilities in May 1992. Instead, its key nuclear facilities were exposed to the
outside world watch and, as a result, it became clear that North Korea’s strategic
ambiguity on its nuclear program was losing its strategic value by the IAEA’s extensive

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57 Due to the effect of ‘loss aversion’ in the cognitive decision-making process, an individual actor is highly
likely to take risky choice, though the probability of success of this risky choice is comparatively low to
other choices, as only this choice might provide a slim chance of returning to its current reference point. In
this case, the value itself of a possible consequence is more influential than the probability of that outcome.
If the probability is extremely low or high, however, a decision maker is not likely to take this risky choice
due to a ‘certainty effect.’ That is, he would like to take a sure choice and the probability of success does
really matter in this case. As for the ‘certainty effect’ and probability weighting in prospect theory, see
George A. Quattrone and Amos Tversky, “Contrasting Rational and …,” 730; Amos Tversky and
Daniel Kahneman, “Rational Choice and …,” 262-270; and Jack S. Levy, “Loss Aversion, Framing, and
Bargaining: The Implications of Prospect theory for International Conflict,” *International Political
and intrusive inspections on its nuclear sites, which had not been absolutely expected prior to this inspection regime by North Korea. Accordingly, its regime vulnerability increased and psychological decision-making processes of adopting risky moves in an effort to defend the status quo and avoid potential losses again resurrected at this moment.

That is, Pyongyang began thinking that stepping up an escalation rung to a higher position would guarantee any chance of returning to its reference point, even though it could also induce a potential of spiraling into a limited or all-out war, one of the worst case scenarios to the North, given enormous power gaps between two opposing rivals. Again, the probability of success is no longer a significant factor and the payoff itself of a certain outcome does really matter, if an actor thinks that they have still some asymmetric advantages against its opponent. As expected in prospect theory, the DPRK continued to increase its escalation rung for the next one year to maximize its strategic gains by exploiting its asymmetric advantages (See also Figure 4-7).

**Decision #3: CCM**

One of the most dramatic changes in North Korea’s first nuclear confrontation was to reach an ‘Agreed Framework’ with the US in October 1994. Of course, there has not been any change in payoffs and probabilities assigned to each alternative to this time, but changes in North Koreas’ own perceptions on the increasing likelihood of all-out war with the US and ensuing catastrophic damage to its regime. Under this circumstance, an individual actor would like to take a risk-averse action because risky move might involve extreme damage to itself. Again, the priority in decision-making criteria changed from payoff itself to probability of success since the ‘certainty effect’ loomed large under this severe circumstance.

**Conclusion: CCM has more explanatory power**

In conclusion, the cognitive choice model endorsed by prospect theory would have more explanatory power than the rational choice model in explaining North Korea’s course of actions in its first nuclear crisis with the US: “a national leader, framed with the loss-aversion and status quo bias, is inclined to be risk-acceptant in its choice when he is in the domain of losses, while risk-averse in the domain of gains relative to its reference point.” Yet, this kind of risk propensity might reverse under a situation where an expected outcome is certain and catastrophic.
Case 2: North Korea’s Second Nuclear Crisis (10/2002-8/2003)

1. General Description

After reaching a historic “Agreed Framework (AF)” between the DPRK and the United States in October 1994, there was an explicit difference in their perceptions on the effectiveness of this nuclear negotiation among key players—Seoul, Washington, and Pyongyang. Since contentions involving the implementation of the AF have played a significant role in setting off the second nuclear crisis, it is recommended to explore major parties’ perceptions on the AF prior in analyzing North Korea’s decision-making process regarding this second nuclear crisis. In addition, understanding the change of strategic environments surrounding the Korean peninsula during this period (10/1994-10/2002) would be helpful in analyzing North Korea’s decision-making process regarding its second nuclear crisis.

Perceptions on the AF from major parties involved

North Korea

For its part, North Korea appeared satisfied with this deal as it had acquired several strategic gains in this tough game with the United States, the only hegemonic power in the world after the collapse of the Soviet Unions. Internally, the Kim’s regime might have enhanced legitimacy of power on the North by demonstrating its toughness in the fight with the US and a ‘phenomenal victory’ to its populace, who have been wavering their confidence on the current regime since the collapse of Eastern communist blocs in the latter half of 1980s and early 1990s. Externally, the North could have obtained a significant means that could be used to prevent, or delay the ‘abandonment’ of its two Cold War patrons--Russia and China--who have been rapidly changing their policies toward South Korea in a friendly manner for the sake of their strategic gains—boosting their economy through a ‘South Korean Economic Model.’ Pyongyang could have also obtained a ‘strategic check’ to offset their inferiority over economic, diplomatic, and military imbalance vis-à-vis its arch-rival, Seoul, by engaging Washington directly. As a result, the North might have thought that its strategic domain is moving toward the previous status quo.
US/ROK

By contrast, Washington and Seoul have faced serious setbacks and criticisms from their ‘hawkish’ conservative circles, who called this agreement a “document of capitulation” to the rogue state’s intimidation. As mentioned in the previous chapter, it was in fact an ad hoc measure only to freeze North Korea’s nuclear program, but not a final solution to dismantle Pyongyang’s ambition completely. In the process of implementing this agreement, they have argued that the North would exploit the uncertainty inherent in this package deal to maximize their strategic gains by periodically escalating tensions. Arms control experts in Washington was especially worried about the ‘educational effect’ of this deal toward other would-be proliferates—Iraq, Iran, Libya, Pakistan, and India. They have estimated that a potential proliferate would be willing to demonstrate their ‘toughness and intransigence’ available in the subsequent negotiations to obtain maximum concessions since they had learned this lesson from North Korea.

South Korean officials who participated in the negotiations with the North were also concerned about the potential that North Korea would strengthen its strategy of alienating Seoul in the later negotiations with Washington. According to some of them, that strategy implies that Pyongyang could have greater legitimacy and initiative in the subsequent process of South-North dialogues than Seoul by showing their independence of foreign powers and the South’s dependency on the influence of the United States on the peninsula in the aftermath of reaching the Agreed Framework in October 1994. Therefore, then incumbent governments of Seoul (the Kim Young-Sam administration) and Washington (the first Clinton Administration) had to receive a lot of reservations and sometimes resistance on their policies toward Pyongyang at the start of their administrations from their domestic politics.


ROK/North Korea Relations

Until the inauguration of Bush administration in January of 2001, there had been no critical confrontation that could put the Korean peninsula at the risk of spiraling into a limited or all-out war, though there were several ups-and-downs in the process of implementing the AF. Even if there were several cases of North Korea’s special force’s infiltration into South Korean territory in the mid-1990s, for instance, they were managed
not to further exacerbate into initiating a local military confrontation by two Korea’s efforts. In October 1996, when a North Korean submarine was stuck with fishing net and then was caught by South Korean military in the report by a fisherman, Pyongyang quickly released an apology about the infiltration of its submarine loaded with a team of special operation force into the eastern shore of South Korea. Considering the North’s behaviors of periodically infiltrating its SOF units and denying its involvement during the period of 1960s-1980s, this confession was considered a ‘rare case’ and their willingness not to disrupt the ongoing process of AF.

Since the inauguration of Kim Dae-Jung administration in 1998, this kind of ‘rare’ attitude of Pyongyang has maintained a certain level of continuity as Pyongyang perceived a ‘sincere’ willingness to engage by the new administration in Seoul. This engagement policy of South Korea, dubbed as “Sunshine Policy,” has gained a strong momentum during Kim’s presidency and resulted in a historic “South-North Summit Talks” in June 2000. After this summit talk, the inter-Korean relations have observed significant progresses on reciprocal conciliation and economic cooperation and kept some amount of continuity despite critical obstacles, including naval clashes between two Koreas in the “disputed” western sea borders in 1999 and 2002, respectively.

**US/North Korea Relations**

As for its relations with the United States, North Korea has also showed some amount of flexibility during this period, though there were several cases of tensions regarding North Korea’s underground ‘suspected’ facilities near **Kum-Chang-Ri** and a long-range missile test in August 1998. For instance, Pyongyang reached an agreement to allow the United States to inspect some ‘suspected’ underground facilities in return for obtaining humanitarian aids from Washington in March 1999. Initially, the North was strongly opposed to the United States’ demand for inspection to ensure its compliance with the AF on the rationale that they are irrelevant to its nuclear program and allowing inspection to its military installations could undermine its sovereignty seriously. With the objective knowledge that then the Clinton administration had been under grave pressure upon its North Korean policy from the Unites States’ Congress, however, the DPRK
decided to cooperate with the Clinton administration without requiring enormous compensation.\textsuperscript{58}

Pyongyang has also maintained a cooperative stance in the missile dialogues with Washington by proclaiming the moratorium of missile tests until the end of 2003, shortly after its first long-range ballistic missile, what is called as “Daepo-Dong-1” in western countries’ terms, in August 1998. Initially, Pyongyang requested a monetary compensation for this moratorium to compensate the loss that would not otherwise incur and it was believed to be $2 billion, according to some US officials involved in this talks. Faced with serious resistance on North Korean policy from then Republican-ruling Congress, the Clinton administration could not accept this ‘huge rebate’ because a government budget is absolutely controlled by Capitol Hill.

Instead, the US administration offered to North Korea other incentives it could afford under its authority: lifting economic sanctions imposed on North Korea since the end of Korean War in 1953, and dropping North Korea out of a list of countries sponsoring terrorism since its involvement in bombing a Korean civilian aircraft in 1987. It has been considered a significant change in Pyongyang’s attitude toward Washington for the North to buy this offer and continue negotiations over the next few years to come, given a lot of uncertainties inherent in the security environment on the peninsula.

In response, the Clinton administration appointed a former Secretary of Defense, \textbf{William Perry}, as a policy coordinator to broadly review its North Korean policies that had received strong resistance from the Republican-ruling Congress for the last 5 years, and sent him to Pyongyang to suggest and discuss a “comprehensive package deal” in May 1999. This initiative by the Clinton administration appeared effective to some extent to deflect Republican attacks on its North Korean policies and prevent Pyongyang from taking further desperate actions.

To help continue the conciliatory momentum on the peninsula in June 2000, the Clinton administration sought to strengthen its engagement policy toward Pyongyang by inviting the first vice chairman of National Defense Commission in the North, \textbf{Jo 58 Initially North Korea requested $3 billion in return for allowing access to the suspicious underground facility near Kum-Chang-Ri, but later reached the agreement with receiving grains of 600,000 tons. See “Conference Report on H.R. 4323, Making Omnibus Consolidated and Emergency Supplemental Appropriations for Fiscal Year 1999,” U.S. House of Representatives, October 19, 1998.}
Myong-Rok (Vice Marshall) to Washington in September 2000. It could be considered a significant improvement toward the US-DPRK relations, given the fact that Vice Marshall Jo is one of the most powerful generals in North Korea People’s Army (KPA), a ‘de-facto’ body controlling a whole North Korean society since the emergence of Kim Jong-Il in 1994. One month later after Mr. Jo’s visit to Washington, the Secretary of State, Madeline Albright, made a return visit to Pyongyang and met with ‘Dear Leader’ Kim Jong-Il. At this meeting, Kim promised to continue its missile test moratorium during the negotiation process to resolve this issue.

Bush Administration’s Change to US/North Korean Relations

Initial Policy Review

The election of George W. Bush in 2000 US presidential election provided the first serious negative impact on Pyongyang’s perception on its security. Surrounded by national security advisers armed with ‘hawkish and hegemonic’ neo-conservatism, President Bush took meticulous and slow-moving steps to review North Korean policies conducted by the Clinton administration, which most Republicans thought had failed to address North Korean nuclear program and instead provided the ‘bad’ precedent for another ‘would-be’ proliferate. As a result, the new US administration did not complete its North Korean policy review and the appointment of key posts exclusively undertaking North Korean policy until six months after its inauguration in January 2001.59

Post-9/11 Relations

It was the September 11 terrorist attacks on the US soils that dramatically changed US policy toward Pyongyang and enormously increased Pyongyang’s security concern on its regime. From this time, the US foreign policy increasingly became rigid and ‘unilateral’ against terrorist organizations and ‘rogue’ states sponsoring them. The Bush administration reviewed its traditional nuclear doctrines based on deterrence and established a new Nuclear Posture Review (NPR), in which a nuclear preemptive

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59 In the mid-June 2001, the Bush administration completed its North Korean policy review and suggested an initiative asking 1) revision of the Agreed Framework, 2) limiting North Korean ballistic missiles in a verifiable manner, and 3) reducing North Korea’s conventional threats to South Korea. For details, see “Statement by the President,” The White House Office of the Press Secretary, June 6, 2001.
doctrine was specified as a key means to effectively deter the ‘irrational and desperate’
attacks from terrorist organizations and rogue states.60

To show their willingness to support the war on terror led by the US, Pyongyang
quickly released the statement that the DPRK would oppose any kind of terrorist
activities and participate in the international efforts to fight terrorism. Yet the Bush
administration did not find much interest on North Korea’s changed attitude, and instead
increased the rationale for waging a war against one of rogue states, Iraq. Bush
administration campaign for war on terror resulted in the State of Union Address in
January 2002, in which President named several rogue states—Iran, Iraq, Syria, Libya,
and North Korea—as “an axis of evil.”61 After this time, the relations between the US
and North Korea became more rigid, and each party exchanged more hostile rhetoric.

**US Demands “CVID”**

Amid the exchange of hostile ‘words of war,’ the US invaded Iraq to dismantle its
weapons of mass destruction and Saddam’s dictatorship in early March 2002. With
amazing success of military operations in Iraq, the Bush administration began suggesting
Pyongyang to “Completely, Verifiably, and Irreversibly Dismantle (CVID)” of its nuclear
program as a precondition for initiating talks with Washington. In response, the North
confronted the US with strong resistance. Periodically, the state of semi-war was
proclaimed to tightly control its population by North Korean People’s Army, and the
North escalated tensions by threatening to disrupt the AF and resume its nuclear program
unless the US complies with its obligations.62

**End of the Agreed Framework**

A ‘finishing blow’ to the end of the AF came in October 2002, when James Kelly,
assistant Secretary of State for Asian Pacific affairs, visited Pyongyang with unwavering

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60 Shortly after the 9/11 terrorist attacks, the Bush administration rushed to establish a new nuclear strategy
in an effort to effectively and credibly deter ‘rogue’ states from using their WMD. It was known as
“Nuclear Posture Review” and composed of three elements (a New Triad): 1) flexible offensive systems
(both nuclear and non-nuclear); 2) a comprehensive defensive system (both active and passive defenses);
and 3) a revitalized defensive infrastructure mainly focusing on intensive intelligence gathering capability.
Among controversies involving this report are to build a low-yield nuclear ‘bunker-buster’ and missile


62 In the March 13th statement of the KCNA, Pyongyang vehemently criticized the recent ‘US’ moves of
adopting a new Nuclear Posture Review and including its regime to the list of an axis of evils and
threatened to terminate the Agreed Framework. See details at [http://www.kcna.co.jp/index-k.htm](http://www.kcna.co.jp/index-k.htm).
evidence that Pyongyang has been enriching uranium for the last several years despite its obligation under the AF. At the meeting, the North Korean point man, Kang Soek-Ju, initially denied the US argument, but soon after, responded with a harsh statement that “the DPRK reserves all rights to make even stronger weapons than nuclear weapons as a sovereign nation.”63 It was practically considered as North Korea’s official acknowledgement that Pyongyang had been enriching uranium as an alternative way to build its nuclear weapons program, and provided a critical justification for the Bush administration to stop its heavy fuel oil shipment to the North in early December 2002.

After this event, both countries have escalated tensions to coerce opponents into concessions until they reached an agreement to hold a multilateral dialogue, known as “Six-Party talks,” to diplomatically address Pyongyang’s nuclear ambition at Beijing in August 2003 (See Table 4-8).

Table 4-8: Actions and Reactions between the US and the DPRK, 10/1994-8/2003

<table>
<thead>
<tr>
<th>Date</th>
<th>The United States</th>
<th>North Korea</th>
</tr>
</thead>
</table>
| **October 21st, 1994**  
(The Agreed Framework) | North Korea agreed to initially freeze and eventually dismantle its nuclear program in return for a package of benefits from the US | |
| **August 31st, 1998**  
(North Korea’s first long-range missile test) | Adopts a “Rumsfeld Report” endorsing the MD system in response to North Korean missile threats | Conducts its first long-range ballistic missile (Dapodong-1) test in an effort to force the US to implement the AF as scheduled |
| **March, 1999**  
(Inspection of Kum-Chang-Ri) | Requests inspections on suspected underground facilities near Kum-Chang-Ri | Requests 600,000 tones of rice in compensation for inspections |
| **September, 1999**  
(The US-DPRK missile talks) | The DPRK agree to suspend its missile tests during negotiation processes in return for lifting economic sanctions against Pyongyang | |
| **October, 1999**  
(Perry Process) | Former Defense Secretary William Perry suggests a comprehensive package deal to North Korea | |
| **June, 2000**  
(South-North summit talk) | Both Koreas hold a historic summit talk (12/6-15/6) at Pyongyang in an effort to boost reconciliation and cooperation between two rivals | |
| **October, 2000**  
(Exchange visits) | High-level officials from both countries achieve exchange visits to deal with North Korea’s growing missile threats, resulting in a US-DPRK communiqué reconfirming North Korea’s missile moratorium | |
| **January, 2001**  
(Back to confrontation) | The first Bush administration inaugurates in January and starts reviewing North Korean policy | Pyongyang hopes to continue a dialogue with Washington from the point where the Clinton administration passed over |
| **September-December, 2001**  
(9.11 attacks and NPR) | Adopts a new national security strategy emphasizing a nuclear | Takes a conciliatory gesture to blunt a prompt US ‘anger’ by |

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Analyzing North Korea’s Decision-Making Process on its Nuclear Weapons Programs
with the Rational Choice and Cognitive Choice Models

Chapter 4: Case Studies

<table>
<thead>
<tr>
<th>Date</th>
<th>Event Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>January, 2002</td>
<td>President Bush includes North Korea to the list of a “axis of evils”</td>
</tr>
<tr>
<td>(The State of Union Address)</td>
<td>North Korea changes its US policy from conciliation to confrontation</td>
</tr>
<tr>
<td>March, 2002</td>
<td>Begin a OIF to expel an infamous dictator, Saddam Hussein</td>
</tr>
<tr>
<td>(Operation Iraqi Freedom)</td>
<td>Proclaims a semi-state of war and strengthens its internal security</td>
</tr>
<tr>
<td>October, 2002</td>
<td>Shows evidence of North Korea’s efforts to acquire equipment for enriching uranium</td>
</tr>
<tr>
<td>(Second Nuclear Crisis)</td>
<td>Claims it has more powerful weapons than nuclear arsenals</td>
</tr>
<tr>
<td>November-December, 2002</td>
<td>Suspends shipping a heavy fuel-oil to North Korea</td>
</tr>
<tr>
<td>(Ending the Agreed Framework)</td>
<td>Expels IAEA inspectors staying in the North</td>
</tr>
<tr>
<td>January, 2003</td>
<td>Summons a board meeting of the IAEA to criticize North Korea’s action and devise reactions</td>
</tr>
<tr>
<td>(Withdrawal from the NPT)</td>
<td>Proclaims it will seal off the container holding 8,000 spent fuel rods extracted in 1994</td>
</tr>
<tr>
<td>April, 2003</td>
<td>Threatens to refer this issue to the UN Security Council for sanctioning Pyongyang</td>
</tr>
<tr>
<td>(Reprocessing plutonium)</td>
<td>Proclaims it begun reprocessing the 8,000 spent fuel rods and reactivate its 5-Mw reactor</td>
</tr>
<tr>
<td>August, 2003</td>
<td>Claims the CVID is a prerequisite for subsequent negotiations</td>
</tr>
<tr>
<td>(The first round of Six-party talks)</td>
<td>Demands compensation for loss of electricity by US’s failure to supply light-water reactors and direct talks with the US</td>
</tr>
</tbody>
</table>

Source: Author’s summary from the original sources

2. Case Analysis

Domain of Action

Internal Factor

“Military First Politics”

North Korea had been recovering from the consecutive natural disasters—the 1996’s flood and 1997’s drought—since a historic summit meeting between two Koreas in June 2000. Shortly after reaching the Agreed Framework with the United States in October 1994, Pyongyang sought to stabilize its domestic security, which was then becoming more unstable due to a sudden death of its ‘Great Leader’ Kim il-Sung, by taking on a new approach relying heavily on its military, what is called “Military First Politics.” Pyongyang appeared to judge that the international security environments surrounding the North has been becoming more stable and at least is not turning against its favor with this successful agreement. The only urgency facing the North at that time

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was to stabilize its domestic security and consolidate the power-base of the newly-launched Kim Jong-Il regime to avoid the worst-case scenario of regime collapse.

Kim Jong-Il Strengthens Domestic Power Base
To address those problems, Kim Jong-Il and his associates tried to establish some measures to strengthen his power-base inside the Korean Worker’s Party (KWP) and Korean People’s Army (KPA) and create charisma that his late father had acquired and he did not. It was a gradual approach requiring several years to complete those objectives.

Kim Jong-Il was reluctant to show up to the public as an innovative leader, but instead tried to behave a ‘filial son’ by taking three year’s mourning session in an effort to acquire his ruling legitimacy on the basis of the Confucian tradition. In the meantime, his secretariats implicitly assigned a group of young military generals loyal to him to key posts in the party, cabinet, and military. In this process of strengthening his domestic power-base, Kim Jong-Il appeared to heavily rely on the military, instead of traditionally-held security apparatuses (e.g., security police and party’s security components), in an effort to effectively control the flow of information to the public, prevent any potential social unrest, and deny any revolt against him.65

Challenges, 1996-1998
However, this cautious and well-organized approach confronted serious challenges due to record natural disasters—the torrential flood in 1996 and scorching drought in 1997, consecutively. Those disasters completely disrupted a traditional rationing system, though it had already been seriously malfunctioned due to the bad crops of grain for the past several years. According to various foreign aid institutions working inside the North, as well as in the South Korea, more than 1 million people—roughly five percent of North Korean total population of about 22 million by that time—was believed to have been starved to death during the period of 1996-1998. The consequence of those tragic disasters was so enormous that the DPRK had nothing but to take drastic measures.

Drastic Changes
For instance, North Korea allowed private markets to be open and temporarily lifted a travel ban in an effort to help mitigate the adverse effect of the collapsed rationing system. Also, allowing foreign aid institutions to work inside the North was considered the most explicit policy change, given the past history that the DPRK had never allowed them until that time and its paranoid reaction to ‘foreign elements’ inside its territory. Considering those explicit changes in its domestic policy, it appeared to be increasingly evident that the North would collapse soon if it did not take more drastic measures to reform its autarkic economic system.66

“Arduous March”
Yet, North Korea survived this hardship by combining the “Arduous March” movement—one way of indoctrinating people by urging them to overcome all current economic hardship with anti-Japanese partisan movements in the 1930s’—with the previous economic reform plan. It was considered an effective measure in stabilizing the ever growing unstable domestic situation, given the fact that no large-scale revolt or resistance was reported in North Korea during this difficult period. From the perspective of domestic security, therefore, North Korea might have begun feeling greater confidence on its regime during this period by successfully muddling through this crisis.

External Factor
Initial Stabilization
Internationally, the DPRK has succeeded in avoiding some of the most serious tensions with the United States since the end of Korean War by reaching the Agreed Framework in 1994 and allowing Washington to inspect suspected underground facilities at Kum-Chang-Ri in March 1999. Those underground facilities were declared to be military storage site not relevant to nuclear program through extensive inspections by US nonproliferation experts. In addition, former Secretary of Defense, William Perry, visited Pyongyang in May 1999 to discuss a comprehensive package deal for engaging North Korea in return for Pyongyang’s concession on the inspection of Kum-Chang-Ri and ballistic missile development program. At this meeting, Pyongyang pledged to put moratorium on its

66 Amid its worst food crisis in 1996-1998, Pyongyang adopted some drastic policy changes to help overcome this dangerous regime crisis. Yet, North Korea’s food shortage was not completely resolved after the end of food crisis and has become a chronic ‘disease’ endangering its regime survival. For the root cause of food crisis and its political implications in North Korea, see Stephan Haggard and Marcus Noland, Famine in North Korea: Market, Aid and Reform (Columbia University Press: New York, 2007).
missile tests during on-going negotiation processes with Washington. This policy change from the North played some roles in mitigating suspicions on its willingness to abide by international rules regarding its nuclear and missile programs.67

**Normalizing Relations**

With those series of conciliatory gestures, Pyongyang could have gained some momentum in pursuing aggressive diplomatic offensive by normalizing ties with other western democratic countries—Australia, New Zealand, Italy, and Sweden. Most importantly, in September 1999, North Korea invited Japanese Prime Minister, Junichiro Koizumi, to Pyongyang in an effort to pave the way for normalizing ties with Tokyo and obtain economic loans severely needed for rebuilding its already failed economy. In this meeting, Kim Jong-II, for the first time, admitted North Korea’s involvement in abducting Japanese citizens during the 1970s and 1980s and provided official apology, a dramatic change in its policy toward Japan.68

**China and Russia**

As with relations with its two patrons, China and Russia, North Korea was regaining the previous strategic partnership with them, which had been severely damaged during the early 1990s. Even if those partnerships had primarily been focused on diplomatic supports and economic aides, they were considered a significant development in their relations, considering such worsening relations in the 1991 and 1992, when both Russia and China established diplomatic ties with South Korea despite strong resistance from Pyongyang.

**China: Food**

During the severe food shortage period between 1996 and 1998, Beijing provided a huge amount of food aid to the North without any conditions and relaxed its tight control on border areas so that North Korean refugees could conduct underground transactions for getting food from the ethnic Koreans living in that area and return back

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67 The so-called “Perry Process,” made public in October 1999, contributed to eliminating suspicions on North Korea’s confidence on its obligations from conservative circles in the US. This initiative by the US represented a good relation between the Kim Dae-Jung administration in Seoul and the Clinton administration in Washington because many of recommendations from Seoul were included to this process. For political implications of the Perry Process on the peninsula, see Baek Hak-Sun, “US-DPRK Relations,” in *Foreign Relations of North Korea*, eds., North Korea Research Center (Sejong Institute: Seoul Korea, 2002), 82-84.

to North Korea to feed their families. According to international human right groups, more than 300,000 North Korean refugees have crossed the border, involved in illicit or underground trade activities, and got married to ethnic Koreans and local Chinese during this period.69

China: Oil Support
For energy sources the North severely needed, China again became a key energy supplier to the North by supplying more than million tons of petroleum annually with low interest rate of loans since the early 1994, when Beijing began returning to its traditional trading pattern with Pyongyang--barter trading and friendly pricing--from the principle of market trading, which had been temporarily taken effect during the period between 1991 and 1993. 70 As a result, China became one of the most reliable and indispensible patrons during this period by providing about 70 % percent of energy sources and more than 40 percent of food to Pyongyang (See Figure 4-8).

![China's Share of Petroleum and Grain Exports to Total North Korean Trade, 1990-2003](image)

Figure 4-7: China’s Petroleum and Grain Exports to North Korea, 1990-2003

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69 Scott Snyder, “China’s Evolving Economic and Political Relations with North Korea,” in China’s Rise and the Two Koreas (Lynne Rienner Publishers, Inc.: Colorado, USA, 2009), 118-121.
70 According to the source released by the Chinese government, China provided a huge amount of food and energy in an effort to prevent the collapse of the North Korean regime until 1999: 520,000 tons of grains, 80,000 tons of oil, and 20,000 tons of fertilizers. For further details, see Lee Tae-Hwan, “DPRK-China Relations,” in Foreign Relations of North Korea, eds., North Korea Research Center (Sejong Institutes: Seoul Korea, 2007), 274.
China’s Interests Increase
This clearly shows how seriously the Chinese leadership considered the importance of regime survival in the North to its national interest. That is, the Chinese Communist Party (CCP) might have thought that holding out the current North Korean regime and the ensuring stability in the region would be more advantageous to its national interest than actively participating in international sanctions regime to disarm North Korea, which would clearly result in the collapse of North Korea and active US involvement in the North. The increase in US intervention in this region would provide significant vulnerabilities to the Chinese leadership because they have to worry about the presence of a US-led coalition aimed at stabilizing North Korea—its strategic buffer zone. The US military, in longer term, would have much more freedom of action in defending Taiwan which China considers a part of its territory because it no longer needs to commit a huge amount of forces to defending South Korea after the collapse of the current North Korean regime.\footnote{According to Chinese experts on North Korea, the Chinese government appears to think that both the Taiwan and North Korean nuclear issues are closely linked together. For its own critical national interests, they argue the PRC could allow North Korea to possess nuclear weapons if it is manageable by its influence because this could provide a significant hedge against potential US involvement in the Taiwan Straight. For Chinese strategic considerations on the value of North Korea, see Shen Dingli, “North Korea’s Strategic Significant to China,” \textit{China Security} (Autumn 2006), 20-21.}

Russia’s Influence Declines, 1991-2000
Russia has also begun trying to regain its influence on the peninsula by holding summit talks between president Putin and Kim Jong-II in 2000. It was the early 1990s that the relation between Pyongyang and Moscow observed a dramatic change. During this period, Kim Il-Sung and foreign minister of the Soviet Unions exchanged several state visits. At those meetings, Pyongyang strongly persuaded its ‘Soviet comrades’ not to establish any types of diplomatic ties with its arch-rival South Korea, but their efforts failed and its ‘big brother’ officially established diplomatic ties with South Korea in August 1991\footnote{It was a historic meeting between President Roh Tae-Woo and Michael Gorvachev in June 1990 at San Francisco that has completely changed the security environments on the Korean peninsula. Even though economic relations between Seoul and Moscow started shortly after the Seoul Olympic in 1988, this San Francisco meeting played a significant role in officially normalizing diplomatic ties between Seoul and Moscow in August 1991. For North Korea’s efforts to disrupt this rapprochement between Seoul and Moscow and its impact on the security environments in northeast Asia, see Don Oberdorfer, \textit{The Two Koreas: A Contemporary History} (Basic Books: USA, 2001), 197-228.}, thus raising serious concern about the collapse of the North Korean regime from Pyongyang, as well as from the international community. From this time, the
Soviet Unions and later Russia has rapidly begun losing its influence on North Korea, in particular, economy, and instead China has started increasing its rein on the Pyongyang regime (See Figure 4-9).

**Russia’s Influence Increases, 2000-2002**

Since Putin’s inauguration as the president of Russia in 2000, however, Russia has sought to change its policy toward North Korea in an attempt to regain its lost influence on the peninsula by suggesting summit talks between two countries. In the following summit meetings with Kim Jong-Il—July 2000 and August 2002—Russia accepted Pyongyang’s request of providing important military parts for maintenance of North Korea’s Russian-made equipment, though there had been repeated pressure on the part of South Korea that Russia stop exporting military equipment to the North. In return for Russia’s changed attitude, the North responded by Kim Jong-Il’s state visit to Moscow in early 2001, and since then, Russia has been joining the Chinese stance of opposing any significant sanction regimes against North Korea. As a result, North Korea also started rebuilding a traditional strategic alliance with Russia, though it had not

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73 See the data of KOTRA(Korea Trade Association) and Statistical Korea at [http://kosis.kr/bukhan](http://kosis.kr/bukhan) and Scott Snyder, *China’s Rise and the Two Koreas: Politics, Economics, Security* (Lynne Rienner Publishers, Inc.: USA, Colorado, 2009), 41.
specified automatic military involvement in the case of war on the peninsula during this period.74

**ROK Factor**

In the South, the Kim Dae-Jung administration, the first South Korean government supporting an engagement policy with the North in a different fashion where socio-economic cooperation prevails over politico-security conciliation, launched several initiatives to engage Pyongyang, despite the still remaining legacy of the Cold War mentality and the urgency of resolving the financial crisis facing Seoul. From the perspective of competing legitimacy between two Koreas, severe financial crisis faced by Seoul would have provided a kind of ‘relief’ to Pyongyang, since it has recently experienced serious regime crises due to food and energy shortage and this vulnerability faced by the South could have provided a relative advantage to the North.

For its part, the new administration in Seoul might have hoped to avoid tough competitions with Pyongyang in an effort to gain greater legitimacy as it had to invest more resources in transforming its economy. In addition, it was an explicit consensus in the South that achieving reunification by absorbing North Korea would put an enormous burden on the Seoul’s shoulder. Objectively speaking, in addition, it was not feasible for South Korea to take that reunification policy right now, given its economic hardship. As a result, North Korea could have lessened its fear of being absorbed by its arch-rival South Korea and would have hoped to exploit the initiative by Seoul for maximizing its own strategic gains during this period.

In fact, South Korean aid funds for North Korea increased dramatically from about 50 million dollar in 1999 to more than 100 million dollar in 2000, when a historic ‘South-North Summit Talk’ was held at Pyongyang. This trend continued in the subsequent years, and the amount of funds even increased by about 10 percent in 2003, marking a record of more than 150 million dollar, compared to the previous year of 2002, when North Korea set off its second nuclear crisis with its alleged highly-enriched uranium (HEU) program. Therefore, these developments clearly demonstrate that the South Korean factor has become more favorable to Pyongyang during this period and

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74 Jeong Sung-Im, “DPRK-Russia Relations,” North Korea Research Center, eds., in *North Korea’s Foreign Relations* (Sejong Institutes: Seoul Korea, 2007), 329-330.
Pyongyang might have thought that it could sufficiently manage the hostile reaction of South Korean society, even though its provocation regarding its nuclear program would set off international outcries (See Figure 4-10).

![Figure 4-10: South Korean Aid Funds to North Korea, 1996-2003](source: Author’s reconfiguration in the original sources from the Ministry of National Unification and Statistics Korea, 2009, at [http://kosis.kr/bukhan](http://kosis.kr/bukhan)).

**Conclusion**

In sum, **Pyongyang appears to have moved toward a better position than the worst status in the early 1990s during this period until the inauguration of the Bush administration in 2001.** Domestically, the newly launched Kim Jong-II regime began obtaining confidence on its system by surviving the worst domestic crises (e.g., energy, food, and security) during this period. As for South Korean factor, North Korea faced a new government that would be helpful for Pyongyang to pursue its urgent objective of rebuilding its collapsed economy, while generating a lot of North Korean ‘sympathizers’ inside the South. Finally, the international security environment surrounding the Korean peninsula might have become more favorable to Pyongyang due to its restoring traditional alliance with China and Russia. More specifically, both countries became a reliable and stronger shield in the UN Security Council (UNSC) against sanction regimes aimed at punishing Pyongyang, which might have provided the North with a significant strategic advantage in their escalation tactics during this period (See Figure 4-11).
It appears clearer that a North Korea’s national goal has changed during this period: from **unifying two Koreas on its terms** to **regime survival**. During the Cold War, the paramount goal of North Korea was to unify two Koreas under its rule, and the most important task to address this goal, Pyongyang repeatedly said, was to get the United States to withdraw from South Korea. In an effort to obtain more justification for its assertion, Pyongyang periodically argued that they had already had all foreign

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President Kim Dae-Jung and his associate (Im Dong-Won) often claimed that Chairman Kim Jong-Il privately recognized the need for US presence as a regional stabilizer after reunification of two Koreas in the 2000 summit talk. They argued this was a significant change in a traditional North Korea’s policy toward South Korea, in which achieving a withdrawal of US forces from South Korea had been one of the most important strategies. Yet, their arguments were not validated with actual courses of actions by Pyongyang. Instead, the DPRK exploited the issue of US military presence as a way for inciting tensions between progressive and conservative circles in the South by periodically bringing up this issue. For further details, see Oh Il-Hwan, “Characteristics of North Korea’s Policy toward South Korea after the 2000 Summit Talks and Countermeasures,” *International Politics Collection*, Vol.43, No.3 (Seoul Korea, 2003), 260-262 and Jeon Hyeon-Jun, *Characteristics of North Korean Policy toward South Korea* (Institute for Unification: Seoul Korea, 2002), 27-28.
forces leave the country by the end of 1958. Unlike North Korean moves, South Korea reached a mutual defense agreement with the United States in 1953, and U.S. Forces Korea (USFK), including two divisions of ground forces, has begun stationing at the South Korean territory according to this agreement. This US involvement and commitment to the defense of South Korea has been a key role in effectively deterring North Korea’s large-scale invasion of South Korea and achieving successful economic development in a short period since then.76

Under the commanding structure of two countries’ combined forces, a four-star general of the United State forces in Korea has been given an official authority to command all South Korean military forces, implying that the United States will take charge of all operations in case of a war on the peninsula. Theoretically, Pyongyang has to wage a war against Washington to unify Koreas on its rule under this structure, and it seemed impossible for North Korea to win in this war without significant aid from its two patrons, the Soviet Unions and China, which had been severely reluctant to directly engage a war with the United States, one of the most formidable adversaries to them, during this period.

As a result, Pyongyang has sought ways to achieve their imminent goal of realizing a withdrawal of US forces from South Korea. One of those strategies was to establish a peace treaty with the United States. Under this peace treaty, North Korea argues, there is no reason for the US forces to stay on the peninsula, and striking a peace treaty between two parties involved in the previous war could obtain much greater moral support from the international community than the US rationale of stationing at South Korea for deterring a potential invasion. In addition to the strategy for disengaging the US from the peninsula, Pyongyang has persistently pursued “three revolutionary elements” to achieve its final goal of communizing the entire Korean peninsula under its rule77: 1) fortifying its territory enough to withstand US attacks; 2) waging a second front

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76 Norman D. Levin, a well-known Korean expert in RAND Corporation, asserts that there are several invaluable benefits obtained by South Korea with US presence in its territory: credibly deterring and, if necessary, defeating North Korean aggression; reducing the strain of defense on the ROK economy; receiving strategic benefits from the broader US role as a regional stabilizer; and reassuring foreign investors at South Korea. For further details, see Norman D. Levin, Do the Ties Still Bind?: The US-ROK Security Relationship (RAND: Project Air Force, Santa Monica, USA, 2004) 11-20.

77 Recited in Oh Il-Hwan, op.cit., 258.
deep inside South Korea with argument that the Pyongyang regime has greater legitimacy
than Seoul’s ‘puppet’ government; and 3) seeking international supports not only from its
allies, but also from neutral countries in the world.

**Post-1992: Regime Survival**

Since the end of Cold War and the collapse of Eastern communist blocs in the
early 1990s, however, North Korea has begun suggesting totally different requests in its
negotiations with the international community. With its first high-level talks with the
United States in the early 1992, the DPRK started requesting three key demands, which
have been consistently repeated in its next negotiation processes with the United States78:
1) requesting a non-aggression pact with the United States; 2) normalizing a diplomatic
ties with the United States; and 3) demanding the US responsibility to induce economic
investment in North Korea from the international community.

The key difference in North Korea’s ‘wish-list’ between the Cold War and the
post-Cold War is about the status of US forces on the Korean peninsula. In its latest
request, Pyongyang has not demanded any form of a withdrawal of US forces in Korea,
and instead requested some structural measures guaranteeing the survival of its
increasingly destabilizing regime.79 Based on those requests, it seems evident that North
Korea acknowledged the grim reality that its regime is no longer able to sustain without
external aides, and the most important task facing Pyongyang is not to achieve such a
high-profile goal of unifying Korea under its terms, but to survive this record economic
crisis. In the Agreed Framework struck in October 1994 between the United States and
the DPRK, North Korea’s such willingness was well represented by trying to devise a
kind of package deal, in which the next step would proceed only if the previous step is
successfully met.

Until the mid-October 2002, North Korea appears to have maintained this national
goal of keeping its regime safe as a reference point in its negotiations with the outside
world, especially the United States, though they periodically threatened to end the Agreed

78 Baek Hak-Sun, *op.cit.*, 77-90.
79 According to former President Kim Dae-Jung, Chairman Kim Jong-Il allegedly agreed that US military
presence on the peninsula would be needed as a power balancer in this region after reunification of two
Framework in an effort to force Washington to implement its obligations as soon as possible.  

**New Discoveries**

All of sudden, the DPRK seems to have faced an urgent situation where it had to change its reference point. In the mid-October 2002, James Kelly, assistant Secretary of State for Asian and Pacific Affairs, visited Pyongyang and then threatened to publicize its secret uranium enrichment activities for the last several years with detailed evidence. For Pyongyang’s part, this uranium enrichment method was considered a hedging strategy against the United States after observing several years of delay in implementing the Agreed Framework. For instance, there has been no significant progress on normalizing ties with the United States and drawing international investment to rebuild its economy. The construction of two light-water nuclear reactors was several years behind the schedule and lifting bans and regulations on the trade with the North has failed due to strong resistance from the Republican-ruling US Congress. Furthermore, the new Bush administration had been very slow and meticulous in completing its North Korean Policy review and has periodically expressed an intention to modify the Agreed Framework so that it could increase the transparency of North Korea’s suspended nuclear program.  

**Becoming a Nuclear Power**

Faced with such an enormous suspicion and pressure from the new US administration, assistant Secretary Kelly’s ‘showdown’ might have suddenly forced the North to change its reference point from maintaining the status quo to acquiring the most reliable and credible deterrent means—becoming a nuclear power. Since then, North Korea has followed a series of escalating steps to achieve that objective: 1)
expelling the IAEA inspectors working at Yeong-byeon nuclear complex in December 2002; 2) removing monitoring cameras from its nuclear facilities and seals on containers in which the 8,000 spent fuel rods were stored in early January 2003; 3) proclaiming again its withdrawal from the NPT in February 2003; 4) refueling the controversial 5-Mw graphite-moderated reactor and starting reprocessing the spent fuel rods in April 2003; 5) proclaiming itself to have become a nuclear power in February 2005; and 6) finally conducting its first underground nuclear test in October 2006.

**Summary**

In sum, it seems rational that North Korea’s reference point has moved toward becoming a nuclear power from maintaining the unstable status quo in its second nuclear crisis when Pyongyang had been experiencing a series of setbacks since the start of the Bush administration (See **Figure 4-10**). From now on, Pyongyang is expected to evaluate all possible options based on this reference point under two analytical frameworks: 1) rational choice model— the North Korean leadership are rational enough to calculate the cost and benefit of each option and will choose an option maximizing their expected utility relative to the reference point; and 2) cognitive choice model— the North Korean leadership are rational enough to calculate their prospective cost and benefit of each option and will choose an option maximizing its prospective expected utility relative to the reference point.

### 3. Predicting North Korea’s Behaviors

**Options**

Given North Korea’s current domain and reference point, several options could be explored, including **the status quo** of maintaining the Agreed Framework as a default option. The second option is to **escalate tensions** in order to increase its bargaining power. The last option is to **take an engagement policy** by agreeing to dismantle its nuclear program in exchange for getting a package of benefits. For simplicity, it is assumed that each option is exclusive in satisfying a national goal or reference point and a combination of more than two options is removed accordingly. The next step is to calculate the expected values of each option based on the key concepts and arguments of
two decision-making models—the Rational Choice and Cognitive Choice Model. In the process of choosing an option maximizing the expected value, the rational choice model employs a net expected value—the difference between expected benefit and cost—relative to the total asset level of the status quo, while the cognitive choice model employs the variation of the prospective value relative to the reference point.

1) Qualitative Analysis for North Korea’s Second Nuclear Crisis

Rational Choice Model

Decision Rules

As usual, a net expected value is a key determinant in North Korea’s strategic decision on its second nuclear crisis. It is difference between the expected benefit and cost incurred by performing a certain option, and that would be compared to the total asset level of the default option—maintaining the status quo, or maintaining the Agreed Framework. That is, an option guaranteeing the largest net expected value would be selected as an alternative if Pyongyang is a rational actor seeking to meet its national goal.

Option #1: Escalate

Escalating tensions could be considered a short-term strategy to increase its bargaining power if Pyongyang thinks it could effectively control the ‘escalation ladder.’ Although the DPRK is extremely weak relative to the ROK-US combined forces in terms of national power, in particular military strength, it appears to have some asymmetric advantages relative to its opposing coalitions (e.g., North Korea’s WMD capable of inflicting a huge collateral damage to South Korea, the easy willingness to use its civilian as a human shield in desperate situation, and the deep-rooted perception of nothing to lose, etc.).

As a result, Pyongyang could gain some positive expected value from this strategy unless it does go beyond the threshold point to which the coalition forces could tolerate. This escalation strategy could be seen as an alternative to produce a greater expected value than the status quo, given the status quo of maintaining the Agreed Framework is no longer sustainable by the release of North Korea’s secret uranium enrichment program and subsequent punishments by the United States. In satisfying North Korea’s latest reference point—becoming a nuclear power—this option could provide some advantage through giving ‘time’ for the completion of its nuclear program.
and allocating more resources to ongoing nuclear programs. North Korea could deter the coalition forces’ preemptive attacks against its nuclear installations by threatening to impose catastrophic counter-attacks, as well as suggesting some room for negotiation.

From the perspective of the rational choice model, this escalation strategy requires North Korea to conduct a careful analysis of the level of tolerance of the coalition forces lest should this escalation move spiral into a limited or all-out war—the worst case scenario for North Korea. The United States periodically released its threshold level of tolerance to North Korea shortly after the collapse of the Agreed Framework in December 2002. Among some actions constituting crossing the threshold level are: impeding the efforts to maintain the continuity of nuclear safeguard (e.g., removing seals and monitoring camera from nuclear reactors and reprocessing plants); refueling or defueling the 5-Mw reactor; and finally reprocessing the 8,000 spent fuel rods from the storage ponds.

Of three phases in its escalation ladder previously mentioned, the first two options could be well considered as a necessary means to increase North Korea’s bargaining power and coerce the coalition forces into more concessions. But crossing the last phase of reprocessing the spent fuel rods is not considered a rational behavior, given such behavior directly implies that North Korea will make a nuclear bomb and it will result in comprehensive sanctions (vis-à-vis Pyongyang) both China and Russia could not afford to resist in the UN Security Council. That is, once Pyongyang crosses the ‘red line’ of reprocessing the spent fuel rods, that is no longer considered as an act to negotiate, but rather a desperate one requiring a different analytic framework.

**Option #2: Abandon Nuclear Programs in Return for Benefits**

Abandoning its nuclear program in return of a package of benefits would require conducting an analysis where a time effect does really matter on the part of North Korea. In other words, there would be a significant difference in North Korea’s strategic calculation of cost and benefit depending on the time effect of this engagement policy.

Given North Korea’s current dire economic situation and some level of

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83 On March 31, two US diplomats working at Korean task in State Department, Jack Pritchard and David Straub, met with North Korea’s diplomats at the UN in an effort to defuse current tension caused by North Korea’s HEU program. In this meeting, North Korean diplomats for the first time delivered North Korea’s intention that it will reprocess the spent fuel rods and create a nuclear deterrent for their defense. See Chinoy, *op.cit.*, 166-167.
confidence on its internal security as mentioned in the previous part, the short-term effect of this option could provide some positive expected value relative to the current status quo, which is now becoming unacceptable to North Korea, by the form of massive foreign aid from the western coalition forces. With this foreign aid, the DPRK could revamp its failed rationing system, reinvigorate its completely stalled factories, and deal with the skyrocketing inflation derived from the initial phase of introducing market economy.

Yet it would take more than decades for those measures to have some meaningful consequences and, arguably, impossible to expect any success in the long-term manner, given the fact that North Korea is in a more difficult situation than China in the 1970s when it started its economic reform plan. In the process of transforming its economy, North Korea would have to give up some of its internal security measures and governing philosophies due to the conflicting natures between two elements: North Korea’s governing philosophy of “Juche” or self-help Versus getting massive foreign aid; the centrally-controlled economic planning system Versus the economic system based on market; and its national goal of unifying two Koreas on its terms Versus South Korea’s massive contribution to its economic reform initiative.

Furthermore, the DPRK might perceive that they could sustain for several years without getting external economic aid from the US-led coalitions due to current developments they have made for the last several years: surviving a record food crisis with the indoctrination movement of the “Arduous March” movement; acquiring sympathy and economic aides from their southern neighbor since the summit meeting in June 2000; restoring traditional alliance from its two allies, China and Russia, since 2000; and initiating maneuvers to establish diplomatic ties with the western democratic countries other than the Unites States and Japan. Therefore, engaging the Unites States without obtaining a safety measure for its regime survival would only provide a limited

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84 Since the early 1990s, the PRC has urged Pyongyang to follow its economic development model to resolve the structural problems inherent in its economic system. But the regime crisis caused by the death of Kim Il-Sung and food shortage prevented Pyongyang from initiating this process for the remainder of the 1990s. It was in the early 2000s when North Korea aggressively adopted its economic reform plan with a strong support from the PRC. Still, North Korea faced a dilemma imbedded in its system: the more North Korea opens its economy to the outside world, the more its internal security become unstable. For North Korea’s aggressive economic reform initiative and Chinese involvement, see Snyder, op.cit., 121-130.
profit, while a lot of systematic problems would loom large in the future. Of course, North Korea’s current reference point of becoming a nuclear power would be difficult to be realized, or absolutely impossible under this option.

**Conclusion: Escalate**

In sum, escalating tensions would be the only option providing North Korea with the highest expected utility relative to the status quo, and Pyongyang might also perceive that this option could meet its current reference point of becoming a nuclear power through buying time and allocating more resources. Therefore, North Korea is expected to take the first option of escalating tensions on the basis of the key arguments of the rational choice model. Yet, it should be accompanied by North Korea’s objective analysis on the threshold point involving this nuclear crisis (See Figure 4-12).

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**Cognitive Choice Model**

**Domain of Losses**

To analyze North Korea’s behaviors on the basis of prospect theory, it is needed for North Korea’s domain to be identified from the beginning. According the previous analysis, Pyongyang seems to have begun perceiving its domain is rapidly moving toward the loss domain since the early 2000, when the Bush administration started its
office. Therefore, North Korea is theoretically in the domain of losses and is likely to rely on a risky choice to meet its national goal of maintaining its regime survival under this model.

**Reference Point: Becoming a Nuclear Power**

Defining North Korea’s reference point is also another important step in the “editing” phase of prospect theory. It is quite possible for North Korea to have changed its reference point from maintaining the status quo by abiding by the Agreed Framework to becoming a nuclear power since October 2002, when North Korea allegedly admitted its secret nuclear program of enriching uranium. According to several statements released from North Korean official news agency since this ‘showdown,’ it seems apparent that Pyongyang has changed their reference point to satisfy their nation goal. That is, in every response to the United States’ warning and persuasions to dismantle its nuclear programs, Pyongyang argued that “it has the genuine right to defend itself by employing every means it can and nuclear weapons would be one of the most effective deterrent means against the United States’ nuclear threat.”

After this ‘bombshell’ by Kang Seok-Ju, first vice foreign minister—one of the most confident aides to Kim Jong-Il—the first Bush administration filled with neo-conservative hardliners was convinced that its suspicion on North Korea’s compliance with the Agreed Framework had been vindicated and there will be no other way but to take a harsh ‘stick’ in an effort to demonstrate strong US resolve to other potential proliferators—a decision to suspend the shipment of heavy fuel oil to North Korea in the early December 2002. A successful outcome on the war in Afghanistan by that time would have also contributed to drawing this hard-line policy against Pyongyang by the Bush administration. In addition, this hard-line stance might have helped draw a successful approval for initiating a war on Iraq from US Congress.

**Escalation is the only option capable to meeting its newly-set reference point**

Under this circumstance, it is quite easy to predict North Korea’s behavior on the basis of the cognitive choice model because two parameters influencing North Korea’s

---

85 Kang Seok-Ju, first vice foreign minister of the DPRK, responded to Kelly’s accusation of its violation of the Agreed Framework by claiming that “the DPRK is entitled to possess not only nuclear weapon but any type of weapon more powerful than that so as to defend its sovereignty and right to existence from the ever-growing nuclear threat by the US.” For further details regarding vocal debates between Kelly and Kang, see Chinoy, *op.cit.*, 120-121 and the October 25th statement of the KCNA at [http://www.kcna.co.jp/index-k.htm](http://www.kcna.co.jp/index-k.htm).
86 For responses of the Bush administration after Kang’s ‘bombshell,’ see Chinoy, *op.cit.*, 128-141.
decision-making process became so clear: its domain is clearly moving toward the ‘loss’ area and its reference point is to become a ‘de-facto’ nuclear power to have a reliable deterrent means against a possible preemptive attack. Of three options available, it seems evident that escalating tensions by improving its nuclear capability would be the only one satisfying its prospective value relative to its newly established reference point. The other options except escalating tensions would not meet Pyongyang’s new reference point because they basically require North Korea to stop in the short-term and dismantle its nuclear program eventually. Therefore, Pyongyang framed with this ‘loss’ domain would surely select the riskiest one, out of three alternatives, because it could only provide a chance of returning to its previous acceptable status quo or even higher position, though the probability is still very slim (See Figure 4-13).

Figure 4-13: North Korea’s subjective value function by the cognitive choice model in its Second Nuclear Crisis, 10/2002-8/2003
2) Quasi-empirical analysis for NK’s Second Nuclear Crisis

In this case, this dissertation assumes that Pyongyang felt it had fallen to $X = -10$ (current status quo) in its strategic status because a new US administration (the first Bush starting in 2001) began a hard-line policy toward Pyongyang with the HEU issue in 2002 after the 9/11 terrorist attacks on the US in September 2001, thus seeking to abolish the AF (under this framework, NK has been receiving 500,000 tons of heavy fuel oil per year and two light-water nuclear reactors has been constructed).

Rational Choice Model

Under this model, this dissertation uses the following equation to effectively reflect a key assumption that North Korean leadership would be risk-averse across all domains of actions (gain and loss areas) under the RCM: $Y = 1,200 \times (\log(50 \times X + 7,000) - \log(7,000))$ where the shape of this function shows marginally concaved form across all areas (see Figure 3-1 in chapter 3). Based on previous parameter and equation, this dissertation could calculate the expected utility of each option in North Korea’s second nuclear crisis under the rational choice model (Table 4-9).

Table 4-9: NK’s Expected Utility in its Second Nuclear Crisis under the RCM, 10/2002-8/2003

<table>
<thead>
<tr>
<th>Parameter (current status quo value, X)</th>
<th>-10</th>
</tr>
</thead>
<tbody>
<tr>
<td>risk-averse equation under the RCM</td>
<td></td>
</tr>
<tr>
<td>$Y = 1,200 \times (\log(50 \times X + 7,000) - \log(7,000))$</td>
<td></td>
</tr>
<tr>
<td>Expected Utility of the Status Quo(j1)</td>
<td></td>
</tr>
<tr>
<td>$EU(SQ,j1) = 1,200 \times (\log(50 \times -10 + 7,000) - \log(7,000)) = -39$</td>
<td></td>
</tr>
<tr>
<td>Expected outcomes in case of NK’s escalating(j2)</td>
<td></td>
</tr>
<tr>
<td>1) 5% of escalating to total war, X = -100</td>
<td>-653</td>
</tr>
<tr>
<td>2) 10% of escalating to limited war, X = -70</td>
<td>-361</td>
</tr>
<tr>
<td>3) 35% of being diplomatically isolated and facing economic sanctions, X = -50</td>
<td>-230</td>
</tr>
<tr>
<td>4) 30% of getting the US comply with the AF, X = 30</td>
<td>101</td>
</tr>
<tr>
<td>5) 20% of appearing empowered without facing preemptive attack, X = 20</td>
<td>70</td>
</tr>
<tr>
<td>$EU(j2) = 0.05 \times -653 + 0.10 \times -361 + 0.35 \times -230 + 0.30 \times 101 + 0.20 \times 70 = -105$</td>
<td></td>
</tr>
</tbody>
</table>
During this period, North Korean leadership might have thought the likelihood of US preemptive attacks is not high because the US military launched a large-scale military involvement in Afghanistan and was preparing a war for liberating Iraq. At best, diplomatic isolation and economic sanctions seemed to be the only penalty they could face. But they might have surely thought escalation could force the US to comply with the previous Agreed Framework and make its regime appear empowered in the sideline of this conflict. These arguments are described in the previous qualitative analysis and used to specify probability of each outcome above.

<table>
<thead>
<tr>
<th>Expected outcomes in case of NK's escalation with calculation (j3)</th>
<th>Y(i) j2</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) 5% of escalating to total war, X = -100</td>
<td>-653</td>
</tr>
<tr>
<td>2) 10% of escalating to limited war, X = -70</td>
<td>-361</td>
</tr>
<tr>
<td>3) 15% of inviting US preemptive attack, X = -50</td>
<td>-230</td>
</tr>
<tr>
<td>4) 40% of obtaining economic and security concession, X = 100</td>
<td>280</td>
</tr>
<tr>
<td>5) 30% of appearing empowered without facing preemptive attack, X = 50</td>
<td>159</td>
</tr>
</tbody>
</table>

\[ EU(j3) = 0.05 \times (-653) + 0.10 \times (-361) + 0.15 \times (-230) + 0.40 \times 280 + 0.30 \times 159 = 56 \]

During this period, North Korean leadership might have thought they could further reduce the possibility of US preemptive attack by managing its escalation steps so that it could not cross the critical point, while increase the possibility of getting economic and security concession from the US.

<table>
<thead>
<tr>
<th>Expected outcomes in case of NK's dismantling its nuclear programs (j4)</th>
<th>Y(i) j3</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) 10% of keeping its regime afloat for a long period with foreign aid, X = 100</td>
<td>280</td>
</tr>
<tr>
<td>2) 20% of keeping its regime afloat for a short period with foreign aid, X = -50</td>
<td>-230</td>
</tr>
<tr>
<td>3) 70% of causing a sudden regime collapse, X = -100</td>
<td>-653</td>
</tr>
</tbody>
</table>

\[ EU(j4) = 0.1 \times 280 + 0.20 \times (-230) + 0.7 \times (-650) = -473 \]

To obtain a clear idea for specifying probabilities and values to each outcome, we are supposed to consider North Korean society: 1) economy has already collapsed so that it is extremely hard to rehabilitate how much foreign aide is supported; 2) society has been so tightly controlled that it seems impossible to induce internal rebellion; and 3) under those previous condition, getting its society open to outside world will cause a sudden regime collapse without obtaining the most reliable assurance of its regime survival. We also describe these arguments in the previous qualitative analysis.

According to this analysis made under the RCM, Pyongyang should have adopted the option of escalating tensions with calculation to maximize its expected utility:

- \[ EU(SQ) = -39 \]
- \[ EU(Escalation) = -105 \]
- \[ EU(Escalation with calculation) = 56 \]
- \[ EU(Cooperation by dismantling its nuclear programs) = -473 \]
In fact, Pyongyang adopted the option of escalating tensions by stepping up escalation rung very quickly, just as the RCM suggests: 1) removing monitoring cameras and seals on its nuclear materials and expelling the IAEA inspectors in December 2002; 2) again proclaiming a withdrawal from the NPT in January 2003; and 3) reactivating the frozen 5-Mw nuclear reactor and reprocessing the spent materials to obtain fissile materials for its nuclear arsenals in March 2003.

**Cognitive Choice Model**

Under this model, this dissertation uses the following equation to effectively reflect a key assumption that North Korea is assumed to be risk-averse (concave) in the domain of gain and risk-seeking (convex) in the domain of loss, known as the “S” curve, and individual’s loss-aversion bias is reflected by more steepness of curvature in the loss domain than gain domain (See Figure 3-2 in chapter 3):

\[
Y = \begin{cases} 
1,200 \times \left( \log(50 \times X + 7,000) - \log(7,000) \right) & X \geq 0 \\
-200 \times \left( \log(-20 \times X + 30) - \log(30) \right) & X < 0, 
\end{cases}
\]

Based on previous parameter and equation, this dissertation could calculate the expected utility of each option in North Korea’s second nuclear crisis under the rational choice model as follow (Table 4-10).

**Table 4-9: NK’s Expected Utility in its Second Nuclear Crisis under the CCM, 10/2002-8/2003**

<table>
<thead>
<tr>
<th>For the Cognitive Choice Model (CCM), NK’s Second Nuclear Crisis (10/2002-8/2003)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>North Korea’s Reference Point (goal)</strong></td>
</tr>
<tr>
<td>&quot;Regime Survival&quot; by securing a reliable deterrent means (nuclear arsenals)</td>
</tr>
<tr>
<td>Parameter (current status quo value, X)</td>
</tr>
<tr>
<td><strong>risk-dependent equation under the CCM</strong></td>
</tr>
</tbody>
</table>
| \[ Y = \begin{cases} 
1,200 \times \left( \log(50 \times X + 7,000) - \log(7,000) \right) & X \geq 0 \\
-200 \times \left( \log(-20 \times X + 30) - \log(30) \right) & X < 0, 
\end{cases} \] |
| **Expected Utility of the Status Quo (j1)** |
| \[ EU(SQ_{j1}) = -200 \times \left( \log(-20 \times -10 + 30) - \log(30) \right) = -177 \] |
| **Expected outcomes in case of NK’s escalating tensions (j2)** |
| Y(i)j2 |
| 1) RCM(5%) --> 2.5% of escalating to total war, X = -100 | -366 |
| 2) RCM(10%) --> 5% of escalating to limited war, X = -70 | -336 |
| 3) RCM(35%) --> 15% of being isolated and facing economic sanctions, X = -50 | -307 |
Here this dissertation establishes **weighted probability** of each outcome by differently specifying the numeric value depending on the size of subjective value of each outcome in an attempt to reflect cognitive biases of human-being (e.g., loss-aversion, endowment effect, and reference-dependence choice). Under those biases, a decision-maker is likely to avoid losses and defend its current assets.

* For simplicity and availability for this quasi-empirical analysis, this dissertation uses a **rule of thumb** to generate weighted probabilities to be used in the CCM, instead of the probability weighting function suggested by Kahneman and Tversky (1979). In general, the risk taking player discounts the probability of negative outcomes and overvalues the probability of positive outcomes due to the loss-aversion bias. Thus, Probability (CCM) or \( W(p) = 0.5 \times \text{Probability(RCM)} \) for outcomes where \( \text{EU(outcome)} < \text{EU(status quo)} \). The positive outcomes then absorb the remainder of the probability.

<table>
<thead>
<tr>
<th>Expected outcomes in case of NK's dismantling its nuclear programs (j3)</th>
<th>( Y(i) )</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) 10% of keeping its regime afloat for a long period with foreign aid, ( X = 100 )</td>
<td>281</td>
</tr>
<tr>
<td>2) 20% of keeping its regime afloat for a short period with foreign aid, ( X = -50 )</td>
<td>-307</td>
</tr>
<tr>
<td>3) 70% of causing a sudden regime collapse, ( X = -100 )</td>
<td>-366</td>
</tr>
</tbody>
</table>

\[
\text{EU(j3)} = 0.1 \times 281 + 0.20 \times -307 + 0.70 \times -366 = -290
\]

In this case, this dissertation is supposed to consider North Korea's perception on the possibility of success in its economic reform plan launched in July 2002. Also, Pyongyang's reference point at this time should be seriously considered to specify probabilities and values to each outcome. This dissertation engages this kind of arguments in the preceding qualitative analysis.

Based on analytical results made by the cognitive choice model, this dissertation could identify that the option of escalating tensions would have been the best choice with which Pyongyang could minimize its potential losses:

- \( \text{EU(SQ)} = -177 \)
- \( \text{EU(Escalation)} = -3.8 \)
- \( \text{EU( Cooperation by dismantling its nuclear programs)} = -290 \)

In its second nuclear crisis (10/2002-3/2008), Pyongyang exactly behaved the same way as the cognitive choice model suggests: 1) seeking to avoid potential losses; 2) trying to evaluate all options vis-à-vis its then reference point; and 3) preferring the certain thing to probable one. These behaviors are consistent with the preceding qualitative analysis.

**Conclusion**

This empirical analysis is clearly consistent with the preceding qualitative analysis where North Korea was supposed to adopt the option of maintaining the Status
Quo to minimize its potential loss under the RCM, while take the option of escalating tensions under the CCM. Consider Pyongyang’s actual behaviors of quickly escalating tensions during this period, however, the latter model seems more explanatory and predictive than the former in explaining North Korea’s behaviors on its nuclear weapons programs.

### 4. Model Performance for Pyongyang’s Behaviors

**Both models predict Escalation strategy**

Unlike the first North Korean nuclear crisis (1992-1994), Pyongyang did not show any change in its behavior in this second nuclear crisis. Instead, the DPRK appears to have continued increasing its escalation rung without any consideration on escalation control to maximize its strategic objectives (See Figure 4-14).

![Figure 4-14: Actions and Reactions between the US and DPRK, 1/2001-8/2003](image-url)
At the peak of this confrontation, there has not been any change in actual payoff and possibility of each alternative on the part of North Korea, but have been some changes in North Korea’s threat perception and security environments surrounding the Korean peninsula: a significant drop in North Korea’s oil acquisition by the KEDO’s decision to suspend heavy oil shipment to the country; an increase in North Korea’s threat perception by a new US preemptive strategy against ‘rogue’ states (e.g., witnessed the collapse of the Taliban government in Afghanistan and the preparation for another war in Iraq by the Bush administration); and a growing increase in the possibility that North Korea would get into a more severe loss domain in the form of receiving tough UN-sponsored sanctions for dismantling its nuclear program.

Model Indicators
To determine which analytical model would be more apt for explaining North Korea’s actual behaviors during this period, several key indicators upon which each decision-making model is based are referred to in an effort to examine casual relations between explanatory variables (North Korea’s domain and reference point) and dependent variables (North Korea’s risk propensity and choice of specific decision-making model), as done in the previous parts.

Behavior inconsistent with RCM
In the first place, the rational choice model posits that North Korea will identify and adopt the option that maximizes its expected utility, subject to constraints and their prior beliefs about the world. Under this assumption, Pyongyang is supposed to search extensively for options and make probabilistic judgments about their consequences. Yet, North Korea’s actual behaviors at the peak of this confrontation appear not consistent with this suggestion.

1) Crossing thresholds of tolerance
They just showed consistent behaviors of increasing hostility and sometimes crossed the ‘red line’ set by its opponents, which is not a rational behavior because it does not consider relative power distributions among parties involved. That is, Pyongyang fixed their option by adopting escalating tensions in an effort to show its opponents that it has nothing to lose, thus coercing them into concessions. According to previous analysis about North Korea’s domain, in fact, Pyongyang was surely in the
domain of gains relative to the previous crisis until the inauguration of the Bush administration in 2001 and therefore might have had something valuable.

2) Ignoring alternatives

Secondly, the DPRK is supposed to update their preferences and adjust their strategies in light of new information under rationalist assumptions. Unfortunately, North Korea’s behaviors since the ‘infamous’ State of Union’s Address in January 2002 appear quite departing from this suggestion by ignoring alternatives other than escalating tensions. There has been only one option of ‘lashing-out’ and consistent risk propensity toward stepping up escalation ladder (see also Figure 4-13).

Under this circumstance, there might have been no room for considering marginal costs and diminishing returns, which are some of key indicators required for rational decision-makers. Therefore, another analytical framework should be explored to explain those anomalies found in North Korea’s second nuclear crisis.

One of alternative frameworks could be explored in prospect theory, where some cognitive processes—the reference dependent choice, framing effect, loss aversion, certainty effect, and status quo bias (endowment effect)—play a significant role in individual’s decision-making process under condition of risk. According to key axioms of prospect theory, the cognitive choice model posits that North Korean leadership are expected to evaluate outcomes in terms of deviations from its current reference point—becoming a nuclear power—and, all else being equal, they will be risk-averse with respect to gains and risk-acceptant with respect to losses relative to the reference point.

Behavior predictable by CCM

1) Ignoring alternatives which do not meet the reference point

Based on the assumption of reference-dependent choice, North Korea is expected to display a strong bias toward risk-seeking strategies to avert losses relative to the current reference point. Therefore, it is quite predictable that North Korea will ignore alternatives which are supposed to not meet its reference point. In fact, Pyongyang followed this prediction by adopting the option of escalating tensions because it could only have provided a chance of reaching its current reference point, though the possibility of success was still uncertain and marginal. In response to the US decision to suspend oil shipment, North Korea stepped up escalation by removing monitoring cameras and seals
on the containers holding spent fuel rods. When the US stepped up its pressure by threatening to refer this issue to the UN Security Council, Pyongyang responded with higher escalation by proclaiming the withdrawal from the NPT and processing the 8000 spent fuel rods—a clear signal to make a nuclear bomb. On its part, Pyongyang might have thought that only such escalations could provide a positive value relative to its current reference point.

2) Outcome payoffs, not probabilities, matter most
   Some of other key cognitive aspects—the framing effect, loss-aversion bias and certainty effect—are also observed in North Korea’s second nuclear crisis. As analyzed in the previous parts, North Korea would have faced severe ‘losses’ at the peak of this confrontation due to US policy change toward the DPRK. Framed with loss-aversion and the endowment effect, North Korea was surely expected to change its reference point from maintaining the status quo to becoming a nuclear power in an effort to secure its reliable deterrence measure for survival. Under this circumstance, the probability of success in each option would no longer play a significant role in its choice, but rather the payoff itself of a certain outcome will do. For example, such escalations as removing seals and processing the spent fuel rods are not able to make North Korea a nuclear power instantly, given its primitive nuclear expertise on explosive device. But the potential payoff of becoming a nuclear power is enormous enough to offset the low possibility of success at this moment.

3) Certainty effects
   On the other hand, North Korea might have provided more value toward the probability of success in each option when the outcome of an option was extremely catastrophic and the probability is sure certain due to the certainty effect. One of the most dramatic changes in North Korea’s behavior at its second nuclear confrontation was to reach an agreement of holding the “Six-Party” talks to peacefully address its nuclear problem in April 2003. Of course, there has not been any change in payoffs and probabilities assigned to each alternative to this time, but changes in North Koreas’ own perceptions on increasing likelihood of all-out war with the US, increasing pressure to take a diplomatic breakthrough by China—one of the most influential patrons to its regime—and ensuring catastrophic damage to its regime when it disobeys Chinese offer. Under this circumstance, an individual actor would like to take a risk-averse action.
because risky move would guarantee extreme and sure damage to itself in this case. Again, the priority in decision-making criteria changed from payoff itself to probability of success since the “certainty effect” loomed large under this severe circumstance.

Conclusion: CCM has more explanatory power

In conclusion, the cognitive choice model endorsed by Prospect theory would have more explanatory power than the rational choice model in explaining North Korea’s course of actions in its second nuclear crisis with the US: “a national leader, framed with the loss-aversion and status quo biases, is inclined to be risk-acceptant in its choice when he is in the domain of losses, while risk-averse in the domain of gains relative to its reference point.” Yet, this kind of risk propensity might reverse under a situation where an expected outcome is certain and catastrophic.
Case 3: North Korea’s First Nuclear Test (10/2006)

1. General Description

Overview of First Nuclear Test

North Korea conducted its first nuclear test in the vicinity of Musudan-Ri, about 500 km north east of Pyongyang, at 10:35 a.m. October 9th 2006 (local time). One day after its nuclear blast, the North Korean Central News Agency (KCNA) officially stated that “in the midst of building a ‘strong and great’ nation, our scientific research department successfully and safely conducted a nuclear test on October 9th 2006 (Juche ’95 year).”\(^87\) It was 4 days after its pre-notified statement that it will test its first nuclear device soon on October 5th.

According to several intelligence sources involved in Pyongyang’s nuclear programs, the explosion was measured as a 3.58 magnitude, an equivalent to less than 0.5 kiloton, causing some debates about whether it was a really nuclear blast because a simple plutonium implosion device (made with 4-6 kg of plutonium) is normally supposed to produce the magnitude of 5-20 kiloton. Among several controversies regarding Pyongyang’s first underground nuclear test are\(^88\): the reduced blast is a North Korean tactic to deny foreign intelligence communities the exact information on its nuclear test, a rational act to save its scare fissile materials (supposed to have used only 2 kg of plutonium), and the clear indicator that its nuclear design still lacks technological expertise needed to become a ‘practical’ nuclear power.

US Financial Sanctions

Regardless of the effectiveness of its nuclear test, however, Pyongyang appears to have conducted a strategic maneuver aimed at pressing the United States into a key concession regarding its financial sanctions against North Korea. About one month after the September 19th agreement of 2005 on the principles for dismantling North Korea’s nuclear program, US Treasury Department began imposing its first far-reaching financial

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\(^87\) North Korea released a short statement about its first nuclear test on October 10th 2006. According to this statement, “this nuclear test was successfully and safely conducted by its own technology and would contribute to maintaining a peace and stability on the peninsula by acquiring a strong self-defensive measure.” For further detail, see the official statement of Korean Central New Agency on October 10th 2006 at http://www.kcna.co.jp/index-k.htm.

sanctions against the Kim Jong-Il regime by freezing its financial assets deposited in **Banco Delta Asia**, one of commercial banks in Macau. This bank has had a long track record of maintaining close connection with North Korean trading companies allegedly involved in a lot of illegal activities, including counterfeiting US currency, trafficking drugs and narcotics, and money laundering.

**North Korean Response to US Sanctions**

In response to this ‘unexpected’ sanctions on its ‘regime-control’ money, Pyongyang vehemently reacted by threatening to withdraw from the ongoing Six-Party talks where a ‘great’ breakthrough for dismantling North Korea’s nuclear program was made in a ‘quid-pro-quo’ manner.\(^8\) For the last three months in 2005, for instance, North Korea stepped up its pressure on the United States that it would lift its freezing on North Korean financial assets in foreign financial institutes by threatening not to take part in the fifth round of six-party talks scheduled on the early November and to continue intensifying its defensive measure in the form of building nuclear weapons.\(^9\)

According to the KCNA’s statement on November 2\(^{nd}\), it seems clear that Pyongyang had strong suspicion on US financial sanctions targeting its bank accounts in Macau because it had been officially made public and taken effect shortly after the 9/19 agreement. By employing this measure, Pyongyang argued that “the United States hopes to disarm and destroy the North without paying attention to peaceful resolution on its

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8. On September 19\(^{th}\) 2005, the six parties agreed on the principles to deal with North Korean nuclear programs in a ‘quid-pro-quo’ manner: North Korea pledged to dismantle all existing nuclear programs, return to the NPT, and implement IAEA’s safeguard agreement soon; the United States promised not to attack North Korea with its nuclear arsenals and will take measures to normalize its relations with the DPRK; the ROK reaffirmed to comply with the 1992 non-nuclearization principle between two Koreas and supply electricity worth of 2000 million watt to Pyongyang; and all parties promised to provide energy aid to North Korea, begin a negotiation to supply light-water reactor to the North in an appropriate time, and establish a different venue to replace the current armistice regime with a permanent peace regime on the peninsula. But there was a sharp difference in the timing of dismantling Pyongyang’s nuclear programs between North Korea and the United States: the DPRK hoped to dismantle its nuclear programs after receiving light-water reactors, while the United States required the dismantlement to be in the early process. For detailed accounts about the 9/19 agreement, see Larry A. Niksch, “North Korea’s Nuclear Weapons Program (updated January 17, 2006),” *CRS Issue Brief for Congress* (Congressional Research Service, Washington D.C.), p.1; the September 20\(^{th}\) statement of the KCNA at [http://www.kcna.co.jp/index-k.htm](http://www.kcna.co.jp/index-k.htm).

9. The Kim’s regime in the North issued a total of 10 statements (October 19/25; November 2/4/30; and December 3/15/20/23) of criticizing US financial sanctions against Pyongyang for the last three months in 2005. The December 20\(^{th}\) statement is one of the most aggressive and intimidating ones, in which the DPRK proclaimed that “it had already made its own nuclear arsenals and vowed to continue increasing the number of its nuclear weapons.” For further accounts, see the December 20\(^{th}\) statement of the KCNA at [http://www.kcna.co.jp/index-k.htm](http://www.kcna.co.jp/index-k.htm).
nuclear program through dialogues and negotiations agreed on the 9.19 principles.” The North warned “this pressure tactics would not succeed in disarming our country, rather intensifying our people’s animosity against American imperialists, because this dissertation had been under US financial sanctions for more than 50 years and have been well survived so far. Therefore, if the United States wants to solve this nuclear issue peacefully, it should first lift the financial sanctions against us because pressure is not consistent with dialogue.”

North Korea Boycotts Six-Party Talks

Despite its strong intimidation not to participate in the 5th round of six-party talks, North Korean delegates went to Beijing in early November 2005 in order to press the United States to lift its sanctions. As expected, both parties had a different method to solve this stalemate: the United States claimed to establish a separate venue to deal with financial sanctions, while the DPRK strongly resisted such a US offer and threatened to boycott the ongoing six-party talks unless this issue is solved within the framework of Six-Party talks. After this talk, Pyongyang boycotted the six-party talks until December 2006, when North Korea faced an ever growing international pressure due to its series of provocative behaviors in the second half of 2006: a host of missile tests, including its long-range Daepodong-II ballistic missile, on July 4th; and its first underground nuclear test on October 9th.

Summary

As a result, this first nuclear test has been on the line of continuation of the 2003 nuclear crisis, when both the United States and the DPRK confronted with North Korea’s highly enriched uranium (HEU) program. For the last five rounds of Six-Party talks (8/2003-2/2006) aimed at dismantling North Korea’s nuclear program peacefully, both parties failed to narrow their differences and instead rather increased suspicions on each other’s confidence by escalating tensions (See Table 4-11). The US financial sanctions against North Korean foreign assets appears to be seen as a tipping point to initiate this first nuclear test, because this financial sanctions seemed aimed at the North Korean leadership, especially Kim Jong-II himself.

91 The November 2nd KCNA statement cited an editorial of No-Dong Sinmun, the official newspaper of North Korean Workers Party, with a title of “Dialogue is not compatible with sanctions. The US decision to freeze our country’s financial assets.” For further detail, see the November 2nd statement at http://www.kcna.co.jp/index-k.htm.
Table 4-11: Interactions between the US and the DPRK to late 2006

<table>
<thead>
<tr>
<th>Date</th>
<th>The United States</th>
<th>North Korea</th>
</tr>
</thead>
<tbody>
<tr>
<td>October, 2002 (HEU showdown, Second Nuclear Crisis)</td>
<td>Shows evidence of North Korea’s efforts to acquire equipment for enriching uranium</td>
<td>Claims it has more powerful weapons than nuclear arsenals</td>
</tr>
<tr>
<td>December, 2002 (Breakdown of the Agreed Framework)</td>
<td>US-led KEDO proclaims it will suspend shipping a heavy fuel-oil to North Korea</td>
<td>Expels IAEA inspectors staying in the North to monitor sealed nuclear facilities since 1994</td>
</tr>
<tr>
<td>January, 2003 (Withdrawal from the NPT)</td>
<td>Summons a board meeting of the IAEA to criticize North Korea’s action and devise reactions</td>
<td>Proclaims it will seal off the container holding 8,000 spent fuel rods extracted in 1994</td>
</tr>
<tr>
<td>April, 2003 (Reprocessing plutonium)</td>
<td>Threatens to refer this issue to the UN Security Council for sanctioning Pyongyang</td>
<td>Proclaims it begun reprocessing the 8,000 spent fuel rods and reactivate its 5Mw reactor</td>
</tr>
<tr>
<td>August, 2003 (The first round of Six-party talks)</td>
<td>Claims the CVID (Complete, Verifiable, and Irreversible Dismantlement) is a prerequisite for subsequent negotiations</td>
<td>Demands compensation for loss of electricity by US’s failure to supply light-water reactors and direct talks with the US</td>
</tr>
<tr>
<td>June, 2004 (The third round of Six-party talks)</td>
<td>Suggests detailed measures for assuring North Korea’s security and economic concerns in exchange for Pyongyang’s dismantlement efforts, passes “the North Korean Human Right Act” in the Senate (October)</td>
<td>Denies accepting a new US offer and repeats its criteria for engaging the Unites States: the end of US hostile policy and nuclear threat toward North Korea</td>
</tr>
</tbody>
</table>
| February-May, 2005 (Pyongyang’s new offensive) | Faces strong oppositions with its North Korean policy from other members (Beijing, Seoul, and Moscow) of the six-party talks: they urge the US to have a direct talk with the North and are opposed to impose economic sanctions and military actions against the North | o Proclaims it will suspend next rounds of six-party talks and possesses nuclear weapons (February)  
 o Shut-downs its 5Mw reactors reactivated in 2003 to extract 8000 fuel rods (April)  
 o Reactivates its 5Mw reactors and resumes constructing its 50Mw and 200Mw reactors suspended in 1994 (June) |
| July-August, 2005 (The fourth round of Six-party talks) | Shows more flexibility in implementing its North Korean policy and suggests several incentives (e.g., endorsing a South Korean offer of providing 2000 Mw electricity to the North) | Raises the stakes by linking the nuclear issue with other economic and security agendas |
| September, 2005 (The 9.19 agreement) | Both countries agree on the so-called “action-on-action” principle where a ‘quid-pro-quo’ and ‘step-by-step’ method is employed |                                                                                  |
| October, 2005 - October, 2006 (Debacle of the 9.19 agreement and North Korea’s second Nuclear test) | Imposes financial sanctions against North Korean assets in foreign financial institutes | Steps up its escalation rungs by test-firing a host of its ballistic missiles in July and blasting its second nuclear device in October |

Source: Author’s summary from the original sources

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2. Case Analysis

Reference point
Declaration of Nuclear Weapons
Since its second nuclear crisis in October 2002, Pyongyang periodically asserted it had already built its own nuclear weapons in an effort to strengthen its deterrent power against a possible US preemptive attack. Especially after the summer of 2003, when it was explicitly evident that the US military was about to proclaim its victory on the Operation Iraqi Freedom (OIF), North Korea seems extremely anxious to convince its US counterparts that it has already had nuclear arsenals. For instance, Pyongyang reportedly began to claim its nuclear possession for the first time at the April 2003 Beijing talks in a private manner and then became more explicit in claiming its nuclear weapons’ possession from September 2004 onwards.93 Perceiving the second Bush administration will not change its hostile policy toward its country through a Senate confirmation hearing on Condoleezza Rice, the nominee of Secretary of State, Pyongyang officially proclaimed its nuclear possession and its intention to continue increasing the stockpile of its nuclear materials through its news agency on February 10th 2005.94

US Response
For a couple of months to come, Pyongyang continued stepping up its escalation ladder to grow its nuclear capability by shutting down a 5-Mw reactor in an effort to extract spent fuel rods in April 2005 and reactivating it after reloading nuclear fuels in June 2005. These kinds of highly charged actions have been intensified since October 2005, when the second Bush administration began imposing its financial sanctions against foreign bank accounts of North Korean trading companies allegedly involved in illegal counterfeiting and drug trafficking. Even though the amount of money halted at the Macau bank is only $25 million, its detrimental effect spread rapidly that several key trading partners in Asia began freezing North Korean foreign assets, instantly disrupting

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93 Niksch, op.cit., North Korea’s Nuclear Weapons Program (Updated January 17, 2006), CRS-7.
94 On February 10th 2005, the KCNA issued an official statement of the DPRK, saying “it will not participate in the current Six-party talks, has already made its own nuclear arsenals and will continue to increase its stockpile of nuclear arsenals in an effort to deter a potential preemptive nuclear attack from American imperalist and defend its sovereignty.” See the February 10th statement of the KCNA at http://www.kcna.co.jp/index-k.htm.
Pyongyang’s foreign exchange transactions\(^95\)—one of key policy objectives the Bush administration adopted this initiative.

**DPRK Response**

The DPRK responded initially by boycotting the fifth round of the Six-Party talks scheduled in the early November and thereafter intensified its level of criticisms against US financial sanctions by issuing a series of hostile statements. Several of them (statements of the KCNA: 11/4, 11/30, 12/13, 12/20/2005; and 01/09/2006) contained an explicit indication that the country had already built its own nuclear arsenals and will continue increasing the stockpile of them to deter a US preemptive attack with its nuclear weapons. For instance, in the December 20\(^{th}\) 2005 statement of the KCNA, Pyongyang vehemently criticized US financial sanctions, showed a number of cases in US failure to comply with international agreements on its nuclear program, and finally warned that this action will aggravate the current situation and its military will continue increasing defensive measures with its nuclear weapons.\(^96\)

**Summary**

In sum, North Korea’s reference point appears to have become a nuclear power in order to guarantee its survival from US military threats since October 2002, when the Bush administration began changing its North Korean policy from engagement to roll-back with three elements: “(1) a demand for an immediate North Korean commitment to dismantlement; (2) the avoidance of direct negotiations with North Korea until North Korea accepts dismantlement; and (3) the isolation of North Korea internationally.”\(^97\)

After US Treasury Department’s sanction in the mid-September 2005, furthermore, Pyongyang’s pursuit for being acknowledged as a nuclear power externally seemed increasingly grown, because it felt the Bush administration is now aiming at the center of

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\(^95\) Three days before reaching the 9.19 communiqué in Beijing, US Treasury Department officially released its statement that it imposed freezing North Korean assets deposited at Banco Delta Asia in Macau in an effort to punish Pyongyang’s trading companies involved in illegal activities, including counterfeiting US currency. With this sanction, more than 20 financial institutes worldwide proclaimed its halt on transactions with the DPRK, thus causing serious blows to North Korean leadership because they have heavily relied on that secret money in bribing their political and military elites. For more detailed accounts, see Jung Sung-Jang, “Management and Resolving Direction of North Korean Nuclear Problem After Pyongyang’s Nuclear Test,” *Sejong Policy Research*, Vol. 3, No.1(Sejong Institute: Seoul Korea, Spring, 2007), 83-84.

\(^96\) For a North Korea’s official statement of its nuclear weapons’ possession, see the December 20\(^{th}\) 2005 statement with a title of “**The US cannot escape from the responsibility of failing the Agreed Framework and will take on the appropriate price**” at [http://www.kcna.co.jp/index-k.htm](http://www.kcna.co.jp/index-k.htm).

\(^97\) Niksch, *op.cit., North Korea’s Nuclear Weapons Program*, CRS-5.
its leadership by cutting off its ‘blood line’ and arming itself with nuclear arsenals would be the only guarantee to ensure their survival.\(^{98}\)

**Domain of Action**

**Domestic Factor**

Of three elements constituting North Korea’s decision environment, the internal factor, in particular, domestic security and social stability, appears to have not changed much or even far more stabilized during the Pyongyang’s first nuclear test provocation period. For instance, no social unrest and rebellion against the Kim’s regime in the North has been reported during the period between North Korea’s second nuclear crisis (10/2002) and North Korea’s first nuclear test (10/2006). After successfully blunting a series of hawkish policies from the first Bush administration, the North seemed to have had much confidence on the resilience of its regime, and that confidence in return might have contributed to internal security and social stability.

Many studies regarding North Korea’s regime stability during this period concluded that Kim Jong-Il’s leadership and his charisma had been stable and there had not been any element jeopardizing the regime stability inside the North. Furthermore, Pyongyang’s effort to incorporate the *Juche* (Self-help) ideology and *Sungun* (Military-First) politics into its regime control mechanism was so successful that they have become the two most powerful guide-lines during this period. As a result, internal stability seems more stable and resilient to outside force than that of the early 1990s.\(^{99}\)

**External Factor**

Like the internal factor, external factors appear to have been improving reasonably relative to the previous ‘big’ crisis—the DPRK’s second nuclear crisis in October 2002. For instance, North Korea’s trade volume has steadily increased since 2002 from $ 22.6 billion to $ 30 billion in 2006, about 25% increase. Despite security

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\(^{98}\) In the December 20\(^{th}\) statement of the KCNA, Pyongyang claimed that its nuclear development program had proven to be a ‘far-sighted’ excellent strategy led by its military in the face of the ever-growing US threats against the country. Also, they justified their nuclear program by indicating that “Iraq had been intervened and collapsed by the external forces led by the United States due to the lack of ‘reliable and strong’ deterrent means,” explicitly referring to nuclear weapons.

concerns of the Northeast Asian region caused by its first nuclear test, Pyongyang succeeded in minimizing the nuclear impact on its economy and even increased its trade volume by about 22% in 2008 (See Figure 4-15), when the conservative Lee administration in the South was inaugurated.

![Figure 4-15: Changes in North Korea’s Trade Volume, 2000-2008](http://kosis.kr/bukhan/)

Energy situation in the North would be another big external factor influencing its decision environment regarding its nuclear program because it is a key source to operate a large size of its Army and social security apparatus. During this period, the volume of crude oil imports appears to have been stabilized even though it had dropped by about 13% in 2006 from the level of 2002, the latest nuclear crisis (See Figure 4-16). But this drop in oil import does not appear to have provided a significant blow to operating the huge-sized North Korean People’s Army (KPA) because, since the early 1990s, it had been adopting measures to minimize the amount of oil needed in the military by cutting off the number of flight sorties for fighter pilots, regular exercises, and the amount of heating oil for military personnel.  

100 According to several North Korean military defectors, the KPA has been adopting various ways to reduce its oil consumption, including converting an oil heating system into a wood and coal burning one.
Analyzing North Korea’s Decision-Making Process on its Nuclear Weapons Programs with the Rational Choice and Cognitive Choice Models

Chapter 4: Case Studies

The Pardee RAND Graduate School

Crude Oil Imports of North Korea (2000-2008)

<table>
<thead>
<tr>
<th>Year</th>
<th>Crude Oil Imports (1,000 Barrel)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000</td>
<td>2,851</td>
</tr>
<tr>
<td>2001</td>
<td>4,244</td>
</tr>
<tr>
<td>2002</td>
<td>4,376</td>
</tr>
<tr>
<td>2003</td>
<td>4,207</td>
</tr>
<tr>
<td>2004</td>
<td>3,900</td>
</tr>
<tr>
<td>2005</td>
<td>3,834</td>
</tr>
<tr>
<td>2006</td>
<td>3,841</td>
</tr>
<tr>
<td>2007</td>
<td>3,834</td>
</tr>
<tr>
<td>2008</td>
<td>3,878</td>
</tr>
</tbody>
</table>

North Korea’s First Nuclear Test (10/2006)
North Korea’s Second Nuclear Crisis (10/2002)

Figure 4-16: North Korea’s Crude Oil Import, 2000-2008
Source: Author’s reconfiguration in the original sources from the Ministry of Knowledge and Economy, the Institute of Energy Economy, and Statistics Korea, 2009, at http://kosis.kr/bukhan/.

Considering coal was more popular energy sources for generating electricity in the North during this period, however, the increase in coal production (about 12% increases) from 21 million to 24 million metric tons during this period appears to be enough to have offset the drop in oil import (See Figure 4-17). This has an important implication for North Korea to meet its energy need without being affected from external assistance. Although Pyongyang should import all its crude oil from China, that is, coal—an important energy source for generating electricity and operating locomotives—does not need to be imported as it has a huge amount of coal deposits inside its territory. In addition, Pyongyang has a lot of hydroelectric energy sources—water—in their territory, especially at the border areas between the North and China. As a result, North Korea has relied more on hydroelectric than fire-electric generation during this period in order to offset the drop in oil import. For instance, the ratio of hydro- and fire-electric power in a total amount of North Korea electricity was 6 to 4 during this period.101

For North Korea’s efforts to reduce the amount of oil in its military, see Andrew Scobell and John M. Stanford, North Korea’s Military Threat: Pyongyang’s Conventional Forces, Weapons of Mass Destruction, and Ballistic Missiles (Strategic Studies Institutes: US Army War College, April 2007), pp. 67-68.

101 For details regarding North Korea’s electricity generation and its ratio of components, see the original data from Korea Electric Power Corporation (KEPCO) and Statistics Korea, 2009, at http://kosis.kr/bukhan/.

4-89
Production of North Korea’s Iron Ore and Coal (2000-2008)

North Korea’s Production of Iron Ore and Coal, 2000-2008
Source: Author’s reconfiguration in the original sources from the Ministry of Knowledge and Economy, the Institute of Geological Resources, and Statistics Korea, 2009, at http://kosis.kr/bukhan/.

A steady increase in generating electricity during this period appears to be a good indicator to validate the argument that exploring alternative energy sources—coal and hydropower—contributed a lot to offset the drop in oil import (See Figure 4-18). According to Figure 4-18, the production of North Korea’s electricity increased by 15% from 19 billion Kw in 2002 to 22.5 billion Kw in 2006, and even 5% increase in 2007, a year after North Korea’s first nuclear test in 2006. As a result, energy sources, one of the important factors influencing North Korea’s external decision-making, appear to have been stabilized and even improved during this period.

North Korea’s Electricity (2000-2008)

Figure 4-18: North Korea’s Production of Electricity, 2000-2008
Source: Author’s reconfiguration in the original sources from the Korea Electric Power Corporation (KEPCO) and Statistics Korea, 2009, at http://kosis.kr/bukhan/.

In sum, it seems evident that North Korea’s external factors influencing its decision environment in 2006 were more favorable than does the previous crisis situation in 2002. Furthermore, Pyongyang’s diplomatic relations with China, one of the most influential and needed allies for its survival, have become more close and recovered to the level of traditional ‘blood-alliance’ since the early 2000s through exchanging official visits of their top officials. For instance, Kim Jong-Il himself visited China once a year on average during this period to restore and strengthen its ‘once-severely-damaged’ alliance with the CCP (Chinese Communist Party). In response, a host of ranking CCP officials reciprocated those visits, including Hu Jintao’s visit to Pyongyang in October 2005.102

ROK Factor
The South Korean factor has become an influential one capable of influencing North Korea’s decision environment since a ‘historic summit talk’ between two Koreas in 2002. Since that summit meeting, inter-Korean relations have grown rapidly and broadly to include all cooperative sectors except for military and security issue.

As time passed, however, Seoul has had some leverage in pressing Pyongyang to address security and military concerns on the peninsula by becoming the second largest donor to that poverty-stricken neighbor. During this period, the volume of South Korea’s aid funds to North Korea sharply grew to about 72% from $ 135 million in 2002 to nearly $ 300 million in 2006. Most of that aid fund was used for humanitarian purposes, such as supplying food and fertilizer to the North. Including economic and other assistance through NGOs to the DPRK, that amount grew to more than 30% on average in each year. After the conservative Lee administration took office in February 2008, however, the amount of aid funds was dropped sharply by more than 70%, signaling serious setbacks to come in inter-Korean relations (See Figure 4-19).

102 Across the year of 2005, Chinese officials opposed any US move to punish North Korea for its provocative behaviors under the auspice of the UN Security Council and rather, created a coalition to press the US to directly engage with Pyongyang and have more flexible stance on the implementation process for dismantling North Korea’s nuclear program. See Emma Chanlett-Avery, Mark E. Manyin, and Hannah Fischer, North Korea: A Chronology of Events in 2005 (CRS: US Congress, April 24, 2006).
Analyzing North Korea’s Decision-Making Process on its Nuclear Weapons Programs with the Rational Choice and Cognitive Choice Models

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Ki-Tae Park
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Figure 4-19: South Korea’s Aid Funds to North Korea, 2000-2008
Source: Author’s reconfiguration in the original sources from the Ministry of National Unification and Statistics Korea, 2009, at http://kosis.kr/bukhan/.

In addition, Seoul’s share of North Korea’s trading volume approached about 30% in the late 2000s, the second largest trading partner after China, marking $1.8 billion in 2006. In the early 2000s, the trading volume between two Koreas was recorded at less than $500 million, the third largest after China and Japan, and then stopped growing for a couple of years after North Korea’s second nuclear crisis in 2002. Observing some positive sign of resolving a nuclear issue through the Six-Party talks, the progressive Roh Mu-Hyun administration began expanding economic cooperation with the North from 2004 onwards in a strategic consideration to strengthen Seoul’s leverage on Pyongyang. This effort made Seoul the second largest trading partner with Pyongyang only after China in the latter half of 2000s, marking nearly 40% share of North Korea’s foreign trade volume in 2007 (See Figure 4-20).
Besides that visible economic cooperation, there have been a number of reconciliation and cooperation initiatives, including several military dialogues between two armed forces in an effort to ease tensions across the DMZ areas. South Koreans’ tour to Kumgang Mountain, a well-known North Korea’s tourist site just north of the DMZ, is one of the visible symbolic signatures representing reconciliation between two Koreas among several civilian exchange programs. Building Kaesong Industrial Park just right north of the DMZ, close to Seoul, was considered as one of the most visible signs for boosting economic cooperation and reconciling tensions between two Koreas, incurring a lot of subsequent dialogues between two Koreas, including military ones, and economic cooperation (See Table 4-12). As a result, the South Korean factor during this period appears to have been more favorable to Pyongyang than that of the previous North Korea’s second nuclear crisis in October 2002.

103 In 2005, there are a number of military dialogues between two Koreas in an effort to address some security concerns caused by building a railway and highway crossing the DMZ, as well as establishing a military hot-line inside the common fishery area in the Western sea border to avoid a potential conflict by misperception and miscommunication. They also agreed to get rid of all propaganda signs criticizing each other’s regime within DMZ areas and allowed North Korean vessels’ safe passage into the straight between South Korea’s southern tip and Jeju island in an effort for them to save time and fuel. For more details, see inter-Korean dialogue data at http://dialogue.unikorea.go.kr/main.asp.
Table 4-12: Inter-Korean Exchange and Aid, 2000-2009

<table>
<thead>
<tr>
<th></th>
<th>2000</th>
<th>2001</th>
<th>2002</th>
<th>2003</th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
<th>2009</th>
</tr>
</thead>
<tbody>
<tr>
<td>South Korean Tourists to Mountain Kumgang (1,000 person)</td>
<td>213</td>
<td>57</td>
<td>85</td>
<td>74</td>
<td>268</td>
<td>298</td>
<td>234</td>
<td>345</td>
<td>200</td>
</tr>
<tr>
<td>Fertilizer Aid (10,000 ton)</td>
<td>30</td>
<td>20</td>
<td>30</td>
<td>30</td>
<td>30</td>
<td>35</td>
<td>35</td>
<td>30</td>
<td>0</td>
</tr>
</tbody>
</table>


Summary
Combining three factors (Internal, External, and South Korea) above, consequently, North Korea would likely be in a better situation relative to that of the previous confrontation with the US in October 2002. By contrast, the second Bush administration begun in January 2005, one of the most ‘formidable opponents’ to Pyongyang, had become more difficult in mobilizing political and diplomatic capitals to coerce the DPRK into concession due to several detrimental factors facing the United States at that time: 1) wars on terrors in Iraq and Afghanistan turned into getting worse; 2) Iran and North Korea’s defiant pursuit for developing nuclear weapons undermined the United States’ status in the NPT regime; 3) a coalition in the Six-party talks, composed of China, South Korea, and Russia, continued to weaken the US stance to isolate and coerce Pyongyang with collective forces by opposing a comprehensive sanction regime on North Korea and urging a direct talk with Pyongyang; and 4) the Democrat’s dominance on both House and Senate in the 2006 mid-term elections provided a significant constraints to the second Bush administration in implementing its North Korean policy at its disposal.

104 Since the first Six-Party talks in August 2003, the Bush administration did not suggest any initiative to address the second nuclear crisis until the third round of the Six-Party talks in June 2004. The “Complete, Verifiable, Irreversible Dismantlement” of the North Korean nuclear program was an unyielding precondition for subsequent talks, in which parties involved could discuss a package of profits to be delivered to Pyongyang in exchange for dismantling its nuclear program. In all talks leading to this final goal, the US has sustained a multilateral type of dialogue involving all concerned parties, especially China, rather than a bilateral negotiation between Washington and Pyongyang, which North Korea has been maintaining since its first nuclear crisis in 1994. That US intransigent stance has invited strong oppositions from its Asian allies—ROK, China, and Japan. For further details regarding US stance and criticisms from its Asian partners, see Chinoy, *op.cit.*, 176-177,187-190, and 202.

105 At the mid-term election in November 2006, Democrat became a majority party in both House and Senate and began pressing the Bush administration to review its policies toward the Iraq war and North Korean nuclear issue, resulting in the resignation of Donald Rumsfeld as the Secretary of Defense. For further details regarding the US internal politics at this time, see *ibid.*, 309.
As a result, North Korea was surely located in the domain of gains relative to the previous crisis situation. Based on those two parameters—North Korea’s reference point and its domain of action—North Korea’s course of actions are classified into two decision models (Rational Choice Model and Cognitive Choice Model) in an effort to falsify the hypotheses established in the previous chapter.

3. Predicting North Korea’s Behaviors

1) Qualitative Analysis for North Korea’s First Nuclear Test

Rational Choice Model

Overview

Assuming North Korea is a rational actor, it will first consider options available to itself given its domain of actions and constraints: 1) maintaining the status quo; 2) concession and cooperation; and 3) escalating tensions. The status quo is to maintain the current confrontation with the Unites States, in which it is employing a dual approach to coerce North Korea into concession: the multilateral pressure in the form of the ‘Six-Party’ talks and the unilateral pressure in the form of imposing financial sanctions on the center of the North Korean regime. Concession and cooperation, on the part of the DPRK, is to dismantle its nuclear program in exchange for securing its economic and security assurance from the international community led by the United States. Escalating tensions is to step up its escalation ladder in an effort to coerce the United States into concession, in which the DPRK could get back its frozen assets as a symbol of US cooperation and confidence on its promise to guarantee Pyongyang’s security and economic assurance.

The next step is to calculate the cost and benefit of each option, the probability of success in each option, and then produce a net expected utility in each option by multiplying both elements (the value and the probability of success in each option) in a linear manner. If Pyongyang is a rational actor, it will compare each expected utility in absolute terms and then choose the one that maximizes its expected utility. Even though an individual actor, under this rational choice model, measures the value and probability of each option subjectively, there is no cognitive bias where the endowment effect and loss aversion are strong and influential in his decision-making process. That is, the net
expected benefit (= expected benefit - expected cost) is one of the most important criteria in his strategic choice.

**Option #1: Maintain Status Quo**

The status quo option appears not acceptable to the DPRK, given the United States had been stepping up its pressure on North Korea in the form of imposing a far-reaching financial sanction against its ‘regime-control money’ deposited at a bank in Macau. Even though the amount of money US Treasury Department froze was about $25 million, this move completely disrupted North Korea’s financial transactions with all foreign financial institutes. According to one South Korean report, more than 25 international financial institutes stop doing businesses with North Korea in the fear of potential punishment by US Treasury Department. In the long-term, this financial sanction would force many of other potential financial institutes and trading companies to give up their plans to trade with Pyongyang even in a legal manner, thus causing more severe problems to its ‘secret money’ that had been allegedly used for bribing its military and political elites.106

As a result, it seemed surely felt by the North Korean leadership that this status quo option would be hard to achieve its foremost goal of securing regime survival in the long-run, as well as have its current status getting worse as time passes. Therefore, they might have thought that Pyongyang’s window of vulnerability grows as time passes, while its window of opportunity diminishes. Combining all these strategic environments surrounding its decision-making process, Pyongyang might have concluded that the benefits of the status quo option is reasonably small but the cost would grow exponentially as it continues to wait, thus surely resulting in a negative net expected utility.

**Option #2: Concede and Cooperate**

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106 The ‘scheme’ of imposing financial sanctions on North Korea’s commercial accounts in Macau was initially initiated by David Asher, an adviser to James Kelly, in early 2004. His initiative of exploiting North Korea’s ‘Achilles’ heel did not draw much attention from the Bush administration by that time because it was in the middle of the second round of Six-Party talks, thus hoping to avoid an ‘event’ inciting North Korea. Experiencing serious dissatisfaction with North Korean behaviors for the last three Six-Party talks, however, the Bush administration changed its previous stance in early 2005 to exploit one of the deadliest vulnerabilities facing Pyongyang—cracking down on its secret money in Macau. For further details regarding North Korea’s illicit activities involving counterfeiting US currency, drug trafficking, and money laundering and its implications for Kim Jong-Il’s power politics inside North Korea, see ibid, 253-254, 255-257, 259-260, and 266 and Baek Hak-Sun, *op.cit.*, 117-122.
The concession and cooperation option seems a better one than the status quo in terms of reducing the potential cost incurred by this option. That is, this option would require establishing a long-negotiation process where North Korea is able to manipulate its leverage in order to maximize its benefit but minimize the cost, as it has done so far. But the probability of success would be so slim without retaining reliable deterrent means, given the basic foundation of North Korean economy is so weak due to several decades of economic recession and the ‘grim reality’ of the collapse of Iraq and Afghanistan Taliban by US military. Furthermore, the risk and uncertainty would basically be high since it will take many years for this option to produce any visible result.

Considering the US move of imposing financial sanctions shortly after the 9/19 agreement, meanwhile, the level of confidence Pyongyang perceived on the US pledges of normalizing ties and lifting sanctions might have reduced sharply. The US persistence with its financial sanction, despite repeated requests of lifting it from both North Korea and other partners, might have far more lowered Pyongyang’s confidence on a US pledge to secure North Korea’s security and economic assurance. North Korea’s strong suspicion on US confidence was very often made public through various channels, including its official news agency of the KCNA, since the debacle of the Agreed Framework in the early 2003, and the level of harshness and frequency grew exponentially after US financial sanctions against its foreign assets in September 2005.107

Given the strong US influence on the Six-Party talks and international financial institutes, the DPRK would believe that it should be a prerequisite to secure a reliable US pledge and sound confidence in achieving its national goal by adopting this option of adopting cooperation. Unfortunately, these requirements appeared to have been severely undermined during this period by both countries’ different strategic considerations in dealing with each other. As a result, this concession and cooperation option was able to provide a little better chance of reducing the potential cost but far more uncertainty due to a long-horizon period and a growing lack of confidence between two opponents. Briefly

107 For the next three months after US decision to impose financial sanctions on North Korea in September 2005, Pyongyang released a total of 4 statements (November 11th and December 2nd of 2005, January 9th and 25th of 2006) criticizing the US move of imposing sanctions while negotiating the North Korean nuclear issue. In all statements, North Korea also warned that “it will not participate in on-going Six-Party talks unless the US lifts its sanctions and augment its deterrent means to defend itself.” See those statements at http://www.kcna.co.jp/index-k.htm.
speaking, this option appeared at best the one for preventing further loss to Pyongyang without guaranteeing its long-term objective—the regime survival.

Option #3: Escalate Tensions

The escalating tension option (conducting a nuclear test) seems a quite rational one for Pyongyang to achieve not only the most urgently needed goal of lifting US financial sanctions, but also its foremost national goal of becoming a nuclear power by improving its nuclear technology. Given the US persistence on its financial sanctions, Pyongyang seems to have felt that the nuclear test would be the only option to coerce the second Bush administration into concessions. So far, Pyongyang has utilized all options available to itself, including defueling reactor and processing the spent fuel rods, in an effort to get the US to come to a bilateral dialogue, but failed to achieve its purpose, further weakening its leverage. Perceiving it is losing its threat credibility, Pyongyang might have felt that it is the right time to reverse that unfavorable loss of momentum. To achieve that purpose, an action should be enough to draw attention from the US and should also be helpful in improving its nuclear expertise in a practical manner. So, the benefit side of this option is to restore its credibility of threat against the US, to be able to leap its nuclear weapons technology with a practical test\(^{108}\), and to boost its domestic morale\(^{109}\), especially from the KPA, by becoming ‘the world’s ninth nuclear power.’

The cost of this option would mainly derive from the economic consequence incurred by this move because military operations by the US seems impractical, given its large-scale involvement in Iraq and Afghanistan and strong opposition from its regional partners, in particular, China and South Korea. Considering its trading partners for the last decade, Pyongyang seems to have perceived that China and South Korea, both of whom are supportive of engagement policy toward North Korea, became the most influential trading partners with itself, while the US and Japan played a marginal role in its trade (See Figure 4-20).

Therefore, the DPRK might have calculated that the negative effect on its economy caused by its nuclear test would not be large enough to offset its benefit. Such a


\(^{109}\) North Korea would have desired to utilize this nuclear test for agitating its wavering populace to unite ‘under the flag.’ For further details regarding North Korea’s mass mobilization to celebrate a ‘successful nuclear test,’ see the October 28\(^{th}\) statement of KCNA at [http://www.kcna.co.jp/index-k.htm](http://www.kcna.co.jp/index-k.htm).
calculation by the North seems to have been vindicated because its trade volume in 2007 marked nearly the same level as that of 2006 and even increased to about 21% in 2008. Also, the shares of China and South Korea in Pyongyang’s total trade volume have grown further since North Korea’s first nuclear test in October 2006, marking their aggregate shares at more than 80% in 2008 (See also Figure 4-21). As a result, Pyongyang might have reasonably thought that it will not be given any serious bad economic consequence with its nuclear test, unless both China and South Korea actively participate in sanction regimes endorsed by the US and Japan.

Figure 4-21: Changes in Shares of North Korea’s Trading Partners, 2000-2008
Source: Author’s reconfiguration in the original sources from Korea Trade Association (KOTRA) and Statistics Korea, 2009, at http://kosis.kr/bukhan/.

Furthermore, a UN Security Council Resolution, which is another side of the cost, might have not provided any serious consideration to Pyongyang because it has already been under other types of UN resolutions by that time without being inflicted any serious damage to its self-sufficient economy, or autarkic economy. The most threatening case to the DPRK is the UN Security Council Resolution authorizing forceful economic and military sanctions invoking the Chapter 7 of the UN Charter. Under that regulation, member states of the UN are allowed to inspect all North Korean vessels and cargo planes suspected of carrying WMD-related materials and technologies—a key source of
its limited foreign exchange—without the approval from the country possessing those ships and airplanes.110

In addition, this resolution could allow member states to conduct a naval blockade against North Korea under UN Security Council authority if necessary. Perceiving the dire consequence of this resolution111, however, the key North Korean ally inside the UN Security Council, China, was surely expected to veto this resolution and, in practice, passed a modified resolution excluding forceful articles. As a result, this UN resolution would have been expected to be ineffective without regional partners’ active participation in this sanction and has not produced any visible outcome so far.

**RCM Conclusion: Escalate Tensions**

In sum, the DPRK might have concluded that the third option—escalation tensions by attempting a nuclear test—would be the one guaranteeing a maximum net expected benefit, out of three options available (See Figure 4-22), given the strategic environments surrounding the Korean peninsula by that time. In fact, North Korea has succeeded in achieving its key objectives with this escalating strategy from the second Bush administration: lifting the financial sanctions imposed on its foreign assets in the mid-2007, abolishing the Trading with the Enemy Act (TWEA) applied to North Korea in June 2008, and delisting Pyongyang from the list of states sponsoring terrorism in August 2008.112 In addition, the DPRK sought to utilize this test in the form of a *fait accompli* strategy. That is, Pyongyang repeatedly argued after this test that “since the country now became a nuclear power, it will participate in a nuclear weapons reduction talk with the United States on the same footage.”113 Internally, the DPRK extensively propagated this nuclear test by citing it as what is called “a breakthrough in its scientific

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110 For North Korea’s first nuclear test on October 9th 2006 in defiance of the previous UN Resolution-1695, the UN Security Council adopted a UN Resolution-1718 invoking Chapter 7 of the UN Charter, in which the UNSC could enforce this resolution with force. But this resolution avoided a comprehensive sanction against North Korea by citing Article-41 of Chapter 7, in which measures not involving the use of armed forces are allowed. See the details at [http://www.un.org/Docs/sc/unsc_resolutions06.htm](http://www.un.org/Docs/sc/unsc_resolutions06.htm).

111 Perceiving the catastrophic consequence of a comprehensive sanction, China and Russia—two allies of North Korea in the UNSC—sought to insert measures not involving the use of force in a resolution. For details regarding tough negotiations in the UNSC, see Chinoy, *op.cit.*, 297-298.


113 See the November 24th statement of the KCNA at [http://www.kcna.co.jp/index-k.htm](http://www.kcna.co.jp/index-k.htm).
research and an invincible defensive means for its country”\textsuperscript{114} one day after its test, October 10\textsuperscript{th} 2006.

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\textbf{Cognitive Choice Model}

\textbf{Overview}

The two most important parameters in this model are North Korea’s reference point and its domain of action. As mentioned before, Pyongyang’s reference point to ensure its survival was \textbf{to become a nuclear power} and its domain of action was located at the gain area relative to the previous crisis situation during this period. The alternative policy options applied to the rational choice model would be also used in this cognitive choice model, but some key characteristics identified in prospect theory—the reference dependent choice, loss-aversion, and endowment effect—should be extensively analyzed in each policy option.

\textbf{Option #1: Maintain Status Quo}

Given the United States was strengthening its pressure on Pyongyang in the form of financial sanctions, maintaining the status quo might have been impossible for the

\footnotesize{\textsuperscript{114} Pyongang held nationwide mass mobilization events (21/25/27/30\textsuperscript{th} October 2006) to celebrate its first ‘successful nuclear test’ in an effort to agitate its populace to unite under the Kim Jong-II regime. See further details regarding those events at \url{http://www.kcna.co.jp/index-k.htm}.}
North to keep away from three key cognitive biases in its decision. In the first place, this option could not meet the North Korea’s reference point set at that time—becoming a nuclear power—because Pyongyang has to continue ‘muddling-through’ without crossing the ‘red-line,’ or a nuclear test implicitly set by the Bush administration under this scenario. Secondly, this option might have not contributed to weakening the two most powerful cognitive biases in an individual decision-making process—the loss-aversion and endowment effect—because it was surely felt by the DPRK that as time passes, the negative effect of the US financial sanctions will further grow, ultimately disrupting its whole financial transactions with the outside world. That is, Pyongyang has to lose something valuable and its status quo has to be undermined under this scenario, a clear contradiction to its cognitive disposition. As a result, North Korea might have felt that this policy option would result in a negative prospect to itself.

**Option #2: Concede and Cooperate**

The concession and cooperation option might have also yielded a negative prospect in satisfying Pyongyang’s reference point because this policy basically assumes the dismantlement of its nuclear weapons program in return for securing economic and security assurances from the international community led by the US. But this option could provide some favorable grounds in mitigating North Korea’s loss-aversion and endowment effect in the form of multilateral dialogue and limited economic aids, as the North has done so far. On the other hand, this option also provides some level of risk and uncertainty in abating North Korea’s worry of maintaining the status quo in the long-term because this concession and cooperation process would require a long horizontal time-frame in nature. In the middle of the process, the North might have a lot of pressure to dismantle its centrally-commanded economy and would be forced to open its society more aggressively to the outside world, ultimately resulting in serious damage to the authority of the Kim’s regime in the North.

**Option #3: Escalate Tensions**

Unlike the previous two options, escalating tensions by attempting a nuclear test is the only policy option that could practically meet North Korea’s reference point. Given its long-standing efforts to obtain fissile materials and reliable delivery means, as they would be explored in detail on the next chapter, the only threshold North Korea has to pass before becoming a nuclear power is to conduct a nuclear test, with which they can
master the expertise needed for obtaining a successful chain reaction. According to various sources, the DPRK was alleged to conduct more than hundreds of high-explosive tests in an effort to design its own nuclear warhead in the 1990s and the early 2000s. But they did not conduct a real nuclear device until October 2006, thus providing significant damage to its capability of building nuclear weapons and its credibility of threat.

**Discussion**

In the aspect of the loss-aversion effect, North Korea could lose some gains in the form of economic sanctions endorsed by the UN Security Council, but that loss could be offset with other types of benefit mentioned in the rational choice model, under this scenario. That potential loss could be also enormously lessened under a modified UN resolution without forceful articles. In addition, China and South Korea, the two most influential trading partners with Pyongyang, has repeatedly expressed their reluctance to impose a comprehensive sanction against the North and this dynamics might have provided another safeguard that the pain would be further weakened. As a result, the DPRK might have concluded that the pain or loss incurred by no action would be far greater than that caused by an action. Taking the alternative guaranteeing less pain would be a natural course of action for an individual framed with two loss scenarios.

**Problem with the CCM Hypothesis**

But, all of sudden, a big contradiction on the hypotheses regarding North Korea’s behaviors surfaces up. Under the hypothesis endorsed by Prospect theory, North Korea is supposed to be risk-averse when it is in the domain of gains. The escalating tension by testing a nuclear device is surely risk-acceptant behavior because it could produce consequences with large variance in their probability. Instead, taking a less risky and surely-certain option would be a natural course of action for an individual who is in the domain of gains in an effort to keep the current favorable circumstances.

**Explanation for why hypothesis appears incorrect**

Then, there would be two clear reasons why a contradiction on the hypothesis has come up. One is the wrong analysis about North Korea’s domain of action. That is, North Korea would have not been in the domain of gains in reality, as suggested in the previous part, but the domain of losses. The other cause might be the fact that the reference point is more influential factor than the domain of action in an individual decision-making process. Though it is hard to identify which cause was more influential, the wrong analysis about North Korea’s domain of action would be the main reason to yield such a contradiction because the perception of its domain is highly subjective and variable depending on a specific issue.

**CCM Conclusion: Escalate Tensions**

In sum, escalating tension by attempting a nuclear test would have been the most probable behavior endorsed by prospect theory (See Figure 4-23), given North Korea’s reference point and its domain of action—a temporary domain of loss due to the ever-growing US financial sanctions against Pyongyang by that time.

![Subjective Value Function](image)

**Figure 4-23: North Korea’s Subjective Value Function by the cognitive choice model in its First Nuclear Test, October 2006**

2) **Quasi-empirical analysis for NK’s First Nuclear Test**

In this case, this dissertation assumes that Pyongyang felt it had fallen to $X = -10$ (current status quo) because Pyongyang might have felt the status quo is getting worse because the second Bush administration began launching a comprehensive financial...
sanctions aiming at the center of its leadership in September 2005. It was so comprehensive and extensive that a lot of financial institutions around the world proclaimed its ending of transactions with the DPRK (refer to the previous qualitative analysis).

**Rational Choice Model**

Under this model, this dissertation uses the following equation to effectively reflect a key assumption that North Korean leadership would be risk-averse across all domains of actions (gain and loss areas) under the RCM: \( Y = 1,200 \times (\log(50X + 7,000) - \log(7,000)) \) where the shape of this function shows marginally concaved form across all areas (see Figure 3-1 in chapter 3). Based on previous parameter and equation, this dissertation could calculate the expected utility of each option in North Korea’s second nuclear crisis under the rational choice model (Table 4-13).

### Table 4-13: NK’s Expected Utility in its First Nuclear Test under the RCM, 10/2006

<table>
<thead>
<tr>
<th>Parameter (current status quo value, X)</th>
<th>(-10)</th>
</tr>
</thead>
<tbody>
<tr>
<td>risk-averse equation under the RCM</td>
<td>( Y = 1,200 \times (\log(50X + 7,000) - \log(7,000)) )</td>
</tr>
<tr>
<td>Expected Utility of the Status Quo (j1)</td>
<td>EU(SQ, j1) = 1,200\times(\log(50\times-10 + 7,000) - \log(7,000)) = -39</td>
</tr>
<tr>
<td>Expected outcomes in case of NK's escalating (j2)</td>
<td>Y(j2)</td>
</tr>
<tr>
<td>1) 5% of escalating to total war, X = (-100)</td>
<td>( Y(1)_{j2} = 1,200 \times (\log(50\times-100 + 7,000) - \log(7,000)) ) = (-653)</td>
</tr>
<tr>
<td>2) 10% of escalating to limited war (a US preemptive attack), X = (-70)</td>
<td>( Y(2)_{j2} = 1,200 \times (\log(50\times-70 + 7,000) - \log(7,000)) ) = (-361)</td>
</tr>
<tr>
<td>3) 30% of being diplomatically isolated and facing economic sanctions, X = (-50)</td>
<td>( Y(3)_{j2} = 1,200 \times (\log(50\times-50 + 7,000) - \log(7,000)) ) = (-230)</td>
</tr>
<tr>
<td>4) 35% of getting the US lift its financial sanctions, X = (50)</td>
<td>( Y(4)_{j2} = 1,200 \times (\log(50\times50 + 7,000) - \log(7,000)) ) = (159)</td>
</tr>
<tr>
<td>5) 20% of appearing empowered without facing preemptive attack, X = (20)</td>
<td>( Y(5)_{j2} = 1,200 \times (\log(50\times20 + 7,000) - \log(7,000)) ) = (70)</td>
</tr>
<tr>
<td>EU(j2) = 0.05\times(-653) + 0.1\times(-361) + 0.30\times(-230) + 0.35\times159 + 0.20\times70 = -68</td>
<td></td>
</tr>
</tbody>
</table>
During this period, North Korean leadership might have thought the likelihood of US preemptive attacks and all-out war is not high because the US military waged a war on terr...sanctions and make its regime appear empowered in the sideline of this conflict. These arguments are described in the previous qualitative analysis and used to specify probabilities and values of each outcome above.

**Expected outcomes in case of NK's dismantling its nuclear programs (j3)**

<table>
<thead>
<tr>
<th>Outcome Description</th>
<th>Value Calculation</th>
<th>EU(j3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) 20% of keeping its regime afloat for a long period with foreign aid, X = 100</td>
<td>( Y(1)_{i3} = 1,200^*\log(50^*100 + 7,000)-\log(7,000) )</td>
<td>281</td>
</tr>
<tr>
<td>2) 30% of keeping its regime afloat for a short period with foreign aid, X = -50</td>
<td>( Y(1)_{i3} = 1,200^<em>\log(50^</em>-50 + 7,000)-\log(7,000) )</td>
<td>-230</td>
</tr>
<tr>
<td>3) 50% of causing a sudden regime collapse, X = -100</td>
<td>( Y(1)_{i3} = 1,200^<em>\log(50^</em>-100 + 7,000)-\log(7,000) )</td>
<td>-653</td>
</tr>
</tbody>
</table>

\[ EU(j3) = 0.2^*281+0.3^*-230+0.5^*-653 = -339 \]

To obtain a clear idea for specifying probabilities and values to each outcome, this dissertation is supposed to consider North Korean society by this time: 1) economy is struggling to rehabilitate with foreign aid, but still a long way to go; 2) society has been so tightly controlled that it seems still impossible to induce internal rebellion; and 3) under this unfavorable conditions, getting its society open to outside world will cause a sudden regime collapse without obtaining the most reliable assurance of its regime survival. But North Korea seems to have a little bit more confidence on the probability of success in its economic reform plan due to previous progress. As a result, there should be a little change in specifying probabilities of each outcome, compared with the previous state. This dissertation also describes these arguments in the previous qualitative analysis.

According to this analysis made under the RCM, Pyongyang should have adopted the option of maintaining the Status Quo (SQ) to minimize its potential loss. That is, all expected utilities coming from his options available produce negative values:

- **EU(SQ) = -39**
- **EU(Escalation) = -68**
- **EU(Cooperation by dismantling its nuclear programs) = -339**

But Pyongyang adopted the option of escalating tensions by stepping up escalation rung very quickly: 1) proclaiming its withdrawal from the on-going “Six-Party” talks shortly after the US treasury department announced its financial sanctions against bank accounts of North Korean trading companies in Macau in October 2005; 2) testing a host of its ballistic missiles, including the Daepodong-II ICBM, in July 2006; and 3) detonating its first ever nuclear device on October 9th 2006, thus shocking international community. In expected utility terms, escalation is clearly less than the
Status Quo, but its relation might be changed depending on how much value Pyongyang assigned to the status quo because their differences are marginal. But cooperating with its enemies at this time was not clearly Pyongyang’s option by this time.

**Cognitive Choice Model**

Under this model, this dissertation uses the following equation to effectively reflect a key assumption that North Korea is assumed to be risk-averse (concave) in the domain of gain and risk-seeking (convex) in the domain of loss, known as the “S” curve, and individual’s loss-aversion bias is reflected by more steepness of curvature in the loss domain than gain domain (See Figure 3-2 in chapter 3):

\[
Y = 1,200*(\log(50*X + 7,000) - \log(7,000)) \quad X \geq 0
\]

\[
= -200*(\log(-20*X + 30) - \log(30)) \quad X < 0
\]

Based on previous parameter and equation, this dissertation could calculate the expected utility of each option in North Korea’s second nuclear crisis under the rational choice model as follow (Table 4-14).

### Table 4-14: NK’s Expected Utility in its First Nuclear Test under the CCM, 10/2006

<table>
<thead>
<tr>
<th>Risk-dependent equation under the CCM</th>
</tr>
</thead>
<tbody>
<tr>
<td>[ Y = 1,200*(\log(50*X + 7,000) - \log(7,000)) \quad X \geq 0 ]</td>
</tr>
<tr>
<td>[ = -200*(\log(-20*X + 30) - \log(30)) \quad X &lt; 0 ]</td>
</tr>
</tbody>
</table>

**North Korea's Reference Point (goal)**

"Regime Survival" by lifting US financial sanctions

Parameter (current status quo value, X) | -30

Pyongyang might have felt the status quo is getting worse because the second Bush administration began launching a comprehensive financial sanctions aiming at the center of its leadership in September 2005. It was so comprehensive and extensive that a lot of financial institutions around the world proclaimed its ending of transactions with the DPRK. Considering the CCM considers individual's loss-aversion bias more seriously, the value of status quo in the CCM should be even lower than the RCM (-10).

**Expected Utility of the Status Quo (j1)**

\[ \text{EU(SQ,j1)} = -200*(\log(-20*-30 +30) - \log(30)) = -264 \]

**Expected outcomes in case of NK’s escalating (j2)**

1) RCM(5%) --> 2% of escalating to total war, X = -100

\[ Y(1,j2) = -200(\log(-20*-100 +30) - \log(30)) \]

\[ -366 \]
Analyzing North Korea’s Decision-Making Process on its Nuclear Weapons Programs
with the Rational Choice and Cognitive Choice Models

Ki-Tae Park

Chapter 4: Case Studies

The Pardee RAND Graduate School

2) RCM(10%) --> 5% of escalating to limited war (US preemptive attack), X= -70
   \[ Y(2)_{j2} = -200(\log(-20*-70 +30) - \log(30)) \]

3) RCM(30%) --> 15% of being diplomatically isolated and facing economic sanctions, X = -50
   \[ Y(3)_{j2} = -200(\log(-20*-50 +30) - \log(30)) \]

4) RCM(35%) --> 48% of getting the US lift its financial sanctions, X = 30
   \[ Y(4)_{j2} = 1,200(\log(50*30 + 7,000) - \log(7,000)) \]

5) RCM(20%) --> 30% of appearing empowered without facing preemptive attack, X = 20
   \[ Y(5)_{j2} = 1,200(\log(50*20 + 7,000) - \log(7,000)) \]

EU(j2) = 0.02*366 + 0.05*336 + 0.15*307 + 0.48*101 + 0.30*70 = -0.7

Here this dissertation establishes weighted probability* of each outcome by differently specifying the numeric value depending on the size of subjective value of each outcome in an attempt to reflect cognitive biases of human-being (e.g., loss-aversion, endowment effect, and reference-dependence choice). Under those biases, a decision-maker is likely to avoid loss and defend its current assets. As a result, he would like to provide a higher probability to the outcome that could meet his current reference point or national goal by this time. This dissertation discusses this kind of arguments in the preceding qualitative analysis.

*For simplicity and availability for this quasi-empirical analysis, this dissertation uses a rule of thumb to generate "weighted probability" to be used in the CCM, instead of the probability weighting function suggested by Kahneman and Tversky (1979). In general, the risk taking player discounts the probability of negative outcomes and overvalues the probability of positive outcomes due to the loss-aversion bias. Thus, Probability (CCM) or W(p) = 0.5 * Probability(RCM) for outcomes where EU(outcome) < EU(status quo). The positive outcomes then absorb the remainder of the probability.

Expected outcomes in case of NK's dismantling its nuclear programs (j3)

<table>
<thead>
<tr>
<th>Outcome Description</th>
<th>Y(i)j3</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) 5% of keeping its regime afloat for a long period with foreign aid, X = 100</td>
<td>[ Y(1)_{j3} = 1,200(\log(50*100 + 7,000) - \log(7,000)) ] 281</td>
</tr>
<tr>
<td>2) 10% of keeping its regime afloat for a short period with foreign aid, X = -50</td>
<td>[ Y(2)_{j3} = -200(\log(-20*-50 +30) - \log(30)) ] -307</td>
</tr>
<tr>
<td>3) 85% of causing a sudden regime collapse, X = -100</td>
<td>[ Y(3)_{j3} = -200(\log(-20*-100 +30) - \log(30)) ] -366</td>
</tr>
<tr>
<td>EU(j3) = 0.05<em>281 + 0.1</em>307 + 0.85*366 = -323</td>
<td></td>
</tr>
</tbody>
</table>

In this case, this dissertation is supposed to consider North Korea's perception on the possibility of success in its economic reform plan launched in July 2002. Also, Pyongyang's reference point at this time should be seriously considered in specifying probabilities and values to each outcome. Compared with previous state, Pyongyang might have felt the probability of success in its economic reform plan is going down due to US financial sanctions and its "True" intent. This dissertation engages this kind of arguments in the preceding qualitative analysis.

Based on analytical results made by the cognitive choice model, this dissertation could identify that the option of escalating tensions would have been the best choice with which Pyongyang could minimize its potential losses:

- EU(SQ) = -264
- EU(Escalation) = -0.7
In its second nuclear crisis (10/2002-3/2008), Pyongyang exactly behaved the same way as the cognitive choice model suggests: 1) seeking to avoid potential losses by then US financial sanctions aiming at the center of its leadership; 2) trying to evaluate all options vis-à-vis its then reference point; and 3) preferring the certain thing to probable one. These behaviors are consistent with the preceding qualitative analysis.

Another key difference, compared with the previous state, is that Pyongyang might have perceived its then status quo (EU(SQ) = -264) was really unacceptable because then US financial sanctions had been exercising so detrimental impact on its financial transactions by this time. That’s reason why Pyongyang raised escalation ladder so quickly to testing its first nuclear device in an attempt to lift US financial sanctions. This could provide an important implication in the process of building deterrence or coercion strategies vis-à-vis North Korea in the future.

**Conclusion**

In general, this empirical analysis is consistent with the preceding qualitative analysis where North Korea was supposed to adopt the option of escalating tensions under the CCM. But there is a little different observation in the RCM between two analyses: the preceding qualitative analysis predicts North Korea’s escalation, while this empirical analysis expects Pyongyang to take the option of maintaining the status quo, though the difference of expected utility between two options is very small under the CCM. The key reason of making this difference seems derived from Pyongyang’s perception on its status quo by that time. That is, the preceding qualitative analysis predicts that then US financial sanctions might have been so comprehensive and detrimental to the North Korean regime that the status quo was extremely unacceptable. On the other hand, this empirical analysis assigns -10 to the current status quo value, which was the same level of value as the previous crisis. If this dissertation sets this value as -20, escalation would be also the best choice under the RCM in this empirical analysis.
4. Model Performance for Pyongyang’s Behaviors

RCM and CCM Agree: Escalate Tensions

North Korea’s behavior of escalating tension by conducting a nuclear test appears to be well explained by the two choice models—the Rational Choice and the Cognitive Choice. The nuclear test would be the option ensuring a maximum net expected benefit in the framework of the rational choice model, given Pyongyang’s strategic environments by that time. This option would be also the only alternative to be able to satisfy the North Korea’s reference point of becoming a nuclear power, which is the most influential parameter in the framework of the cognitive choice model.

Discussion—results contradict hypothesis

But there might be one contradiction on the hypotheses regarding North Korea’s behavior. According to one hypothesis set in the previous chapter (*Hypothesis 1: North Korea would follow the rational choice model in its decision-making process when it is in the domain of gains, while following the cognitive choice model when it is in the domain of losses*), North Korea’s move should have been explained only by the rational choice model, given it had been in the domain of gains. As this dissertation observed in the previous part, however, the cognitive choice model could have also a significant exploratory power in predicting North Korea’s risky behaviors even in the domain of gains. Therefore, there should be some measures to resolve this confusion involving hypothesis. One way to solve this contradiction is to re-define the domain of action in a manner where cognitive perception on its own domain would be well represented. Although it was analyzed that Pyongyang, in general, had been in the domain of gains during this period, for instance, it was really frustrated by the US financial sanctions and felt ever-growing threat to its regime. As a result, North Korea might have not been in the domain of gains since the inception of US financial sanctions on its trading companies.
Case 4: North Korea’s Second Nuclear Test (5/2009)

1. General Description

Second Nuclear Test (May 25, 2009)

North Korea conducted its second nuclear test in the northeastern part of the country on May 25th 2009, despite strong oppositions from the international community, including its long-time allies—China and Russia. The Pyongyang’s second nuclear test was considered a more powerful and successful test compared with its first nuclear test on October 9th 2006. For instance, the magnitude of blast in the first nuclear test was considered less than 1 kiloton so that there was some allegation that Pyongyang had blasted a large amount of high explosives to disguise a nuclear blast. By contrast, the second one is believed to be more than 4-5 kilotons, according to the western nuclear experts who used geologic seismic waves detected around the site to produce this estimate.116 Unlike the first Pyongyang’s nuclear test, its second nuclear test provoked its two closest allies—Russia and China—so greatly and promptly that they actively participated in an emergency session of the UN Security Council to draw a resolution condemning the North Korea’s nuclear test and imposing even tougher sanctions on the reclusive regime.117

UN Resolution 1874

As of June 13th, 2009, the UN Security Council approved a new resolution known as a “UN resolution 1874,” in which the international community could have the legal right to stop and inspect North Korean vessels suspected of carrying nuclear and missile-related materials on the high seas. In addition, the UN could impose both travel bans on North Korean figures involved in nuclear programs and financial sanctions on


117 A couple of hours before Pyongyang detonated its second nuclear device, the Chinese government is believed to have been given a notice about this test, while the North’s another ally—Russia—was not allegedly offered any “hint” from the DPRK, thus increasing frustration in its influence on North Korea. But there was no difference in their resolves to build a UN Security Council resolution condemning Pyongyang’s second nuclear test and imposing even tougher sanctions on the latter. This sort of significant change in their attitudes reflected the seriousness of the North’s second nuclear test on the stability of the Northeast Asia and contributed to the unanimous approval of this resolution in the Security Council. For different reactions from two North Korea’s allies, see Joe Lauria and Evan Ramstad, “Beijing and Moscow, Fearing a Nuclear Neighbor, Are Said to Be More Open to Tougher Restrictions Against Reclusive Regime,” Wall Street Journal, May 28, 2009 (online edition); Jay Solomon, Ian Johnson, and Gordon Fairolough, “China’s Anger at North Korea Test Signals Shift,” Wall Street Journal, May 29, 2009 (online edition); “Senior Russian MP accuses North Korea of state terrorism,” BBC, May 31, 2009 (online edition).
Pyongyang’s banking institutions associated with its WMD programs under this new resolution. The most significant difference compared with the previous resolution, however, is to establish a special panel comprising 7 members from 5 permanent security members and two—Korea and Japan—known as “P5+2,” to evaluate the implementation of the sanction to be conducted. So far, Pyongyang’s two traditional “patrons,” Russia and China, have been so cooperative with the other permanent security members on establishing a punitive resolution for North Korea’s second nuclear test, though they often voice peaceful manners in implementing the provisions of this sanction and the need for making inducements to leave a room for North Korea to change its course of actions.

North Korean Response

Faced with the unexpected international sanction in which its two allies actively join, the North responded with harsh rhetoric as expected, saying “any interception of its vessels on the high seas by the US-led international forces would be considered as an act of war against its country and it reserves all legitimate right to strike back at this unlawful forces to defend its sovereignty.” In addition, the DPRK has escalated its level of provocation by proclaiming that it would restart its already closed experimental nuclear reactors at Yeong-byeon and start its uranium enrichment activities to increase the stockpile of its nuclear materials. To add an effort to its traditional strategy of heightening tensions on the Korean peninsula, Pyongyang also proclaimed that it would not acknowledge the legality of the Northern Limit Line (NLL), set shortly after the end of Korean War in 1953 on the western sea border between South and North Korea, so that any boats from Seoul and Washington sailing in this region would be met with

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120 One day after a new UN resolution passed unanimously, June 13th 2009, North Korea’s foreign ministry issued a statement condemning the international effort to impose sanctions on its regime and showing its resolute willingness to resist them. For more details, refer to June 13th’s online version of Korean Central News Agency (KCNA) at http://www.kcna.co.jp/index-k.htm.
121 In the same statement (June 13th 2009), Pyongyang proclaimed that “it will weaponize all amounts of plutonium to have been extracted from spent fuel rods, a third of which has already been processed, and start its uranium enrichment activities.”
potential military attacks. Intelligence sources from the ROK and the US say that the North is also expected to escalate tensions by test-firing several missiles, including a long-range ballistic missile, in the direction of the US state of Hawaii within time period between 25th June and 10th July 2009.

2. Case Analysis

Domain of Action

North Korea’s domain is the first parameter influencing a decision environment upon which North Korea chooses an option in accordance with recommendations of two decision-making models. Recently, North Korea is surely in the domain of losses, just as identified in the previous chapter employing three factors—internal, external, and South Korea. Since the end of the Cold War in the latter of 1980s, that is, North Korea has been continuously moving toward the domain of losses and its status currently seems getting worse due to several factors recently emerged: 1) uncertainties surrounding Kim Jong-Il’s health condition and transferring power to his youngest son, 2) the emergence of

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122 One day after North Korea tested its second nuclear test, on May 26th 2009, the Lee administration of South Korea proclaimed that it would join the international non-proliferation effort—PSI (Proliferation Security Initiative). In response, Pyongyang released a statement that “it will consider Seoul’s participation in the PSI as a declaration of war, no longer abide by the armistice set in 1953, and accordingly, it will not acknowledge the legal effect of South Korea’s claims to the disputed 5-islands in the west costal border.” For more details, refer to May 26th’s online version of Korean Central News Agency (KCNA) at http://www.kcna.co.jp/index-k.htm.

123 North Korea fired two short-range missiles into the East Sea of Korea near Won-San, one of the biggest harbors in eastern part of the DPRK, at around 5:30 p.m. on July 2 (local time). According to intelligence sources of South Korea and the US, more missile firings are expected in a week. For more details, refer to Choe Sang-Hun, “North Korea Test-Fires 4 Short-Range Missiles,” The New York Times, July 2, 2009.

124 Several experts on North Korea claim that Pyongyang’s current provocations appear extremely irrational compared with the past cases where the North had some intentions to negotiate with other players, even amid extensive tensions. They argue that Kim Jong-Il’s sudden collapse nearly one year ago due to chronic diseases might have significantly strengthened his perception that becoming a nuclear power would be the only solution to defend its regime and ensure successful power transfer to his youngest son. For detailed accounts, see Bruce Klingner, “North Korea’s Nuclear Defiance,” WebMemo (The Heritage Foundation, May 26, 2009); Richard C. Bush III, “North Korea’s Nuclear Bargain,” The Daily Beast, May 26, 2009 (online edition); Dennis Wilder, “It is China that holds the key to North Korea,” Financial Times, June 04, 2009 (online edition).
conservative government in Seoul, and 3) Obama administration’s strict review over previous government’s North Korean policy in the United States.

**Internal Factor**

Of three factors mentioned, North Korea’s internal issues appear to have played a significant role in putting Pyongyang into even deeper domain of losses because the ‘regime survival’—the foremost goal of the regime—is greatly influenced by internal stability in a dictatorial country like North Korea. Kim Jong-Il’s health problem and transferring power to his youngest son are considered one of the most unstable factors to its regime, given North Korean society has been completely controlled by the unprecedented policing power of Kim’s dynasty for the last five decades. According to various sources, Kim Jong-Il was hospitalized due to his serious and chronic stroke caused by diabetes and heart disease in August 2008, and took an emergency surgery in Pyongyang by French and German doctors.

After a series of rumors arguing he has already died, he made public appearance to eliminate the concerns of regime instability arose shortly after his stoke to the international audiences, as well as to its populace. His physical appearance occurred two months later after his collapse due to a stroke in August 2008, however, was not enough to get rid of all concerns surrounding him, even further stepping up the possibility of his sudden death and ensuing rapid dissolution of its regime due to a watershed of defects from its strong army. This kind of concern and possibility were rampantly circulated in

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125 Inaugurated in the early 2008, the conservative Lee administration in Seoul proclaimed two principles in its North Korean policy: reciprocity and transparency. Under this circumstance, Pyongyang might have been difficult to exploit its strategic advantages relative to Seoul—the hostile and secret nature of its South Korean policy. See the details of Lee administration’s North Koran policy at [http://blog.daum.net/mounification/8767759](http://blog.daum.net/mounification/8767759).

126 Since its inauguration in early 2009, the Obama administration did not pay much attention to North Korea as it paid to Iran’s nuclear issue. Also, the new US government made it clear that it will not reward the bad behavior of Pyongyang and the Six-Party talks is the only venue to address North Korea’s nuclear issue. See the early Obama administration’s North Korean policy and Pyongyang’s responses at [http://sitrep.globalsecurity.org/articles/090427313-obama-and-north-korea-first-100-days.htm](http://sitrep.globalsecurity.org/articles/090427313-obama-and-north-korea-first-100-days.htm) and [http://www.brookings.edu/testimony/2009/0617_north_korea_bush.aspx](http://www.brookings.edu/testimony/2009/0617_north_korea_bush.aspx).

the politics of Northeast Asia during the latter period of 2008 and early 2009. Amid this controversy regarding his health problem, Kim Jong-Il might have thought that he would need a special measure to eliminate all concerns about the future of his regime. One of those measures might have been the succession of power to his son and it meant the continuation of the Kim’s dynasty, thus ensuring its military the vested interests they have enjoyed for the last several decades. To acquire a strong support from his army in his pursuit for a successful power transfer to his son, Kim Jong-Il mighty have had to grant his military their adamant demand—arming the KPA with nuclear arsenals and means to deliver them.

Yet, this ‘special overture’ does not seem enough to completely eliminate the concern associated with the continuation of Kim’s regime from his army generals given a lack of experience of his heir apparent in military and party apparatus, further aggravating the ‘fear’ of a possible regime collapse. As a result, North Korea has faced serious internal instability mainly derived from Kim Jong-Il’s bad health condition, and the ensuing leadership crisis appears to have put the Pyongyang regime into further deep domain of losses, coupled with a lack of confidence on his heir’s ability to lead the regime.

**External Factor**

The Obama administration started its first term in January, 2009, when the US faced the worst economic recession since the Great Depression in the mid-1930s. Faced with two great crises for its own—economic recession and struggling with war on terrors, the Obama administration did not have much room for spending its efforts on dealing with North Korea’s nuclear and missile issues in the early days of his administration. Even though the current US administration has inherited a lot of political legacies and philosophy from the Democratic Clinton administration, furthermore, it has to impose strict standards on dealing with Weapons of Mass Destruction (WMD) because the

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128 According to one South Korean blog studying North Korea, a rumor regarding Kim Jong-Il’s health problem first erupted in an article of the prominent South Korea’s daily newspaper—*Chosun Ilbo*—in August 2008 and then it was proved to be true in October 2008 with several observations. First, Kim Jong-Il himself did not show up in the 50th anniversary of North Korea’s foundation in September 9th 1949, an unprecedented event given he participated in that event every year for the last decade. Secondly, Kim Song-Ho, chief of South Korean intelligence agency, testified in October 10th 2008 before National Assembly that “Kim Jong-Il collapsed with a stroke and recovered after a surgery enough to manage the country’s business.” See the detail news regarding Kim Jong-Il’s collapse and internal politics inside Pyongyang at [http://blog.naver.com/ysan777?Redirect=Log&logNo=70034949929](http://blog.naver.com/ysan777?Redirect=Log&logNo=70034949929).
treatment of North Korea’s WMD is highly intertwined in the nuclear negotiation with Iran, one of the most important US non-proliferation initiatives.\textsuperscript{129}

The new US administration has hoped to have enough time to review the past North Korean policies in order to avoid the same mistakes conducted by the previous governments: sometime pursuing appeasement policy by the Clinton administration and sometime seeking containment policy by the Bush administration, but in reality failing to reduce North Korea’s nuclear and missile threats, even increasing those capabilities.\textsuperscript{130} As a result, the US government has been reluctant to rapidly engage North Korea, instead indirectly prodding the Chinese government to pressure Pyongyang to return to the Six-Party talks.\textsuperscript{131} Accordingly, North Korea has been increasingly anxious about the indifference of the new US administration, and that feeling has developed into self-imposed frustration due to a lack of confidence on itself for manipulating security concerns to attract the US attentions.

\textbf{ROK Factor}

Externally, North Korea has witnessed two significant changes in the political structure from its two adversary administrations—South Korean President Lee Myeong-Bak took office in January, 2008; and the Obama administration in Washington started its first term in January, 2009. Unlike North Korean policies of previous 10-years’ progressive governments in Seoul,\textsuperscript{132} the Lee’s administration has requested reciprocal relationships between Pyongyang and Seoul from the beginning, and sought more transparency in providing humanitarian aids so that they could not be averted to the military purpose. Such two requests—‘\textit{reciprocity} and \textit{transparency}’—have become a

\textsuperscript{129} Scott Snyder, “Obama and North Korea: First 100 days,” available at \url{http://sitrep.globalsecurity.org/articles/090427313-obama-and-north-korea-first-100-days.htm}

\textsuperscript{130} Jayshree Bajoria, “The Six-Party Talks on North Korea’s Nuclear Problem,” \textit{Backgrounder} (Council on Foreign Relations: updated July 1\textsuperscript{st} 2009)), available at \url{http://www.cfr.org/publication/13593/}.

\textsuperscript{131} In an article posted at the website of Global Security Organization, Scott Snyder claims that the new US administration have sought a more reciprocal approach toward Pyongyang and has not had any intention to reward any intimidating behaviors. For more detailed accounts about the North Korean policy of a new Obama administration, refer to “UN Security Council Response to North Korean Missile Test: Washington’s Policy Debate” at \url{http://sitrep.globalsecurity.org/articles/090413294-un-security-council-response-t.htm}.

\textsuperscript{132} The North Korean policy of previous two governments in Seoul—Kim Dae-Jung and Noh Mu-Hyun administrations—is characterized by emphasizing more on facilitating cooperation and reconciliation by a wide range of exchanges rather than requesting reciprocated actions from Pyongyang and verifying its promised pledges, which had been key Seoul’s policy bases toward Pyongyang prior to Kim Dae-Jung’s elect as the President of South Korea and again becomes a new guideline for the newly launched Lee administration in 2008.
key political platform for the current ruling circles in the South since Lee’s inauguration in January 2008, and, accordingly, the current administration in Seoul had to firmly set up this guideline in developing all North Korean policies. Unfortunately, this kind of policy shift in Seoul does not seem best fitted for the North Korea’s previous objective of maximizing economic gains from South Korea through socio-economic cooperation while keeping its tight control of its society strongly supporting Kim’s regime under the “Juche” Ideology. That is, Seoul’s policy shift requires more transparent verification in their aids and more openness of North Korean society to the outside world.

Amid disputes regarding the nature and direction of cooperation and reconciliation between two Koreas, one South Korean tourist was inadvertently killed by the shooting incident of a North Korean guard protecting “Kumgang Mountain” tourist special zone in July, 2008. After this incident, the inter-Korean relation has rapidly worsened and plummeted into its nadir by early March, 2009, when North Korea unilaterally proclaimed the closure of the “Kaesong Industrial Park,” a symbol of reconciliation and cooperation between two Koreas for the last ten years. For the newly launched conservative government in Seoul, this incident was not an issue to compromise given the strong criticism of previous two government’s naïve North Korean policy from President Lee’s conservative power bases.

133 From the early period of a presidential primary for his party nomination in 2007, President Lee has set up a new approach toward North Korea, known as “Denuclearization and Openness 3000.” Unlike the previous governments’ policy emphasis of facilitating reconciliation and cooperation, this policy put the key emphasis on transparency and reciprocity in dealing with North Korea. Based on these principles, Pyongyang should dismantle its nuclear programs completely and verifiably in exchange for getting economic and political assurances from South Korea. For more detailed accounts for this policy, refer to Yong Seong Dong, “The initiative of ‘Denuclearization and Openness 3000’ and the plan for inter-Korean economic cooperation” at http://www.peacefoundation.or.kr and http://www.newshankuk.com/news/news_view.asp?articleno=k2008013017252709339.


135 For a standoff derived from the death of a south Korean tourist, refer to Kim Sue-Young, “Opposition Urges Lee to Mend ‘Pragmatic Diplomacy’,” The Korea Times, July 15, 2008 (online version).

136 As for how Kaeseong industrial park was blackmailed by the North since the inauguration of Lee administration in Seoul, refer to Andrei Lankov, “Kaeseong Industrial Complex Faces Serious Threat,” The Korea Times, May 15, 2009 (online version).

137 In an article of Monthly Chosun—the conservative monthly magazine in Seoul—Hong Hyeong claims that “this incident is another type of terror organized by Kim Jong-Il in an attempt to train the newly launched Lee administration so that it could continue to easily control Seoul. Therefore, the conservative government should sever this vicious cycle of North Koran provocation by thoroughly investigating and
For the last one year of Lee’s presidency, accordingly, any cash support, including foreign currency for tour expenses, has never been sent to North Korea and it might have seriously hurt Pyongyang’s ability to obtain foreign exchange for importing critical materials necessary to sustain its regime (e.g., crude oil, luxury goods and food, etc.). For instance, South Korea’s aid funds, combining all sectors, has significantly dropped by more than 60 % from about 300 million dollars in 2007 to just 100 million dollars in 2008, when the current South Korean government began its office (See Figure 4-24). And this trend is expected to continue for another couple of years to come since North Korea initiated another provocation by conducting its missile and second nuclear tests in April to May 2009.

![Figure 4-24: Change in ROK’s North Korean Aid Funds, 2000-2008](http://kosis.kr/bukhan/)

In addition, South Korea’s share in North Korea’s total trade volume has also dropped to about 30 % from nearly 40 % in previous year since the Lee administration took office in early 2008 (See Figure 4-24). It means that if the current confrontation between Seoul and Pyongyang continues to go, the trade between two Koreas would drop more significantly in the future even though that figure in 2008 was maintained to the

same level of 2007. As a result, this confrontation will further weaken Seoul’s leverage on Pyongyang in terms of economic power and, instead, strengthen Beijing’s influence on North Korea’s economic, as well as politico-military arenas in the future.

Combining all developments occurred after the Lee administration’s inauguration in early 2008, it seems evident that the South Korean factor has become unfavorable toward Pyongyang. Particularly, North Korea’s effort in earning its desperately needed foreign exchange might have faced a serious blow by Seoul’s decision to suspend all its tour projects to Mountain Kumgang shortly after the shooting incident because the tour project has constituted a major source to legally acquire foreign reserve for Pyongyang. According to Figure 4-25, North Korean foreign exchange acquisition in 2008 dropped more than 60 percent relative to the previous year 2007 by Seoul’s decision to stop its Kumgang Mountain tour project until Pyongyang cooperates with South Korea’s effort to investigate the incident and provides a measure guaranteeing the safety of South Korean tourists.

In addition, growing public anger by this incident might have made it difficult for the progressive circle supporting engagement policy toward Pyongyang to push forward their political platform against the conservative Lee administration, thus resulting in a huge loss of North Korea’s ‘sympathizers’ in Seoul.

![Figure 4-25: Changes in North Korea’s Trading Partners, 2000-2008](http://kosis.kr/bukhan/)

**Source:** Author’s reconfiguration in the original sources from Korea Trade Association (KOTRA) and Statistics Korea, 2009, at [http://kosis.kr/bukhan/](http://kosis.kr/bukhan/).
Conclusion

In a conclusion, North Korea has recently moved into the deeper domain of losses across three elements influencing its strategic status—internal, external, and South Korean factors. Internally, Kim Jong-Il might have felt one of the most critical leadership crises due to his faltering health condition and ensuring succession issue since he took power in 1994 after his father’s death. Contrary to Pyongyang’s expectation, externally, the Obama administration in the US took even tougher stance against Pyongyang than the Republican Bush administration, and sometimes adopted a malignant neglect attitude toward North Korea’s calculated provocations, further frustrating the DPRK. In the southern part of the peninsula, the conservative Lee administration adopted a new North Korean policy endorsing “transparency and reciprocity,” which was set aside in the past two progressive governments in Seoul in an effort to first facilitate reconciliation between two rivals, and reorganized a regional coalition to increase pressure on Pyongyang.

Figure 4-26: Change in North Korea’s Domain of Action, 10/2006 - 5/2009
Reference Point

Becoming a Nuclear Power

North Korea’s reference point at this period is another parameter which could significantly influence the decision environment of Pyongyang. From North Korea’s recent reactions to the international community’s demand to dismantle its nuclear programs, one could infer its reference point. That is, one could well estimate North Korea’s reference point by analyzing its current commentaries of the No-Dong Daily—North Korea’s workers’ party newspaper—carried by Korean Central News Agency (KCNA) in the aftermath of its second nuclear tests on May 25th, 2009. In several commentaries, the DPRK has repeatedly asserted that its nuclear weapons would be a final resort “for defending itself against the imperial US and its puppet—Lee Myong-Bak administration in the South.”

Several documents released in the US and ROK also suggest that North Korea’s current reference point would be to become a nuclear power to defend its regime against internal and external threats, given the structural and systemic difficulties North Korea is now facing—complete diplomatic isolation, a state of near economic collapse and South Korea’s preponderant power advantages relative to North Korea.

Reasoning

As a result, one has seen a significant change in North Korea’s goal or reference point since the end of the Cold War: from reunification of two Koreas under its control to regime survival through developing reliable deterrent means—nuclear weapons. Especially, acquiring survivable and credible nuclear options appear to have become an indispensable national goal since the early 2000s, when the Pyongyang regime vividly witnessed the tragic results of the ‘rogue’ states facing the US ‘hegemonic’ efforts without acquiring reliable and credible self-defensive means. Specifically, the end of Saddam regime in Iraq would have provided to Kim Jong-II an invaluable lesson that it is impossible for its regime to deter the US from preempting the North without a nuclear

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138 At the mass mobilization to celebrate the successful nuclear test, the North claims that “acquiring a nuclear deterrent means is sovereign right and it would be a significant foundation to become a ‘strong and prosperous nation’ by the 2012.” For detailed assertions, refer to the June 3rd’s online version of Korean Central News Agency (KCNA) at [http://www.kcna.co.jp/index-k.htm](http://www.kcna.co.jp/index-k.htm).
Analyzing North Korea’s Decision-Making Process on its Nuclear Weapons Programs with the Rational Choice and Cognitive Choice Models

Chapter 4: Case Studies

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deterrent means.\textsuperscript{140} Even though the North has some asymmetric advantages against the ROK-US combined forces, it appears to perceive that conventional capabilities without credible deterrent means (WMD) would not be enough to deter the US forces employing sophisticated and lethal conventional offensive weapons. Therefore, Pyongyang seems to follow the path of Pakistan where Islamabad equipped with limited but survival nuclear options has been enjoying a deterrent power against its stronger neighboring countries like India since its successful nuclear test in 1998.\textsuperscript{141}

Summary
Consequently, acquiring survival and credible nuclear options would be Pyongyang’s latest national goal, or its “reference point” given its current preponderant hardships facing its regime—the collapse of its economy and its ensuing difficulty in feeding its populace, the absolute isolation from the international community, the growing power gap with its ‘arch-rival’, South Korea, and the growing international norm of sanctioning the ‘rogue’ states developing WMD means.

3. Predicting North Korea’s Behaviors

1) Qualitative Analysis for North Korea’s Second Nuclear Test

Rational Choice Model

Overview
In the subsequent part, this dissertation will calculate respective expected utilities for three options North Korea could take at this time: 1) escalating brinkmanship, 2) waging a limited or all-out war, and 3) pursuing cooperative option of dismantling its nuclear programs in exchange for benefits.

Option #1: Escalate Tensions

\textsuperscript{140} North Korean military leaders might have perceived growing security threats after witnessing a host of ‘hostile’ policies by the Bush administration: adoption of a nuclear preemptive strategy after the 9/11; inclusion of its country to the list of an ‘axis of evils’; and invasion of Iraq in an effort of regime change. James Laney, former US ambassador to Seoul, said that all these factors might have combined to facilitate North Korea’s nuclear program as reliable and credible deterrent means against the US. See James T. Laney and Jason T. Shaplen, “How to Deal with North Korea,” \textit{Foreign Affairs} (March/April 2003), 20-21.

\textsuperscript{141} Pyongyang might have apparently observed that once a country becomes a recognized nuclear power, the US becomes friendlier to that country. Pakistan, India and China are the most outstanding case. See Dick K. Nanto and Emma Chanlett-Avery, \textit{North Korea: Economic Leverage and Policy Analysis} (US Congress: CRS Report, August 14, 2009), 9.
The first option is the case where North Korea continues to escalate tensions by conducting its nuclear test and missile launching, but short of a limited war or all-out war. In this case, North Korea could obtain some positive benefits in achieving internal unity by demonstrating its military might to its populace and army and attracting international attention by raising security concerns, in particular from South Korea, Japan and the United States. Also, Pyongyang might improve its technical expertise with this option so that it could make its nuclear warhead small enough to be fitted into its ballistic missiles. But North Korea should consider the negative aspects of this provocation, such as losing economic aides and security assurance from China and Russia, by defying their repeated requests not to escalate tensions. Both of Pyongyang’s two allies could wield the veto power against the UN-led sanctions supported by the US and Japan.

In this latest North Korea’s provocation, one would not absolutely estimate which aspect of two would be greater. Considering the fact that Pyongyang’s neighboring countries—the ROK, the US, and Japan—have already been accustomed to its repeated provocations, however, the positive aspect of generating security attentions from the neighboring countries does not seem to gather much appeal. Furthermore, new governments pursuing transparency and reciprocity toward Pyongyang have started their terms in three countries recently, further frustrating North Korea’s traditional tactics of escalating tensions. In addition, the purpose for solidifying its internal unity dose not appear to provide additional or marginal positive values, given the fact that Pyongyang has already been in an absolute control on its population and military.

But the negative aspect of its second nuclear test appears to be looming large given Pyongyang’s two closest allies—China and Russia—are voicing their grave
concerns and participating in an international effort to impose sanctions against that
provocation. For instance, North Korea’s escalation of testing nuclear device and
launching long-range ballistic missiles would make both of its long-time allies—China
and Russia—frustrated with Pyongyang’s intractable behaviors because they are in a
position to support the non-proliferation regime in order to maintain their strategic gains
in this region—maintaining stability on the Korean peninsula for their economic
prosperity, eliminating the possibility of Japan’s rearming and arms race in this region,
preventing both South Korea and Japan from going for nuclear, and avoiding the
formation of the “Missile Defense” coalition led by the US in this region.144

If they are not able to dissuade North Korea from building nuclear weapons,
Pyongyang’s neighboring countries—South Korea and Japan—will surely try to build
nuclear weapons with their advanced technologies and an ample amount of accumulated
nuclear materials within a short period. In turn, this move will ignite an arms race in this
region, thus seriously undermining national interests of both countries. Also, Taiwan’s
traditional pursuit for building nuclear weapons as a strong deterrent measure against the
mainland China would no longer be prevented or dissuaded from the Western allies in
this region, including the United States. This case would virtually constitute the worst
case scenario for China characterizing the annexation of “the renegade island” into its
territory as one of its most significant national goals.145

As a result, Pyongyang’s two allies are now strongly opposed to its second
nuclear test and a series of short and medium-range missile tests, and would like to give a
strong message in this case to their ‘intractable’ ally, so that the North would not
jeopardize their national interests any more. Accordingly, this first option would result in
a net negative expected value when applying the rational choice model, in which this
dissertation only considers the variation of Pyongyang’s expected utility from its current

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144 As for Chinese strategic considerations on North Korea’s nuclear program, see Shen Dingli, “North
Korea’s Strategic Significant to China,” China Security (autumn, 2006), 19-34.
145 For regional ramifications of North Korea’s nuclear programs, refer to Christopher W. Hughes, “North
Korea’s Nuclear weapons: Implications for the Nuclear Ambitions of Japan, South Korea, and Taiwan,”
Asia Policy, No 3(January 2007), 75-104.
value of the status quo, not seriously taking into account its deep domain of losses and the resultant “framing effect” upon which the cognitive choice model is built.

**Option #2: Pursue All-Out War**

The second option involves a limited war or all-out war between two players—Pyongyang versus the ROK-US combined forces. Even though North Korea has been maintaining strategic partnerships with China and Russia, such relations do not guarantee the automatic military involvement of both countries in the peninsula to help their “intractable and arbitrary” ally. Therefore, if a potential limited or all-out war would occur only from Pyongyang’s ‘reckless and unjustified’ behavior, both allies of North Korea might not provide direct military aid, other than brokering missions to avoid the conflict expanding across the region.

On the other hand, the US is supposed to involve in any military conflict threatening the security of Republic of Korea based on the provisions of the ROK-US mutual defense pact, taken effect in October 1953 shortly after the end of Korean War. Also, Japan has already eliminated all legislative barriers in providing military aides with the US forces involving in the Korean peninsula through correcting and establishing a series of related laws.146

Even though North Korea has asymmetric strategic advantages in some areas—special operation forces and WMD—against the ROK-US combined forces, a limited or all-out war waged by North Korea would surely lead to the collapse of the Kim Jong-Il regime. As a result, this option would provide the worst negative expected value to North Korea from the perspective of the rational choice model.

**Option #3: Maintain Status Quo**

146 Under the current “Peace Constitution,” taken effective in 1948, the Japanese Self-defense force is not authorized to exercise 1) the use of force, 2) possess the physical force, and 3) exert the right for engagement beyond its territory. In April 1999, however, the House of Representative of Japan passed “the Law for Incidents in Periphery” in an effort to terminate legal obstacles in supporting the US forces involving a potential war on the Korean peninsula. This law was based on the Common Communiqué between the US and Japan in April 1996, in which both countries specified detailed items on Japanese support for US forces involving in a regional war close to Japan. After this initiative, Japan subsequently passed “the Correctional Act for the Self-defense Force” in an attempt to complete this security initiative at a time when North Korea’s missile threats are growing. For further details, see Michael Stankiewicz and Ahn Byung-Joon, “Korean Peninsula Security and US-Japan Defense Guidelines,” Policy Paper # 45(Institute on Global Conflict and Cooperation: October 1998) and Richard Cronin, “The North Korean Nuclear Threat and the US-Japan Security Alliance: Perceived Interests, Approaches and Prospective,” The Fletcher Forum of World Affairs, Vol.29, No.1 (Winter 2005).
The third option is to maintain the current status quo, not further escalating tensions, by returning to the Six-Party talks and abiding by their promises to completely dismantle its nuclear programs in exchange for economic aids and security assurance from the international community, in particular from the United States. But there is one significant dilemma for Pyongyang in accepting this ‘grand bargain.’ In the process of revitalizing its almost collapsed economy with the help from the international community, the Pyongyang regime has to open its society to the ‘contaminated’ capitalism. This initiative would pose grave threats to the current North Korean regime heavily obsessed with ‘the siege mentality and xenophobia’ toward the outside world.\(147\) South Korea’s active role in engaging North Korea would also give even greater ‘ideological and psychological’ shocks to the ordinary North Korean populace, who have been heavily indoctrinated that “its southern brothers and sisters are poor slaves of the imperial US and the puppet government of South Korea, and some days we northern brothers and sisters have to help them get out of the ordeal.”\(148\)

To get rid of those concerns from Pyongyang, the Chinese government has been persuading North Korean regime to accept “the Chinese Model,” in which the Chinese government adopted aggressive economic openness and innovation while maintaining a tight rein on political power by the Chinese Communist Party (CCP). Since the early 2000s, Kim Jong-Il himself visited the eastern industrial complex of China to directly witness the successful results of those policies. But the North Korean regime still appears reluctant to take the Chinese model and consider an alternative which could guarantee the continuation of the ‘Kim’s dynasty’ strongly supported by its army, even though it would make it hard for its long-time centrally commanded economy to quickly integrate into the market economy. For them, securing their vested interests by slowing the pace and scope


\(148\) This kind of North Korean propaganda prevailed over the periods between the 1960s and 1990s in all North Korean ‘mouthpieces.’ After its engagement with Seoul in early 2000, however, Pyongyang changed its rhetoric in an attempt to split the security alliance between Seoul and Washington by emphasizing ‘national unity’ and ‘national cooperation’ in its propaganda. See the latest rhetoric(May 13th 2009) stressing ‘national unity and cooperation’ against South Korea’s decision to join the PSI (Proliferation Security Initiative) in an effort to punish Pyongyang’s provocation shortly after its second nuclear test in early May at [http://www.kcna.co.jp/index-k.htm](http://www.kcna.co.jp/index-k.htm).
of its openness would be more attractive than a dramatic measure, though it could provide more chance of success.149

The North Korean regime might think that it faces different situations compared with China in conducting those policies the People’s Republic of China (PRC) adopted for the last several decades. For example, the current leadership of the CCP did not seek the succession of political power like the Kim Jong-Il regime while conducting its economic innovative policies aggressively, so that there were a lot of flexibilities and freedom of actions in taking a variety of economic policies. Also, China had a huge number of rural populations who were driving forces to increase productivity, consume products made and invest their earnings into new derivative industries during those periods.

North Korea, however, is now facing totally different situations. The portion of rural population in North Korea has been continuously declining because they had to leave their rural villages in pursuit of indispensable foods for their survival after experiencing several years of consecutive natural disasters—severe flood in 1996 and drought in 1997. Therefore, North Korea right now lacks sufficient labor forces which could drive its innovative economic policies. In addition, the rigidity of political system would not allow any flexibility by government officials in conducting economic policies, thus further slowing the economic recovery.

As a result, it is not yet clear whether this option of cooperating with the international community would provide positive and negative expected value to the current North Korean regime in a long-term manner. But it would surely give a greater positive expected value than the first option of escalating tensions, given regime survival is now the foremost goal for the Pyongyang regime, because the latter could lead to the worst case scenario of provoking a limited or all-out war on the peninsula.

RCM Conclusion: Status Quo (or Escalate Tensions)

Considering the expected values of three options, this dissertation could project each option into the subjective value function of the rational choice model, in which an individual actor is deemed as risk-averse regardless of his strategic status or domain, and

his total level of assets against the status quo only matters (See Figure 4-27). On this subjective value function of North Korea, the value of \( U(3) \), the expected utility of cooperative option, is identified to be the highest one out of three in a short term manner. As a result, North Korea should have taken option-3, instead of escalating brinkmanship, in accordance with the logic and assumptions of the rational choice model.

But there might be different interpretation. If the North is vehemently dissatisfied with the status quo and perceives that it would be able to maximize its gains by escalating tensions, there is still the possibility that the value of \( U(1) \)—the expected utility of escalation tensions—might be larger than that of \( U(3) \)—the expected utility of maintaining cooperation. In that case, Pyongyang’s second nuclear test could be explained with the logic of the rational choice model, though it would be the case interpreted in a long-term manner.

![North Korea’s Subjective Value Function](image)

Figure 4-27: North Korea’s Subjective Value Function by the rational choice model in its Second Nuclear Test, May 2009

* North Korea’s subjective value function is concave on the assumption that it will be risk-averse when it is in the domain of gains and the status quo is used as a reference point to be compared with alternatives available.
Cognitive choice model

Overview

North Korea’s reference point should be first selected to apply the cognitive choice model to this case study. Its reference point would be to build a strong deterrent means for defending its regime. Considering current North Korea’s military assets, of course, “the last resort” of its defense would be to acquire survivable nuclear options and its delivery means—ballistic missiles—to deter the ROK-US combined forces. And then, each option identified in the previous part would be evaluated upon its current reference point, and one option would be selected when it offers the best prospective utility relative to its reference point. In the process of calculating prospective utility of each option, Kim Jong-Il’s propensity toward risk and his domain should be seriously considered because they will constitute key decision environments upon which he chooses his best option out of alternatives available to him.

Option #1: Escalate Tensions

Considering the fact that acquiring nuclear deterrent means is currently a Pyongyang’s reference point, the first option of escalating brinkmanship appears to be best fitted for achieving its goal of defending its regime. Even though the first option would incur some critical costs of its allies’ threatening not to supply aides and wield a veto power against UN sanctions, it could provide some chance of returning to a favorable position where it could enjoy the status of being a “nuclear power”, though the chance is very slim. Also, this option could provide significant ‘psychological’ confidence with the Kim’s regime, which is facing serious concern of regime collapse due to failure of economy and faltering physical condition of its ‘Dear Leader’ Kim Jong-Il himself. Obtaining strong supports from its army by meeting their requests of securing ‘a strong deterrence means’ is another type of benefit in this risky choice.

Also, this dissertation could observe the ‘preference reversal’ of prospect theory in this case. That is, since Pyongyang is located in the center of the deep domain of losses, it will be forced to be framed with psychological pressure for avoiding any loss using every means they can. Under this “framed” environment, the North would likely undertake a risky choice of escalating brinkmanship, which is practically worse to the
third option of maintaining cooperation in the expected utility term. So, the “preference reversal” in the North Korea’s choice could be observed under the deep domain of losses. This “framed effect” created by the North’s strategic domain of losses would give a strong influence on its valuation of subjective value and probability assigned to each option. That is, under the serious domain of losses, the weighted value and probability of option-1 of escalating tensions would become larger than those of option-3 of maintaining cooperation because of the cognitive characteristics of an individual’s decision-making process—loss aversion, the phenomenon that humans usually overvalue loss over the comparable amount of gain. As a result, the first option would result in a net positive prospective utility relative to the current reference point and should be selected as an alternative on the basis of logic of the cognitive choice model.

Option #2: Pursue All-Out War
The second option of waging a limited or all-out war might become one of options for Pyongyang facing a serious domain of loss in order to return to a favorable position where its regime would return to the previous status quo. But it could surely lead to a rapid collapse of its regime due to a significant difference in military power between North Korea and the combined forces. That is, the chance of success would be extremely small and the ensuing result could be catastrophic, if the Kim regime would take the second option. In this case, the ‘reference reversal’ predicted by the standard logic of prospect theory would not occur, even though North Korea is located in the deep domain of losses.

In addition, this dissertation could observe the ‘certainty effect’ in this case, in which an actor would like to put more value on a sure case rather than a probable one, just as this dissertation could see that phenomenon in the “Russian Roulette Game.” That is, pulling out a last bullet from a pistol would be valued more than the case of pulling one bullet from the pistol charged with 4 bullets, even though the expected probability of mitigating fatality is identical with 1/6, because of psychological impact seeking complete elimination of fatality—a type of the certainty effect. As a result, the North would not take the riskiest option of waging a limited war or all-out war if the chance of success for that option is extremely small and the ensuing outcome is catastrophic.
because of such certainty effect. Instead, Pyongyang will take a safer choice following
the rational choice model’s logic of maximizing its expected utility under this situation.

**Option #3: Maintain Status Quo**

The last option of maintaining the status quo with cooperation would not also
produce a net positive prospective utility for the Pyongyang regime, given it is now so
tightly framed with the fear of Kim Jong-II’s sudden death. This option could also incur
serious defects from the North’s conservative military circles because they are worried
about their standing in North Korean society when capitalism pours into North Korea.
From the perspective of North Korea’s current ruling party, in other words, the chance of
success for defending their regime is very slim and the ensuing cost would be
overwhelmingly greater than the benefit.

From the aspect of meeting the reference point of becoming a nuclear power, this
option is also not the best one because there would not be any chance that the North
could secure its own nuclear arsenals once it accepts the third option. Consequently, this
option of maintaining cooperation would also result in a net negative prospective utility,
given North Korea is in the deep domain of losses and its current reference point is to
become “a nuclear power.”

**CCM Conclusion: Escalate Tensions**

In sum, this dissertation could also project each option into the subjective value
function of prospect theory, on which North Korea’s domain and its “framing effect” play
a significant role in Pyongyang’s choice of options available (See Figure 4-28). On this
value function, this dissertation could observe that the option of escalating tensions might
produce higher net prospective utility—\( U(1)' \) and \( U(1)'' \)—than a less painful but safe
choice of maintaining cooperation—\( U(3) \)—for the North Korean regime, though the
chance is not so high. That is, Pyongyang would like to take a riskier choice of escalating
tensions by conducting missiles and nuclear tests than a safer choice of maintaining
cooperation because that choice could provide them with a chance for returning to their
reference point of becoming a nuclear power and they are aggressively averse to
additional loss under the deep domain of losses. As a result, the current North Korea’s
behavior of testing nuclear device and ballistic missiles is well explained with the argument of prospect theory.

Figure 4-28: North Korea’s Subjective Value Function in the Cognitive Choice Model in its Second Nuclear Test, May 2009

* North Korea’s subjective value function is a ‘S’ curve based on the assumption that North Korea will be risk-averse above the reference point (concave) and risk-acceptant below the reference point (convex).

2) Quasi-empirical analysis for NK’s Second Nuclear Test

Compared with the previous state in 2005-2006, North Korea might have thought this period is getting better because they achieved most of their requests from the second Bush administration by this time: delisting NK from the list sponsoring terrorism, lifting trade regulations on NK, and reaching the 2.13 agreement (2007) where NK will dismantle its nuclear programs in return of US assurance of its security and economy. All of sudden, Pyongyang felt it was moving again to the loss domain due to crises derived from Kim Jong-Il's health problem and emerging neighboring administrations pursuing "transparency and reciprocity" toward Pyongyang (refer to the previous qualitative
analysis). As a result, this dissertation assumes that Pyongyang felt it had fallen to $X = -10$
(current status quo).

**Rational Choice Model**

Under this model, this dissertation uses the following equation to effectively reflect a key assumption that North Korean leadership would be risk-averse across all domains of actions (gain and loss areas) under the RCM: 

$$Y = 1,200 \times (\log(50 \times X + 7,000) - \log(7,000))$$

where the shape of this function shows marginally concaved form across all areas (see Figure 3-1 in chapter 3). Based on previous parameter and equation, this dissertation could calculate the expected utility of each option in North Korea’s second nuclear crisis under the rational choice model (Table 4-15).

**Table 4-15: NK’s Expected Utility in its Second Nuclear Test under the RCM, 5/2009**

<table>
<thead>
<tr>
<th>Parameter (current status quo value, $X$)</th>
<th>$-10$</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>risk-averse equation under the RCM</th>
</tr>
</thead>
<tbody>
<tr>
<td>$Y = 1,200 \times (\log(50 \times X + 7,000) - \log(7,000))$</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Expected Utility of the Status Quo (j1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>$EU(SQ, j1) = 1,200 \times (\log(50 \times -10 + 7,000) - \log(7,000)) = -39$</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Expected outcomes in case of NK's escalation-it's second Nuclear Test (j2)</th>
<th>$Y(i)j2$</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) 1% of escalating to total war, $X = -100$</td>
<td>-653</td>
</tr>
<tr>
<td>$Y(1)j2 = 1,200 \times (\log(50 \times -100 + 7,000) - \log(7,000))$</td>
<td></td>
</tr>
<tr>
<td>2) 5% of escalating to limited war (US preemptive attack), $X = -70$</td>
<td>-361</td>
</tr>
<tr>
<td>$Y(2)j2 = 1,200 \times (\log(50 \times -70 + 7,000) - \log(7,000))$</td>
<td></td>
</tr>
<tr>
<td>3) 15% of being diplomatically isolated and facing economic sanctions, $X = -30$</td>
<td>-126</td>
</tr>
<tr>
<td>$Y(3)j2 = 1,200 \times (\log(50 \times -30 + 7,000) - \log(7,000))$</td>
<td></td>
</tr>
<tr>
<td>4) 25% of getting economic and political concession from its &quot;opponents&quot;,&quot; $X = 30$</td>
<td>101</td>
</tr>
<tr>
<td>$Y(4)j2 = 1,200 \times (\log(50 \times 30 + 7,000) - \log(7,000))$</td>
<td></td>
</tr>
<tr>
<td>5) 54% of appearing empowered for clearing leadership crisis derived from Kim Jong-Il's getting worse health problem, $X = 100$</td>
<td>281</td>
</tr>
<tr>
<td>$Y(5)j2 = 1,200 \times (\log(50 \times 100 + 7,000) - \log(7,000))$</td>
<td></td>
</tr>
</tbody>
</table>

$EU(j2) = 0.01 \times -653 + 0.05 \times -361 + 0.15 \times -126 + 0.25 \times 101 + 0.54 \times 281 = 133$
During this period, North Korean leadership might have thought the likelihood of US preemptive attacks is low because the US military was really in a "quagmire" in Afghanistan and Iraq. At best, diplomatic isolation and economic sanctions seemed to be the only penalty they could face. Under this circumstance, they might have surely thought this escalation could make its regime appear empowered enough to eliminate the regime crisis derived from the "Dear Leader's" getting worse health problem and ensuing power succession to his inexperienced son. These arguments are described in the previous qualitative analysis and used to specify probabilities and values of each outcome above.

<table>
<thead>
<tr>
<th>Expected outcomes in case of NK's dismantling its nuclear programs (j3)</th>
<th>Y(i)j3</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) 10% of keeping its regime afloat for a long period with foreign aid, X = 100</td>
<td>Y(1)j3 = 1,200*(log(50*100 + 7,000)-log(7,000)) = 281</td>
</tr>
<tr>
<td>2) 20% of keeping its regime afloat for a short period with foreign aid, X = -50</td>
<td>Y(2)j3 = 1,200*(log(50*-50 + 7,000)-log(7,000)) = -230</td>
</tr>
<tr>
<td>3) 70% of causing a sudden regime collapse, X = -100</td>
<td>Y(3)j3 = 1,200*(log(50*-100 + 7,000)-log(7,000)) = -653</td>
</tr>
<tr>
<td>EU(j3) = 0.1<em>281 + 0.20</em>-230 +0.70*-653 = -475</td>
<td></td>
</tr>
</tbody>
</table>

To obtain a clear idea for specifying probabilities and values to each outcome, this dissertation is supposed to consider North Korean society by this time: 1) its aggressively-launched economic reform plan totally failed; 2) its leadership allowed ordinary people to run a private market and move around without permission to mitigate a horrific food crisis; 3) more and more people left their country toward China to search for food; and 4) under this unfavorable conditions, the tight security mechanism began to lose its strength. This dissertation also describes these arguments in the previous qualitative analysis.

According to this analysis made under the RCM, unlike the previous two cases, Pyongyang is supposed to adopt the option of escalation to maximize its expected utility:

- EU(SQ) = -39
- **EU(Escalation) = 133**
- EU(Cooperation by dismantling its nuclear programs) = -475

Unlike officially-known environments unfavorable toward North Korea by this time (e.g., food crisis, leadership crisis from Kim’s health condition, and economic crisis), North Korea seems to have had other assets with which they could maximize their strategic gains: 1) US involvement in Afghanistan and Iraq was getting worse; 2) Pyongyang’s two traditional patrons (China and Russia) was restoring their relations with the DPRK, thus able to block any sanction initiatives led by the US in the UN Security Council; and 3) by this time, North Korea obtained fissile materials enough to build nuclear warheads somewhere between 10 and 20 (for detail, refer to chapter 5) that they might have thought it was time to change their strategy from nuclear ambiguity to nuclear clarity in an attempt to be recognized a de-facto nuclear power and advertise their nuclear

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expertise to Third World countries, in particular, the Islamic Republic of Iran. That’s reason why the DPRK assigned so much value and high probability to the outcome of being empowered through nuclear escalation.

**Cognitive Choice Model**

Under this model, this dissertation uses the following equation to effectively reflect a key assumption that North Korea is assumed to be risk-averse (concave) in the domain of gain and risk-seeking (convex) in the domain of loss, known as the “S” curve, and individual’s loss-aversion bias is reflected by more steepness of curvature in the loss domain than gain domain (See Figure 3-2 in chapter 3):

\[
Y = 1,200*(\log(50*X+7,000) - \log(7,000)) \quad X \geq 0 \\
Y = -200*(\log(-20*X + 30) - \log(30)) \quad X < 0,
\]

Based on previous parameter and equation, this dissertation could calculate the expected utility of each option in North Korea’s second nuclear test under the rational choice model as follow (Table 4-16).

**Table 4-16: North Korea’s Expected Utility in its Second Nuclear Test under the CCM, 5/2009**

<table>
<thead>
<tr>
<th>North Korea's Reference Point (goal)</th>
<th>&quot;Regime Survival&quot; by being empowered through its second nuclear test</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parameter (current status quo value, X)</td>
<td>-20</td>
</tr>
<tr>
<td>The value of status quo in the CCM might be lower than the RCM because North Korean leadership could perceive greater seriousness in the domain of losses by leadership crisis during this crisis. As a result, this dissertation sets the status quo value as -20, 10 less than the RCM.</td>
<td></td>
</tr>
</tbody>
</table>

**risk-dependent equation under the CCM**

\[Y = 1,200*(\log(50*X+7,000) - \log(7,000)) \quad X \geq 0 \]
\[= -200*(\log(-20*X + 30) - \log(30)) \quad X < 0,\]

**Expected Utility of the Status Quo(j1)**

\[EU(SQ,j1) = -200*(\log(-20*-20 +30) - \log(30)) = -231\]

**Expected outcomes in case of NK's escalating(j2)**

<table>
<thead>
<tr>
<th>Expected outcomes in case of NK's escalating(j2)</th>
<th>Y(0)j2</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) RCM(1%) -- 0% of escalating to total war, X = -100</td>
<td>-366</td>
</tr>
<tr>
<td>[Y(1)j2 = -200*(\log(-20*-100 +30) - \log(30))]</td>
<td></td>
</tr>
<tr>
<td>2) RCM(5%) -- 5% of escalating to limited war (a US preemptive attack), X = -70</td>
<td>-336</td>
</tr>
<tr>
<td>[Y(2)j2 = -200*(\log(-20*-70 +30) - \log(30))]</td>
<td></td>
</tr>
</tbody>
</table>
Analyzing North Korea’s Decision-Making Process on its Nuclear Weapons Programs with the Rational Choice and Cognitive Choice Models

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3) RCM(15%) --> 10% of being diplomatically isolated and facing economic sanctions, $X = -30$

\[ Y(3)_{j2} = -200(\log(-20*30 +30) – \log(30)) \]

4) RCM(25%) --> 30% of getting economic and political concession from its "opponents", $X = 30$

\[ Y(4)_{j2} = 1,200(\log(50*30 + 7,000) – \log(7,000)) \]

5) RCM(54%) --> 55% of appearing empowered for clearing leadership crisis derived from Kim Jong-Il's getting worse health problem, $X = 100$

\[ Y(4)_{j2} = 1,200(\log(50*100 + 7,000) – \log(7,000)) \]

\[ EU(j2) = 0.00*\text{-264} +0.05*\text{-336} +0.10*\text{-264} +0.30*101+0.55*281 = 142 \]

Here this dissertation establishes weighted probability* of each outcome by differently specifying the numeric value depending on the size of subjective value of each outcome in an attempt to reflect cognitive biases of human-being (e.g., loss-aversion, endowment effect, and reference-dependence choice). Under those biases, a decision-maker is likely to avoid loss and defend its current assets. As a result, he would like to provide a higher probability to the outcome that could meet his current reference point or national goal.

* For simplicity and availability for this quasi-empirical analysis, this dissertation uses a rule of thumb to generate weighted probabilities to be used in the CCM, instead of the probability weighting function suggested by Kahneman and Tversky (1979). In general, the risk taking player discounts the probability of negative outcomes and overvalues the probability of positive outcomes due to the loss-aversion bias. Thus, $\text{Probability (CCM)} = 0.5 \times \text{Probability(RCM)}$ for outcomes where $EU(\text{outcome}) < EU(\text{status quo})$. The positive outcomes then absorb the remainder of the probability.

### Expected outcomes in case of NK's dismantling its nuclear programs (j3)

<table>
<thead>
<tr>
<th>Outcome</th>
<th>Y(j3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) 0% of keeping its regime afloat for a long period with foreign aid, $X = 100$</td>
<td>$Y(1)_{j3} = 1,200(\log(50*100 + 7,000) – \log(7,000))$</td>
</tr>
<tr>
<td>2) 10% of keeping its regime afloat for a short period with foreign aid, $X = -50$</td>
<td>$Y(2)_{j3} = -200(\log(-20*-50 +30) – \log(30))$</td>
</tr>
<tr>
<td>3) 90% of causing a sudden regime collapse, $X = -100$</td>
<td>$Y(3)_{j3} = -200(\log(-20*-100 +30) – \log(30))$</td>
</tr>
</tbody>
</table>

\[ EU(j3) = 0.00*281 + 0.10*-307 +0.90*-366 = -360 \]

In this case, this dissertation is supposed to reflect cognitive biases of North Korean leadership because they were getting framed with the domain of losses by this time. As a result, they are likely to provide a higher probability to the outcome that could lead its regime to a catastrophe so that they could have more resource in finding out alternatives to prevent this "end-game." These kinds of arguments are clearly explained in the preceding qualitative analysis.

Based on analytical results made by the cognitive choice model, this dissertation could identify that the option of escalating tensions would have been the best choice with which Pyongyang could maximize its expected utility by this time:

- $EU(\text{SQ}) = -231$
- $EU(\text{Escalation}) = 142$
- $EU(\text{Cooperation by dismantling its nuclear programs}) = -360$
In its second nuclear test (5/2009), Pyongyang exactly behaved the same way as the cognitive choice model suggests: 1) seeking to avoid potential losses by then leadership crisis derived from Kim Jong-Il’s getting worse health condition; 2) trying to evaluate all options vis-à-vis its then reference point; and 3) preferring the certain thing to probable one by improving and showing its nuclear expertise. These behaviors are consistent with the preceding qualitative analysis.

**Conclusion**

One of the most different observations, compared with previous cases, is that both the RCM and CCM are urging Pyongyang to adopt escalation not to minimize its expected utility, but to maximize in this second nuclear test. This is a little different analysis from the previous qualitative analysis where only the CCM recommended the North to escalate, while the RCM advised Pyongyang to maintain the Status Quo or cooperate with its enemies. What makes difference is North Korea’s perception on its Status Quo. In this quasi-empirical analysis, more weight was added to the point that Pyongyang was thinking its status quo is getting worse (unacceptable) and wanted to make itself appear empowered to escape then serious leadership crisis. On the other hand, the qualitative analysis assigned more emphasis to the international isolation and economic sanctions North Korea could have by its nuclear confrontation.

**4. Model Performance for Pyongyang’s Behaviors**

**CCM is more correct**

Given the North is in the deep domain of losses and its current reference point is to become a nuclear power, its choice of testing nuclear device and ballistic missiles would be well explained with the logic of the cognitive choice model: “an individual will likely be risk-averse when he is in the domain of gains, while aggressively risk acceptant if he is in the domain of losses even though the expected value of that choice is negative, but a small chance of returning to the previous status quo.”

**Certainty Effect Excludes All-Out War**
But the North will exclude the option-2 of waging a limited or all-out war from their options available because of the certainty effect, in which a risk-averse individual prefers a sure choice to a probable one, particularly in case the resulting outcome is catastrophic. Considering enormous power gap between North Korea and the ROK-US combined forces, in other words, it would be certain that the Kim’s regime will be defeated if the North would wage a war against the combined forces and that will surely lead to the end of its regime. Accordingly, Pyongyang will never take the most risky choice of waging a war, even though it is located in the deepest domain of losses, because of the certainty effect mentioned before.

**Discussion**

According to actual North Korean behaviors in this crisis, those two arguments appear to be easily validated. Unlike the previous crises, for instance, extensive interactions between opponents have not been observed. In fact, the relations between Pyongyang and Washington could not be friendlier than any other period in 8 years of the Bush presidency. All of sudden, however, Pyongyang stepped up its escalation ladder to its highest level it could do without any consideration on the logic of the rational choice model—searching extensively for options, updating its preferences, and adjusting strategies in light of new information from opponents. Instead, Pyongyang maintained the consistent and fixed strategy of conducting a nuclear test in an effort to become a practical nuclear power during this crisis. This behavior could not be well explained with the logic of the rational choice model, but could be well described with the arguments of the cognitive choice model: “North Korea will evaluate options vis-à-vis its new reference point of becoming a nuclear power and ignore other pertinent information about its choice problem.”

In sum, one could well explain Pyongyang’s a series of current provocations with the logic of the cognitive choice model, in which an actor’s domain and its psychological framing effect put a significant impact on its choice of options. Combining Pyongyang’s actual course of actions and theoretical arguments by two suggested decision models, therefore, two hypotheses set for Pyongyang’s decision-making process on its nuclear program could be proved in this case.
Summary and Policy Implications

Cognitive Choice Model is Strongly Predictive

Combining North Korea’s actual course of actions in four crises regarding its nuclear program, it seems evident that Pyongyang has chosen one of two choice models in its strategic choice problem depending on its action of domain—gains and losses—and reference point in an effort to maximize its strategic goal in each specific period. The DPRK was risk-averse in the domain of gains to keep its hardly-won benefits, for instance, while aggressively risk-acceptant in the domain of losses in an effort to avoid an additional loss and recoup its sunk-cost. When the Kim Jong-II regime was risk-averse, furthermore, the logic and argument of the rational choice model were visibly identified in its decision processes—adjusting its strategies and preferences in the face of new information and searching extensively for alternatives. On the other hand, Pyongyang followed key axioms of the cognitive choice model—displaying a strong bias toward risk-seeking strategies to avert losses relative to its reference point—when it was risk-acceptant. That is, it seems evident that a sign curve has best represented North Korean behaviors regarding its nuclear weapons program (See Figure 4-29).

Also, a host of key arguments in two choice modes was clearly tested through these case studies: 1) North Korea was surely in the domain of losses for the last two decades of nuclear confrontations; 2) the certainty effect or preference reversal was clearly identified in some cases; 3) both models are consistent with subjective value functions this dissertation suggests in the theoretical part; and 4) the CCM is more explanatory than the RCM when it comes to explaining a decision-maker in the domain of losses.

Consequently, this dissertation should obtain a significant implication for establishing effective/adaptive/robust deterrent measures vis-à-vis nuclear-armed North Korea in the future from the analyses made under the cognitive choice model. That is, the most effective way to deter Pyongyang is to deny its military objectives or goals through strengthening our defensive forces. That deterrence could be theoretically achieved by increasing the probability of Pyongyang’s failure in its military operations and the probability that North Korean leadership would surely have serious punishment once it violates the status quo.
That is exactly the same way that the ROK-US decision-makers adopted to effectively deter North Korea during North Korea’s First Nuclear Crisis (3/1993-19/1994): 1) augmenting missile defense systems to effectively deny Pyongyang’s ballistic missile threats; 2) strengthening intelligence systems to identify/detect/locate/track high-valued targets of North Korea in a real-time manner; and 3) deploying striking forces (e.g., F-15Es/F-117s/B-2s/B-52s), known as “decapitation means,” to strengthen our deterrence capability.

Implication: Rational Deterrence Likely to be Ineffective

Accordingly, this dissertation could predict that North Korea would take risky choice when it is located in the deep domain of losses in the future. In this case, traditional deterrence strategy based on the rational choice theory does not seem quite effective in deterring Pyongyang because its decision would not be largely influenced by such a rational process as calculating costs and benefits of options—the key assumption for applying the rational choice model. Also, Pyongyang is now predominated with the “seized mentality” that they have nothing to lose. Under this mind-sets framed with the loss-aversion bias, the calculation of expected benefit and cost for a certain option could no longer become a meaningful standard upon which an actor chooses a certain alternative. As a result, policy makers should establish a measure that could provide the certainty effect of Pyongyang’s sure failure in its provocation and catastrophic loss to the North when it is in the deep domain of losses in order to effectively disrupt and deter its provocation—a quite departure from the rational deterrence strategy focusing on retaliation by offensive forces.

Establishing effective deterrence

For example, measures that could completely deny the DPRK its strategic gains utilizing its asymmetric advantages\(^{150}\) while increasing its vulnerability should be

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\(^{150}\) According to military assessments, Pyongyang enjoys several strategic or asymmetric advantages on the Korean theater: 1) Seoul, the capital city of South Korea with holding more than 12 million populations, is located so close to DMZ that it is exposed to all kinds of threats, in particular long-range artillery pieces; 2) Pyongyang retains more than 500 ballistic missiles, capable of carrying a various types of warheads (e.g., chemical, biological, and nuclear); 3) North Korea has maintained more than 100,000 special operation forces to be used to wage a second front warfare in the rear areas of South Korea; and 4) general topology of North Korean territory is so rugged and mountainous that it is difficult to locate and attack key military assets.
established. Unlike the previous deterrence measures, mainly composed of offensive capabilities, a combination of defensive and offensive options would maximize its deterrent effect against the current North Korean regime extremely obsessed with the “deep domain of losses” or the “seized mentality.” Among them are to deploy reliable missile defense systems for neutralizing Pyongyang’s ballistic missile threats, develop highly coordinated concepts of operations for countering its long-range artillery pieces deployed near DMZ, augment a variety of advanced equipment for countering the infiltrations of North Korea’s special operation forces, and establish a more flexible and credible nuclear doctrine in an effort to provide Pyongyang with the clear message that the combined forces’ nuclear options are highly employable under any circumstance. In the subsequent chapter, more detailed measures would be explored.
North Korea always adopted risky choices (nuclear provocations) when its subjective value function was in the deep domain of losses, while risk-free choices (dialogues and negotiations) when it was in the domain of gains.

Figure 4-29: Changes in North Korea’s Subjective Value Function and its Nuclear Provocations, 1990-2009

* North Korea’s First Nuclear Crisis (5/1994)
* North Korea’s Second Nuclear Crisis (10/2002)
North Korea’s Second Nuclear Test (5/2009)
North Korea’s First Nuclear Test (10/2006)
Intensive financial sanctions against North Korean commercial bank accounts in Macau (9/2005)
Leadership crisis due to Kim Jong-II’s serious health condition and the inauguration of conservative Lee administration in the South (2008)

* Summit Talks between two Koreas (6/2000)
The collapse of the Soviet Unions and South Korea’s diplomatic ties with Russia and China (early 1990s)
The inauguration of the Bush Administration and the 9/11 terrorist attacks on the US (early 2000s)
US military quagmire in Iraq and Afghanistan and a partial economic recovery (2005-2006)
Bush administration’s policy change toward North Korea from the “CVID” to engagement (2007-2008)
North Korea’s Asymmetric Assets and Coercive Strategies

Pyongyang’s Military Assets

Military Strategy to counter North Korea—Coercive Strategies

- Punishment Strategy
- Decapitation Strategy
- Denial Strategy
- Risk Strategy
Chapter 5: North Korea’s Asymmetric Assets and Coercive Strategies for the ROK-US Combined Forces

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Figure 4-13: Escalation Ladders between the US and DPRK, 1/2001-8/2003
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“Hence that general is skillful in attack whose opponent does not know what to defend; and he is skillful in defense whose opponent does not know what to attack.”

Chapter 6 (Weak Points and Strong) in the Art of War, Sun Tzu

Introduction

Section 1 will revisit North Korea’s decision-making processes, with an eye toward predicting future behavior, and taking deterrence measures against it. Section 2 will survey North Korea’s military assets, particularly the “asymmetric” assets it possesses and the consequent strategy options those assets provide. Section 3 discusses coercive strategy, covering theory, requirements for success, and specific types of strategies that could be employed against North Korea.

1. Revisiting North Korea’s Decision-Making Processes

In sum, North Korea’s behaviors regarding its nuclear weapons program seem to have varied dramatically from rational choice to cognitive choice model, depending on its domain of a strategic status and reference points. Therefore, the first step to effectively deal with North Korea should be to identify its domain and reference point, just as this research did in the previous chapter, and then seek to identify Pyongyang’s asymmetric assets with which it could wield its escalatory actions against the ROK-US combined forces. Based on those analyses of North Korea’s asymmetric assets and potential provocative scenarios, a new framework could be explored in an effort to establish adaptive/robust/effective deterrence measures against North Korea. In that process, two hypotheses regarding North Korea’s behaviors should be seriously considered:

**Hypothesis 1:** North Korea would take risk-averse behaviors in its nuclear weapons programs when it is in the domain of gains, while risk-seeking behaviors when it is in the domain of losses.

**Hypothesis 2:** North Korea might take a risk-averse action when the chance of success is extremely low and the ensuing result is catastrophic to its regime, even though it is in the domain of losses.
As discussed in the previous chapter, the DPRK appears to have alternately used two decision-making models—rational choice and cognitive choice—depending on whether its status was in the domain of gains or losses. North Korea’s status appears to have been in the domain of losses as a whole since the end of the Cold War. However, the key standard for identifying North Korea’s decision-making domain should be its current status relative to the previous stage, rather than its absolute or general net status.

Case 1 Revisited
According to this standard, Pyongyang seems to have been in the domain of losses during the first nuclear crisis (1993-1994). The collapse of the Soviet Union brought an end to the DPRK’s security alliance, stopped massive inflows of economic aid, and, overall, resulted in an abrupt and staggering loss of status as a nation. The remaining three key nuclear-related provocations (the second nuclear crisis in October 2002, the first nuclear test in October 2006, and the second nuclear test in May 2009) appear to have occurred when the DPRK found itself with either the same or slightly improved status as compared to 1994. Internal security, one of the key factors influencing North Korea’s perception on its domain of action, appears to have continually strengthened after Pyongyang successfully overcame the first nuclear crisis.151

As analyzed in the previous case study, North Korea appeared to be in the domain of growing losses during the first nuclear crisis in 1993-1994. Throughout this crisis, the DPRK undertook risky and desperate choices in the hope that this behavior would prevent further losses and show its resoluteness and intransigence to other parties involved, thus causing them to back down. The steps they took during this period included proclaiming to withdraw from the NPT regime, reloading nuclear fuels into a

151 After successfully overcoming the severe food shortage of 1995-96, the Kim Jong-Il regime managed to restore confidence in its resilience. This was accomplished by undertaking a host of initiatives in early 1998: revising the constitution, re-instituting Kim Jong-Il as chairman of the National Defense Committee, and reshuffling party and military elites loyal to ‘Dear Leader’ Kim Jong-Il. With these kinds of momentum, the DPRK has conducted aggressive diplomatic overtures since early 2000, resulting in a historic summit talk with the president of its arch-rival, Kim Dae-Jung of South Korea, and realizing diplomatic ties with several European countries, including Italy. For North Korea’s changes in internal and external status since the end of Cold War, see Mazarr, op.cit., North Korea and The Bomb; Scott Snyder, China’s Rise and The Two Koreas: Politics, Economics, and Security (Lynne Rienner: Boulder, London, 2009); Samuel S. Kim, North Korean foreign relations in the post-Cold War world (Strategic Studies Institute, US Army War College, 2007); and Victor D. Cha and David C. Kang, Nuclear North Korea: A Debate On Engagement Strategies (Columbia University Press: New York, 2003), 41-69.
controversial experimental reactor and threatening to reprocess the spent fuel rods. This provocative defiance, which might have led North Korea to an all-out war with the ‘formidable’ ROK-US combined forces, appeared to be a type of ‘lashing out’ behavior under its rapidly deteriorating domain of losses.\footnote{For North Korea’s escalatory moves during the first nuclear crisis, see Mazarr, \textit{op.cit., North Korea and The Bomb}, 101-123 and “Going Just a Little Nuclear: Nonproliferation Lessons from North Korea”; Mack, \textit{op.cit., “The Nuclear Crisis on the Korean Peninsula”}; and Snyder, \textit{op.cit., “North Korea’s Nuclear Program: The Role of Incentives in Preventing Deadly Conflict.”}}

Given the balance of power, which was heavily tilted toward the ROK-US side, an all-out war would have been a worst-case scenario for Pyongyang and thus not a rational choice for meeting its reference point of regime survival. Therefore, this could be construed as an act for preventing further losses and realizing its hope of returning to the previous status quo, which is a key argument derived from prospect theory upon which the cognitive choice model in this dissertation is based. Furthermore, North Korea’s last minute concession to reach the Agreed Framework (AF) with the United States appears to be an indication of prospect theory’s validity: “a national decision-maker would likely take a risk-averse choice even in the domain of losses when its risky choice will surely lead to a catastrophic outcome and its probability is certain to sure.”\footnote{In general, an individual decision-maker in the domain of losses is likely to be risk-seeking. But this kind of risk propensity does not always occur if he or she perceives the consequence of a certain outcome to be catastrophic and the probability of that outcome to be near 1.0 (Sure). For detailed accounts on the “certainty effect” in prospect theory, see Jack S. Levy, “Prospect theory and International Relations: Theoretical Applications and Analytical Problems,” \textit{Political Psychology}, Vol.13, No.2, (June, 1992), 303; “Loss Aversion, Framing, and Bargaining: The Implications of Prospect theory for International Conflict,” \textit{International Political Science Review}, Vol.17, No.2, (April, 1996), 185; and “Prospect theory, Rational Choice, and International Relations,” \textit{International Studies Quarterly}, Vol. 41, No.1, (March, 1997), 91-92.}

Case 2 Revisited

Pyongyang appears to have clearly recognized two significant changes in US military and foreign policies since the 9/11 terrorist attacks: the Nuclear Policy Review (NPR) of December 2001 and the “Operation Iraqi Freedom (OIF)” in early 2003. First, Pyongyang seems to have felt serious security threats from the possibility of a US nuclear attack on its nuclear facilities as the Bush administration provided much more operational flexibilities in operating nuclear weapons with its military through the NPR than those of the Cold War era. The NPR officially incorporated nuclear pre-emptive attacks against both terrorist organizations and ‘rogue’ states sponsoring and harboring terrorists into
official US military doctrines and strategies. The Bush administration’s state of Union address in January 2002, where North Korea was included to the list of an “axis of evil,” further exacerbated Pyongyang’s security concern because those countries are subjects to be eliminated, not partners to be negotiated. Secondly, the “OIF” was a clear message that the US will continue to go forward with its new military strategy that emphasized pre-emptive attacks against ‘rogue’ states by employing its unparalleled conventional military forces to change the regimes.\footnote{A dramatic change in US military doctrine since the September 11 terrorist attacks in 2001 was to replace traditional deterrence strategy with a pre-emptive one using all kinds of means, including low-yield nuclear weapons. This new approach has reflected the difficulties inherent in deterring terrorist organizations and regional adversaries: lack of information on high-value targets, difficulty in tracking mobile targets, and rogue states’ different value system relative to a normal state, thus insulating themselves from the ordeal of ordinary people derived from the sanctions by the international community. For detailed accounts on a new national security doctrine of the Bush Administration, see George W. Bush, \textit{The National Security Strategy of the United States of America} (Washington, D.C.: Executive Office of the President, 2002a); \textit{National Strategy to Combat Weapons of Mass Destruction} (Washington, D.C.: The White House, 2002b).}

Faced with these two changes in US policy, the DPRK, in order to more surely guarantee its survival and security, appears to have changed its reference point from regime survival to practically becoming a nuclear power. Since then, North Korea’s behavior seems to have been determined by whether a given policy can satisfy this reference point or not. The following risky choices after the second nuclear crisis seem to have validated that argument: 1) expelling IAEA inspectors from the Yeong-byeon nuclear complex in December 2002; 2) removing monitoring cameras and seals on nuclear facilities in early January 2003; 3) proclaiming to withdraw from the NPT regime again in early 2003; and 4) processing the 8,000 spent fuel rods in May of 2003.

These moves were so desperate that it seems impossible to explain North Korea’s those behaviors on the basis of the rational choice model emphasizing the optimization process. Given all factors influencing its perception of its domain were improving at the time, for instance, these risky and rapidly ‘lashing-out’ behaviors cannot be explained without relying on North Korea’s reference dependence-choice propensity: “a national leader framed with rapidly deteriorating losses is likely aggressively risk-acceptant in an effort to satisfy its reference point, though its general domain of action is improving.”\footnote{In expected utility theory, the key determinant of decision-making is the net expected utility, while in prospect theory the key determinant is whether the outcome is perceived as a gain or loss relative to a reference point. This reference-dependent decision, coupled with the “framing effect,” creates a unique}
Cases 3 and 4 Revisited

In the following two highly-charged nuclear provocations—the first nuclear test in October in 2006 and the second nuclear test in May 2009—Pyongyang seemed to follow the same decision-making process as the previous one for satisfying its newly established reference point—becoming a nuclear power. Given a nuclear test is the last stage toward becoming a nuclear power, those behaviors were interpreted as crossing the ‘red-line’ the United States and its allies had put forward. Despite a variety of threats from the international community, North Korea seems to have been ready to confront harsh sanctions for satisfying its national goal and undertaken a ‘fait accompli’ strategy by frequently proclaiming that it had already become a nuclear power. Alternatively, some analysts say it could be interpreted as a rational behavior on the part of North Korea to maximize its utility by exploiting difficulties the United States and South Korea faced at the time. These included expanding US involvement in Iraq and increasing casualties in 2006, the growing rift between the Bush administration and then the progressive Roh Moo-Hyun’s government in Seoul upon North Korean policy, and the Obama administration’s lack of political capital on punishing North Korea’s nuclear test due to its focus on economic recovery in the early 2009.


156 So far, the United Nations Security Council (UNSC) has passed two resolutions—1718 (2006) and 1874 (2009)—in an effort to sanction North Korea’s nuclear tests. The key contents of these resolutions were to urge all member states of the United Nations to stop trading nuclear and missile-related technologies and materials with Pyongyang. But the effectiveness of these sanctions appears uncertain due to the lack of initiative and cooperation on the parts of China and Russia—the two North Korea’s allies in the UNSC.

157 In the first half of 2005, Pyongyang sought to convince the international community that it had already obtained nuclear weapons by officially proclaiming its nuclear status through its state-run news agency and sending its diplomat to speak on a television news program in the United States. For detailed accounts, see the February 10th statement of the KCNA; “North Korea says it has nuclear weapons and rejects talks,” New York Times, Feb. 10; and “N. Korea Building Bombs, Its Envoy says,” Washington Post, July 5.

158 Shortly after his inauguration in early 2003, the ‘progressive’ Roh Moo-Hyun administration had to engage tough negotiations with the ‘hawkish’ Bush administration in an effort to establish a bilateral dialogue between Washington and Pyongyang, which had been vehemently opposed by key neo-conservative officials in the Bush administration for the past 10 months. Given the imminent invasion of Iraq by the United States, the Bush administration’s acceptance of a bilateral dialogue might have sent Saddam Hussein a signal that the threat of a US invasion was not credible. Thus, the new South Korean government failed to achieve its objective at that time, and its policy differences with the United States regarding North Korea continued to grow. For more details on the two allies’ confrontations regarding North Korea’s nuclear programs, see Mike Chinoy, MELT DOWN: The Inside Story of The North Korean Nuclear Crisis (St. Martin’s Press, New York, 2009), 161-162 and 176-178.
However, the possibility of backlash from its most important ally—China—should not be considered lightly on the part of North Korea, due to the significance of a nuclear ‘domino-effect’ involving Northeast Asian countries, including Taiwan. Given Pyongyang’s ever-growing reliance on China, the highly risky behavior daring to conduct a nuclear test could alienate the Chinese leadership so severely that it could plunge North Korea into a more unfavorable situation than it has anticipated. Despite this expected negative consequence of its nuclear test, Pyongyang chose such a ‘last-ditch’ maneuver in order to meet its reference point, though the possibility of success is extremely slim and there is a long way to go for becoming a practical nuclear power. As a result, these two nuclear tests could be well explained with key arguments of prospect theory: “a national leader framed with severe security threat (losses) is likely to follow the decision-making process buttressed by prospect theory rather than expected utility theory, in which loss aversion and reference dependent choice are prevailing factors over the cost-benefit analysis of each option.”159

2. North Korea’s Asymmetric Assets and Nuclear Scenarios

Overview

All of the DPRK’s asymmetric military assets fall into one of two categories: conventional military assets and Weapons of Mass Destruction (WMD). The DPRK steadily grew the former from the end of Korean War until the early 1990s, when it dramatically changed its emphasis on the structure and doctrine of conventional military forces. These changes in strategy were a response to the political and economic context at the time. The DPRK could no longer sustain its modernizing efforts in all sectors of the Korean People’s Army (KPA) with the loss of Soviet military aid in the aftermath of the Soviet Union’s collapse. Furthermore, the dramatic drop in foreign trade with ideological allies in Eastern Europe exasperated Pyongyang’s foreign reserve status, making it impossible for North Korea to go forward with its modernizing plan unilaterally. Given

these two constraints—the loss of key patrons and ensuing economic hardship—the KPA had to concentrate its scarce resources on building and strengthening asymmetric retaliatory assets in order to meet its strategic objective of “maintaining a strong deterrent power” against its arch-rival South Korea.¹⁶⁰

Asymmetric Assets

Conventional Assets

To maximize its strategic military objective of inflicting ‘unimaginable’ damage upon Seoul—the capital of South Korea—in an attempt to increase its credibility of deterrence against the ROK-US combined forces, Pyongyang appears to have chosen several options—expanding and hardening its long-range artillery/multiple launch rocket systems (MLRS), augmenting special operation forces and massing its offensive forces on the front line (See Figure 5-1).

The long-range artillery and multiple rocket launcher systems appear to be the most attractive to the KPA leadership in several respects: 1) well-protected deep underground shelters and mountain caves, thus being invulnerable to the ROK-US combined air power; 2) required a short preparation time (5-7 minutes), further making it harder for the CFC to detect and neutralize them before firing; 3) flexible in carrying all kinds of warheads (e.g., chemical, biological, and high-explosive); and 4) deployed close to the DMZ with massive amounts (estimated 13,000 pieces) that it seems impossible to intercept all these “bullets” once they are simultaneously fired.

This heavy artillery fire would be employed to quickly neutralize the combined forces’ defense line north of Seoul during an all-out war, but also exploited to effectively

¹⁶⁰ North Korea has begun strengthening its asymmetric military assets (e.g., special operation forces and Nuclear, Biological and Chemical weapons) to offset the ever growing conventional inferiority relative to the ROK-US combined forces since the early 1990s. For North Korea’s military build-up since the end of Cold War, see Daniel A. Pinkston, The North Korean Ballistic Missile Program (Strategic Studies Institute, US Army War College, 2008); Andrew Scobell, North Korea’s Military Threats: Pyongyang’s Conventional Forces, Weapons of Mass Destruction, and Ballistic Missiles (Strategic Studies Institute, US Army War College, 2007); and “ The Shifting Security Structure on the Korean Peninsula and the Nuclear Crisis,” The Strategic Balance in Northeast Asia (Korea Research Institute For Strategy, Seoul, Korea, 2003), 333-363.
intimidate Seoul, the capital city of South Korea, in an effort to maintain its deterrent power vis-à-vis the ROK-US combined forces during a peace time.¹⁶¹

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and its locations inside hardened underground shelters. According to several analyses by military experts, it would take 5-7 minutes for this weapons system to be operational, about 5 minutes to fire several rounds of shells, and additional 5 minutes to return to its hardened shelters. Thus, this weapons system requires less than 15 minutes in completing one round of a barrage strike. Another strategic problem confronting the ROK-US combine forces is the geographical location of Seoul and its satellite cities from the Demilitarized Zone (DMZ). Seoul is less than 30 miles from the DMZ, which means all parts of Seoul and some parts of satellite cities are well within the range of North Korea’s long-range and multiple rocket launching systems.

**Rapid Counterattack Crucial but Difficult**

Unlike a ballistic missile, it is technically difficult to track the incoming shells within such a short time of a minute. This makes intercepting shells before they land practically impossible. As a result, one of the most effective reactions to this threat is to quickly counter-target these sites with the combined forces’ precision/rapid counter artillery (Advanced Concept Technology Demonstration, ACTD)\textsuperscript{162} after receiving ‘some round of shells.’ Still, even with a rapid counter-strike, the small amount of DPRK shells could inflict overwhelming damage to Seoul’s infrastructure and population, given the density of this huge metropolitan city. Furthermore, the locations of the bunkers holding these weapons systems are hidden behind high mountains or in narrow valleys, making them more difficult for the combined forces to detect, identify, track, and engage effectively.

**DPRK has invested in these because of their strategic advantages**

Considering North Korea’s perspective and the number of long-range artillery and multiple launch rocket systems they have, the KPA leadership appear to be well aware of the strategic advantages these weapons systems provide and they would likely hope to exploit the problems these systems cause for the ROK-US combined forces. That is,

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\textsuperscript{162} Conventional weapons (‘dumb’ bomb) are difficult to precisely destroy long-range artillery pieces placed in deep underground shelters. As a result, the ROK-US combined forces have been working on this problem for years, and the Precision/Rapid Counter-Multiple Rocket Launch [CMRL] ACTD was deployed North of Seoul in 1996-97. This system reportedly demonstrated an adverse weather, day/night, end-to-end, sensor-to-shooter, precision deep strike capability, capable of neutralizing the threat posed by the 240mm Multiple Launch Rocket Systems (MLRS) and 170mm Self-propelled (SP) Guns deployed just north of the Demilitarized Zone (DMZ) in North Korea. For detailed accounts regarding anti-artillery systems, refer to the following web-site: \url{http://www.globalsecurity.org/intell/systems/jpsd.htm}.
according to the ROK-US intelligence communities, North Korea is believed to have deployed more than 500 long-range artillery pieces (170 mm Koksan Gun) and 200-250 multiple launch rocket systems (120/240 mm) to underground bunkers close to the DMZ areas separating South and North Korea. A defense analyst at the RAND Corporation, Bruce W. Bennett, provided more accurate estimates of North Korea’s artillery fire powers using quantitative modeling—within 24 hours of hostility, the KPA Army could fire more than 200,000 rounds of artillery shells against the forward defense line of the combined forces and Seoul areas.

Obtaining measures to neutralize artillery is crucial for ROK-US

In short, Kim Jong-Il and his KPA leadership would like to maximize the strategic advantage derived from their long-range artillery and multiple launch rocket systems to offset the growing inferiority of their conventional weapons systems and to support their strategic goal of maintaining a strong deterrent power against the ROK-US combined forces by means of inflicting overwhelming damage to Seoul. Therefore, there should be a measure that could completely neutralize KPA’s artillery pieces before they are operational in order to effectively deny North Korea’s military objective with a series of new military operations aided by integration of a variety of intelligence platforms, just as will be explored in the next chapter.

Special Operations Forces

Original purpose: incite unrest in ROK

North Korea’s special operations forces (SOF) constitute another asymmetric asset, given its size and estimated scope of operations. Pyongyang has a long history of developing its SOF units. In early 1960s, Kim Il-Sung began expanding the size of SOF units and providing more resources and special missions to them after acknowledging that the national goal of reunifying the entire Korean peninsula under its own terms could

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164 North Korea would like to use its long-range artillery and multiple rocket systems in an effort to achieve its operational and strategic objectives. According to Bruce Bennett, North Korea’s artillery force is expected to impose significant damage to the combined defensive forces north of Seoul at the outset of hostility. For detailed analyses regarding the employment of North Korea’s artillery force, see Bruce Bennett, The Prospect for Conventional Conflict on the Korean Peninsula (Korea National Defense University, Seoul, Korea, 2009).
not be realized without ‘the armed support’ for inciting unrest in the South. At the time, South Korean society experienced a period of domestic political unrest. The stepping down and exiling of then authoritarian South Korean president Lee Sung-Man was followed by a series of national democratic movements and a military coup led by then army Major general Park Jeong-Hee. Pyongyang sought to use its SOF units to exploit this instability in the South during this unstable period.

**Change of focus to guerrilla warfare**
Initially, Kim Il-Sung believed that the nationwide uprising would end the “corrupt and imperial-dependent South Korean regime,” and yield favorable conditions, in which the North would only accept the offer of ‘capitulation’ by the revolutionary people’s parties in the South. “Unfortunately,” (for Pyongyang) this scenario was not realized. Instead its southern counterpart, Park Jeong-Hee, quickly stabilized the chaotic situations in the South through his unique controlling version of an ‘authoritarian regime’ and established a sound foundation for economic development. This provided a significant challenge to the Kim’s regime in the North since its political legitimacy was rapidly weakening due to the quick and ‘formidable’ economic success in the South. To reverse this unfavorable development on the peninsula, Kim Il-Sung sought to change his policy toward the South from supporting the uprising in the South to indirectly and aggressively resorting to armed conflicts in the form of guerrilla warfare. The small-scaled conflicts involving North Korea’s SOF units operating within South Korean territory represented this change of his strategy during the late 1960s. During this period, for instance, one of the well-trained North Korean SOF units crossed the highly-guarded DMZ areas and succeeded in reaching the Blue House, the South Korean presidential residence, in an attempt to assassinate President Park and his associates with barely any substantial obstacles.

**Continued expansion of SOF capabilities**
Although their assassination plan failed and invited unexpected negative consequence in the South in the form of anti-communist sentiment, Kim Il-Sung did not stop his efforts to expand the size and strength of its SOF units. Even when faced with serious economic hardships starting the mid-1980s, the DPRK continued to expand the size and equipment of its SOF units. For example, the KPA initiated its SOF operation with about 40,000 personnel in the early 1970s, continued its effort to reach total
manpower levels of around 80,000 personnel in the mid-1980s and finally established the world’s largest SOF units of more than 100,000 in the early 1990s.  

**SOF infiltration capabilities**

The KPA has also made a lot of efforts to procure a large amount of equipment for the infiltration operations of its SOF units for the last two decades. The key standard of selecting that equipment is to make it undetected by sophisticated radar systems of the ROK-US combined forces, while quickly transporting as many as SOF forces possible into the rear area of the South.

1) **Aircraft**

By this standard, An-2 (Colt) aircraft is considered one of the due to its flight characteristics. The An-2 has a cruise speed of less than 120kt, in some cases, 35kt, and it can fly at altitudes of less than 200ft. It has even been known to fly at 100 ft above some place of valleys. Under these flight conditions, even some of advanced fighter jets from the ROK-US combined forces—KF-16 and F-15K—are likely to have some problems in successfully engaging this aircraft in adverse weather condition, though they are equipped with some technologies to overcome these difficulties, including Ground Moving Target Indicator (GMTI). North Korea is believed to possess more than 300 these aircrafts, each capable of infiltrating 6-8 fully-armed commandos into rear areas of South Korea.

2) **Seaborne Vessels**

The second means for infiltrating SOF units is to employ sea-borne assets, such as air cushioned landing craft, small and fast-moving submerged vessels, and the “W-class” submarines—North Korean Navy ranks as the world’s largest fleet in this type of submarine (roughly 200).

3) **Underground Tunnels**

The final means for secretly sending SOF units is to employ underground tunnels crossing the DMZ. This method has been widely known to the public since the early 1970s, when the ROK military identified the first North Koran underground tunnel at the

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166 In addition to An-2, North Korea is believed to retain more than 300 helicopters for a transportation mission of its special operation forces. See details, *ibid.*, 56-57.
167 The North Korean Navy has a variety of amphibious lift aircraft to include about 135 Kong Bang (literally meaning “air bag”) class hovercrafts which can carry approximately 40 troops and travel at speeds of 40 knots, as well as over 100 other types of amphibious ships. For detailed accounts regarding the KPA’s sea-borne transportation means, see *ibid.*, p.35.
northwestern part of the DMZ, close to the expected main avenue of the North Korea’s offensive force. Since then, four underground tunnels have been identified and each is believed to be well utilized for rapid infiltration of massive ground forces into the rear areas of the ROK army’s first defense line (See Figure 5-2), called as “FEBA (Forward Edge of Battle Area)-A,” a concentric defense line 10NM South of the DMZ. Based on defector testimony, the ROK military estimates there could be as many as 20 more underground tunnels for this massive infiltration purpose.168

Figure 5-2: North Korea’s Tunnel Operations under the DMZ
Source: Author’s reconfiguration from the original169

Lessons learned from irregular warfare conflicts
With such large and well-equipped SOF units, the KPA is expected to conduct several key missions to meet its two military doctrines: “a combination of regular and irregular warfare and two-front people’s war.” North Korea has carefully observed several modern wars to iron out a military doctrine which would be best suited for the

Korean Theater. From the 1960-1970s’ Middle east wars involving Israel and neighboring Islamic countries, North Korea has learned the value of irregular warfare in the form of terrorist activities deep inside Israeli territory. The Vietnamese conflict during the 1964-1972 demonstrated the significance of the “people’s war.” In the latest warfare of the Gulf war in the 1992 and the Balkan conflict in 1999, the DPRK must have realized that a decisive, quick victory would be necessary to prevent US involvement in the future. Indeed, the hardened protection and separate displacement of its military assets are key elements to neutralize the sophisticated and lethal air power of the United States.

Likely SOF missions
Based on those lessons learned from recent wars and strategic considerations on the peninsula, the KPA is likely to employ its SOF units to conduct the following missions.170

1) Strategic Targets in ROK rear area
The first one is to conduct the interdiction, seizure, or control of strategic targets in the rear area of the ROK (e.g., air bases, naval bases, POL storages, logistics and transportation hubs, C4ISR compounds, and the high-valued national infrastructure such as nuclear power plants). This operation would be necessary to undermine or weaken the capability of the ROK-US combined forces, giving the DPRK the upper hand in pressing the combined forces to come to the negotiation table. It would be also helpful to significantly delay the US reinforcement to the peninsula by destroying the logistics networks in the South.

2) Terrorist Activities against US military compounds
Waging terrorist activities against U.S. military compounds would be another key mission for SOF units. Perceiving that US public opinion is highly sensitive to military casualties, as was evident in several recent wars, the DPRK is likely to exploit this “Achilles’ heel” by conducting terrorist activities against US military compounds located in the rear area of the ROK, thus maximizing the death toll of the U.S. forces. The last key SOF mission is likely to deliver its WMD assets deep inside South Korea and set off some of them to demonstrate its willingness and capability to inflict massive damage to the South. This strategy may serve to intimidate the ROK-US combined forces in the

170 Scobell and Sanford (2007), op.cit., 45-47.
hope that they would not to expand the scope of conflict and instead negotiate with the North.

**Massive Force Deployment toward the DMZ**

The last asymmetric advantage derived from North Korea’s conventional forces is about its disposition along the DMZ. Since the early 1980s, North Korea has been increasing the deployment of its forces between the DMZ and the area south of the Pyongyang-Wonsan line, with 40 percent of its total manpower in 1981 (720,000 personnel), 65 percent in 1998 (1.1 million personnel), and 70 percent as of 2007 (1.2 million personnel)—See Figure 5-3.

![Figure 5-3: Trends in North Korea’s Force Deployment toward the DMZ](Source: USFK Korea Story Brief, 2005)

*Figure 5-3: Trends in North Korea’s Force Deployment toward the DMZ*

Source: recited from the original, Scobell and Sanford (2007), *op.cit.*, 66.
Strategy Unclear

This asymmetric disposition of the forces is the subject of some debate on whether the KPA has an offensive or defense military doctrine. Most conservative military analysts argue that this military posture is an explicit sign that North Korean forces are pursuing an offensive doctrine, since there is no need for further reinforcement and the KPA could reduce the warning time under this disposition in case of initiating a war. By contrast, some progressive academics claim that this kind of highly dense placement of forces is not advantageous in achieving high mobility—a key element needed for offensive operations. Given the narrow avenue of North Korea’s potential invading routes into the South, this high concentration of its forces would have a tendency to trap the North Korean army within its own forces and rugged mountains, thus making itself more vulnerable to the ROK-US combined air powers. As a result, this posture would be best used to show that the KPA will quickly respond to any pre-emptive attacks by the ROK-US combined forces with massive firepower allocated in the front lines, showing its military power capable of imposing overwhelming damage to Seoul.

Strategic Advantages for the DPRK

Regardless of whether this posture is for offensive or defensive purposes, North Korea would certainly have asymmetric advantages in this posture because the ROK-US combined forces will surely face serious problems in managing operations facing this asymmetric posture. In the case of North Korea’s offensive operations, the combined forces do not have any reasonable warning time and buffer zone for mitigating damage posed by North Korea’s offensive threat. If this is defensive posture, it would be difficult for the ROK-US combined forces to conduct the pre-emptive attacks against North Korea’s strategic assets, including nuclear weapons, since they have to consider Pyongyang’s overwhelming retaliation, which would be quite possible given current military posture of North Korean army in the front line.

171 For accounts arguing North Korea’s military posture is offensive, see Bermudez, op.cit., pp. 3-5.
172 According to David Kang, the current disposition of North Korean military is best fitted for deterring the pre-emptive attacks by the ROK-US combined forces given its antiquated military equipment and high concentration of its forces on the areas south of Pyongyang-Wonsan line. For detailed accounts regarding the defensive nature of North Korean forces, see David C. Kang, “Threatening, but Deterrence Works,” Victor D. Cha and David C. Kang, eds., Nuclear North Korea: A Debate On Engagement Strategies (Columbia University Press, New York, 2003), 46-56.
Summary

In sum, North Korea appears to have pursued its strategic goal of maintaining a reliable deterrent through asymmetric means since the end of Cold War. Given the enormous gap in terms of conventional military and economic power between two opposing rivals, it seems to be quite rational for the DPRK to seek some asymmetric military advantages relative to the combined forces to meet its national goal of ‘regime survival’ by exploiting these asymmetric assets as a means for retaliation. Although each of these asymmetric assets has differing scope and lethality, there is one common standard: “How could it inflict maximum damage to the South to increase the credibility of its retaliation?” To support this doctrine, North Korea had to find assets capable of keeping the combined forces from neutralizing its asymmetric means. Among those satisfying this requirement are deploying long-range artillery and multiple rocket launching systems on the front lines, expanding the size and the lethality of SOF units, and concentrating its forces on the front lines.

Weapons of Mass Destruction (WMD)

Ballistic Missiles

Target: US forces in Japan

North Korea’s enormous efforts to expand the size and scope of its WMD assets would constitute another significant change in DPRK military strategy since the early 1990s. Even though all of Pyongyang’s WMD programs have a long history, the KPA did not display its deterrent power with these weapons until the 1990s. For instance, North Korea began increasing the range of its ballistic missiles in the early 1990s, presumably to threaten Japan (where roughly 100,000 US forces were based). Although all parts of South Korea were already within the range of North Korea’s short range ballistic missiles—the Hawsung-5/6 (300-500km)—in the late 1980s, Japan was outside the range of Pyongyang’s ballistic missile threat until the early 1990s. This significantly limited its deterrent power against “formidable” US forces in the region.\(^\text{173}\)

\(^{173}\) North Korea’s efforts to build ballistic missiles began in the late 1970s and early 1980s when reverse-engineering the “Scud” samples from Egypt had been a key method for Pyongyang’s missile development program. With limited foreign assistance from several “rogue” states in the Middle East and its traditional allies—China and the Soviet Union, the DPRK succeeded in developing the Hwasong-5 missile with a range of 320km in the mid-1980s and deployed it in the late 1980s. During the Five-year (1987-1992) missile development plan, Pyongyang began expanding its missile development programs to produce the
Hwasong-6 (a North Korean variant of Scud-c with a range of 500km) and the No-dong (a medium-range ballistic missile capable of striking Japan with a range of 1,000km). All these missiles were successfully developed and deployed with very limited flight tests in the early 1990s and have been foundation for developing the Paektusan-1/2 intercontinental ballistic missiles capable of hitting the western part of the continental United States with a range of 4,000-6,000km. For detailed accounts regarding North Korea’s ballistic missile development program, see Daniel A. Pinkston, *The North Korean Ballistic Missile Program* (Strategic Studies Institute, US Army War College, 2008), 14-37.
1993: First MRBM
Realizing the significance of US forces in Japan for potential conflicts on the peninsula, the DPRK needed the means to threaten these forces for effective deterrence. In 1993, Pyongyang successfully test-fired its first medium–range ballistic missile (1,000-1,500km), called as the “No-dong.” This test demonstrated the capability to attack anywhere in Japan, and its success became the foundation for developing intercontinental ballistic missiles to intimidate the United States.\(^{174}\) With the success of its Medium-Range Ballistic Missiles (MRBM), North Korea has continued to invest in ballistic missile programs, despite ever-growing economic hardship. This means that Pyongyang has put all its efforts into deterring the United States and Japan since the end of the Cold War.

1998: First ICBM
After several years of heavily investing in ballistic missile programs, the DPRK demonstrated its capability of launching its first intercontinental ballistic missile (ICBM) in August, 1998. Even though its first ICBM, called as the “Taepo-dong-I” (the “Paekdusan-I” in North Korean terminology), was not successful in showing the capability of an ICBM (i.e. range 2,000-3,500km), the demonstration was enough to motivate the United States to come the negotiation table. Stopping its missile program was North Korea’s ‘bargaining chip’ to exchange for economic concessions from the Clinton administration in September 1999. However, North Korea’s provocation has also produced an unintended negative development. Perceiving significant security threats from North Korea’s missile programs, Japan elected to participate in the joint missile defense program with the United States, providing strong momentum for the Bush administration’s ambitious “Missile Defense (MD)” program.

Japan partners with US for missile defense
Though North Korea intended to increase their ability to intimidate their neighbors, this string of events potentially reduced its deterrent capability in net. For instance, Donald Rumsfeld (then a member of US House), in the mid-1998, established

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\(^{174}\) The No-dong medium-range ballistic missile was first spotted in May 1990, but the test-flight at that time was failed. Despite the failure of the first test-flight, North Korean reportedly began a small-scaled production ever since. With financial support from Iran and Pakistan, Pyongyang conducted a successful test flight of the No-dong in May 1993. For detailed accounts regarding the No-dong missile program, see \textit{ibid.}, 17-19.
the so-called “Rumsfeld Commission” in the US House to examine the ballistic missiles threats to the United States in the coming 21st century. One month after releasing his report, he proved his assessment regarding North Korea’s missile threat to be right since Pyongyang tested its first intercontinental ballistic missiles on August 31, 1998, thus resulting in a Japanese official proclamation of its aggressive involvement in missile defense programs with the United States.

2006: ICBM capable of striking western United States
Despite several years of ups and downs in its negotiations with the United States, North Korea secretly continued its efforts to increase the range of its ballistic missiles and to master the technology equipping them with nuclear warheads. Once North Korea achieves Nuclear ICBM capability, they will (in their eyes) become a “real-world” nuclear power. Amid the growing tensions with the United States over its nuclear program, Pyongyang defiantly test-fired its second intercontinental ballistic missile, named as the “Taepo-dong-II,” in July 2006. North Korea was believed to have increased its capable range by establishing a three-state rocket system, theoretically making it possible to reach the western United States. The additional threat in this missile test was reinforced by North Korea’s first nuclear test in October 2006. These two events caused grave concern over whether the DPRK had the expertise to equip a missile with WMD materials, such as nuclear, chemical, and biological agents.

Summary: Ballistic missiles pursued as deterrent
In sum, North Korea’s behavior since the collapse of the communist blocs in the 1990s indicates that it believes the most effective deterrent against its enemies lies in increasing its ballistic missile capability. North Korea has already demonstrated its technology and deterrent value inherent in short and medium-range ballistic missile capability by exporting those weapons to Middle East nations, including Iran, during the 1980s. Since the early 1990s, additionally, North Korea has increased its efforts to develop long-range ballistic missiles so that it may threaten Japan and the United States (though it still has a long way to go, technologically speaking, before it can arm its missiles with nuclear warheads). Yet, Current capabilities still constitute a formidable
threat against South Korea and Japan when coupled with North Korea’s known chemical warfare capability (see Table 5-1).175

Table 5-1: North Korea’s Ballistic Missile Capabilities

<table>
<thead>
<tr>
<th>Type</th>
<th>Range (Km)</th>
<th>Payload (Kg)</th>
<th>Warhead</th>
<th>CEP* (Meters)</th>
<th>Launcher /Fuel</th>
<th>Target</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Long-Range</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Taepo-dong-II (Paekdusan2)</td>
<td>5,000-6,000</td>
<td>Unknown</td>
<td>Conventional Possible nuclear, biological, or chemical</td>
<td>Unknown</td>
<td>Fixed, Liquid Fuel</td>
<td>The United States</td>
<td>R&amp;D prototype testing</td>
</tr>
<tr>
<td>Taepo-dong-I (Paekdusan1)</td>
<td>2,200</td>
<td>Unknown</td>
<td>Conventional Possible nuclear, biological, or chemical</td>
<td>Unknown</td>
<td>Fixed, Liquid Fuel</td>
<td>Japan, Guam</td>
<td>Testing Deployed? Exported?</td>
</tr>
<tr>
<td>Medium-Range</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No-dong</td>
<td>1,000</td>
<td>700</td>
<td>Conventional Possible nuclear, biological, or chemical</td>
<td>2,000-4,000</td>
<td>Mobile Liquid Fuel</td>
<td>Japan</td>
<td>Deployed Exported</td>
</tr>
<tr>
<td>Scud-D</td>
<td>700</td>
<td>500</td>
<td>Conventional Possible nuclear, biological, or chemical</td>
<td>Unknown</td>
<td>Mobile Liquid Fuel</td>
<td>South Korea</td>
<td>Deployed Exported</td>
</tr>
<tr>
<td>Short-Range</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hwasong-6 (Scud-C)</td>
<td>500</td>
<td>700</td>
<td>Conventional Possible nuclear, biological, or chemical</td>
<td>2,000</td>
<td>Mobile Liquid Fuel</td>
<td>South Korea</td>
<td>Deployed Exported</td>
</tr>
<tr>
<td>Hwasong-5 (Scud-B)</td>
<td>300</td>
<td>1,000</td>
<td>Conventional Possible nuclear, biological, or chemical</td>
<td>800-1,000</td>
<td>Mobile Liquid Fuel</td>
<td>South Korea</td>
<td>Deployed</td>
</tr>
</tbody>
</table>


* CEP: Circular Error Probable

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175 According to various defense sources, North Korea retains a lot of delivery means for its chemical agents: artillery, multiple rocket launchers, FROGs, ballistic missiles, aircraft and naval vessels. Therefore, Pyongyang’s current ballistic capabilities combined with chemical agents are enough to maintain its deterrence power against South Korea and Japan. For North Korea’s chemical warfare and its infrastructure, see Pinkston, _op.cit._, 49-52; “North Korea: WMD Proliferation,” _Jane’s Intelligence Digest_ (December, 2003); and Sin Song-Taek, “North Korean Chemical Weapons Threat and Proposed Countermeasures,” National Defense Policy Research Report, Number 00-052 (Korea Institute of Defense Analysis, Seoul, Korea, 2000).
Chemical Weapons Program Origins

Like its nuclear program, the concept of chemical warfare has constituted another key part of the KPA military strategy since the end of Koran War. Shortly after reaching the Armistice agreement in 1953, the DPRK received chemical agents and technical assistance for producing chemical agents from the Soviet Union. Then, in the early 1960s, Pyongyang began to aggressively develop its chemical program. Faced with strong limitations in acquiring nuclear expertise from its two allies—the Soviet Unions and China—Pyongyang began seeking chemical agents in the early 1960s while simultaneously continuing its nuclear efforts.\(^{176}\) This emphasis on chemical weapons seems to have taken advantage of chemical weapons plants in North Korea that were abandoned by the Japanese after World War II. Building on these resources, North Korea was able to initiate its own chemical program despite its lack of scientific expertise in the early stages of that program.\(^{177}\)

**Further expansion and development**

Throughout the 1970s and 1980s, North Korea expanded its chemical warfare capability, developed a variety of means for delivering them, and established specified military strategies to maximize the threat of chemical warfare in the Korean War Theater. North Korea possessed a variety of basic chemical agents—phosgene (choking), hydrogen cyanide (blood), mustard (blister), and sarin (nerve agent)—as of November 2009 (See Table 5-2).

<table>
<thead>
<tr>
<th>Type of CW</th>
<th>Agent</th>
<th>Potential for Mass Casualties</th>
<th>Effects Onset</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Choking</td>
<td>Phosgene, Chlorine</td>
<td>Low</td>
<td>Seconds-Hours</td>
<td>Unknown</td>
</tr>
<tr>
<td>Blister</td>
<td>Mustard, Lewisite</td>
<td>Medium</td>
<td>Hours-Days</td>
<td>Mustard-Storage/Deployed</td>
</tr>
</tbody>
</table>

\(^{176}\) It was the Soviet Union that had transferred the basic sources of chemical warfare to Pyongyang since the end of Korean War in 1953. Faced with the imminent tasks of reconstructing its devastating economy during the Korean War in the late 1950s, however, Pyongyang began its aggressive initiative for developing chemical warfare capability in 1961 through Kim Il-Song’s “Declaration for Chemicalization.” For North Korea’s background history for its chemical warfare capability, refer to the following website: [http://www.nti.org/e_research/profiles/NK/Chemical/index.html](http://www.nti.org/e_research/profiles/NK/Chemical/index.html).

\(^{177}\) During Japanese colonial rule on the Korean peninsula, a lot of chemical infrastructure was built on the North Korean territory in an effort to support the invasion of China by the Japanese imperial army. After Japanese withdrawal, those factories remained intact and were delivered to a newly established North Korean regime by the Soviet Union. For the initial cooperation of North Korea’s chemical warfare capability between Pyongyang and Moscow, see the following website: [http://www.globalsecurity.org/wmd/world/dprk/cw.htm](http://www.globalsecurity.org/wmd/world/dprk/cw.htm).
Chapter 5: North Korea’s Asymmetric Assets and Coercive Strategies

As for quantity, the DPRK is ranked the world’s largest producer with stockpiles on the order of 2,500-5,000 metric tons of chemical agents. During wartime, it could increase production capacity to about 12,000 tons. For its delivery means, North Korea has developed several options: long-range artillery (122 and 170 mm), multiple rocket launchers (120 and 240 mm), short-range missiles (FORG-5/7), Scud-B/C ballistic missiles, aircraft, naval vessels, and unconventional delivery by its SOF units.

Civilian population prepared for chemical warfare

Considering the fact that the KPA has trained regularly since the mid-1980s in the areas of nuclear and chemical warfare across all sectors of society (including even the civilian population), the KPA seems to consider chemical warfare as a part of regular military operations. According to testimony from North Korean defectors, Pyongyang has already distributed protective equipment and decontamination devices to even its civilian population and required a regular chemical warfare drill in every military exercise.

Chemical Weapon Offensive Strategy

The KPA’s military doctrine of “a combination of regular and irregular warfare and two-front people’s war,” heavily relies on chemical warfare capability.

Phase 1

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179 Ibid., 49, 53, and 56.
180 For North Korea’s chemical warfare drills, refer to ibid., 56 and the following website: http://www.globalsecurity.org/wmd/world/dprk/cw.htm.
At the outset of its first offensive phase\textsuperscript{181}, North Korea needs a decisive and rapid penetration into the frontlines where the ROK-US defensive forces are strong enough to resist North Korea’s initial offensive blow with their superior air power. Without neutralizing the opposition’s air power at the outset of invasion, North Korea’s penetration would be impossible or, at the very least, take longer than anticipated. Any delay would provide more time for rapid US reinforcement. Facing this scenario, North Korea would likely launch its non-persistent chemical agents against the ROK-US defensive forces to limit their response and achieve quick penetration in the frontlines.\textsuperscript{182}

**Phase 2**
At the second phase of its offensive invasion, the DPRK also would utilize its chemical warfare capability in defense of its flanks and to delay US rapid reinforcement. For instance, the KPA would likely defend its wide flanks (which would be created in the process of a rapid penetration) by planting persistent chemical agents on its flank defensive lines. In the event that the KPA successfully penetrates the combined forces’ defense-line and surrounds Seoul, North Korea would then need to delay US reinforcement as much as possible. To conduct this mission, persistent chemical agents could be used to attack the logistics facilities of the combined forces—airbases, ports, and transportation nods in rear areas—which would significantly delay their reinforcement efforts and inflict massive US casualties—a key negative element that may also help to influence US domestic opinion in an advantageous way.\textsuperscript{183}

**Phase 3**

\textsuperscript{181} According to several analyses by military experts, the KPA’s offensive plan against South Korea is composed of three phases. The objective of the first phase is to breach the DMZ and destroy forward Combined Forces Command (CFC) defenders. In the second phase, North Korean Forces will attempt to isolate Seoul and consolidate their gains. The third phase is to be the pursuit and destruction of remaining CFC Forces and the occupation of the peninsula. For detailed accounts about North Korea’s war scenarios, see Colin Robinson and Stephen H. Baker, *Stand–Off with North Korea: War Scenarios and Consequences* at [http://www.ciaonet.org/wps/roc09/roc09.pdf](http://www.ciaonet.org/wps/roc09/roc09.pdf); Chung Min Lee, *Rethinking future paths on the Korean Peninsula* (Yonsei University: Seoul, Korea, 2002), 17-22 at [http://www.ceri-sciencespo.com/archive/jan03/artcm1.pdf](http://www.ceri-sciencespo.com/archive/jan03/artcm1.pdf); and Jonathan D. Pollack and Chung Min Lee, *Preparing for Korean Unification: Scenarios and Implications* (RAND: The Arroyo Center, Santa Monica, CA, 1999), 67-70.

\textsuperscript{182} "North Korea's Chemical and Biological Weapons (CBW) Program," *op.cit.*, 56.

\textsuperscript{183} In its second phase of offensive, North Korea would employ its persistent chemical agents to defend its flank sides produced in the process of rapid penetration and to neutralize the high-valued fixed targets in the rear areas in an effort to delay reinforcement efforts of the combined forces. For detailed accounts regarding North Korea’s use of persistent chemical agent, refer to the following website: [http://www.globalsecurity.org/wmd/world/dprk/cw.htm](http://www.globalsecurity.org/wmd/world/dprk/cw.htm).
In the last phase of this hypothetical North Korean offensive plan, the chemical warfare capability would be useful for retaliation. After occupying Seoul, North Korea would likely offer a ceasefire to consolidate its strategic gains. Such a ceasefire would be a rational decision (i.e. one that maximizes the expected net benefit), given both North Korea’s lack of resources and the coming reinforcement from the United States. In the process of ceasefire negotiations, the KPA could threaten to launch its “No-dong” MRBMs armed with chemical agents against US airbases and ports in Japan or Japanese cities in an effort to sever the close alliance between Japan and the United States. Also, the threat of chemical weapons would be a useful (and credible) deterrent against the ROK military from this point on.

**Summary: DPRK’s Strategic Advantages of Chemical Weapons**

In sum, the KPA’s chemical capability provides another strong asymmetric asset to Pyongyang given its size and concept of operations. Across any level of operations, this chemical capability has enormous potential to maximize the impact of a surprise attack, and it is capable of killing many military personnel in a short time period without being detected. For instance, if non-persistent chemical agents were used against the forward-deployed combined forces, the KPA could quickly penetrate the strong combined defensive line. Such an attack would also reduce counterattack momentum because it would force the ROK-US combined forces to wear heavy protective gear. If persistent chemical weapons were employed against fixed targets (e.g., airbases, ports, C4ISR facilities, and logistics hubs), on the other hand, the DPRK could enjoy strategic gains in the form of significantly delaying the reinforcement efforts of the United States.

Strategically, this capability could provide several advantages to the DPRK. By threatening to target major cities in both South Korea and Japan, Pyongyang may be able to sever the strong alliance relationships among three nations of the ROK, the United States and Japan. This “blackmail” would also provide a strong deterrent to North Korea when it wants to keep the combined forces from crossing the DMZ in an effort to decapitate the Kim’s regime once its offensive operation failed.
Nuclear Weapons

**ROK-US strategy must assume DPRK possesses nuclear capability**

There has been a great deal of debate regarding the intentions behind North Korea’s nuclear program and possible ways to obstruct its progress, including the possibility of surgical strikes in 1994. Through two nuclear crises (1994 and 2002) and two underground nuclear tests (2006 and 2009), however, Pyongyang appears to have undertaken a strategy of *fait accompli* by several formal statements that it had already made nuclear weapons since the second nuclear crisis in October 2002.\(^{184}\) Therefore, it is no longer realistic to attempt to prevent North Korea from developing nuclear weapons. Instead, it is necessary to acknowledge that little can be done about Pyongyang having enough fissile materials for nuclear weapons and the technology for mating them with ballistic missiles. Under that acknowledgement, it would be easier to begin a new framework, in which nuclear arsenals are treated as an asymmetric asset and potential employment scenarios are analyzed on the Korean peninsula.

**Strategic advantages despite incomplete development**

In absolute terms, North Korea is far from becoming a nuclear power. Still, Pyongyang must continue testing its nuclear devices for developing a reliable trigger, increase the amount of fissile materials for increasing the number of warheads, master its warhead technology to fit them on the top of the ballistic missiles, and increase the accuracy of its ballistic missiles. Still, North Korea’s current level of nuclear technology may be enough to constitute an asymmetric asset, useful in meeting its strategic objectives for three reasons.

1) **“Crude” nuclear devices**

The most important reason is that the DPRK could exploit its current asymmetric advantages mentioned earlier to effectively employ its (admittedly “crude”) nuclear devices. For instance, the KPA could use their professional SOF units and equipment to

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\(^{184}\) Amid growing pressure from the re-elected Bush administration in early 2005, North Korea for the first time proclaimed that “it has manufactured nuclear weapons for self-defense” in its Foreign Ministry statement on February 10, 2005. One month later, Pyongyang released an official statement saying that “Now that the DPRK has become a full-fledged nuclear weapons state, the Six-Party Talks should be disarmament talks where the participating countries negotiate the issues on an equal footing.” For further details, refer to [North Korea: A Chronology of Events in 2005](https://crs.congress.gov/product/pdf/RL/RL32339), Congressional Research Service (April 24, 2006).
deliver “crude nuclear devices” into the rear areas of the South to overcome the technical difficulties regarding its ballistic missiles and a nuclear warhead trigger.\textsuperscript{185}

2) North Korean population more prepared for nuclear war
Another reason that North Korea’s current level of technology is useful is the difference in the level of preparedness for nuclear war and absorbing damage between the DPRK and the ROK-US combined forces. According to intelligence from the ROK and US governments, there are more than 10,000 underground bunkers and a myriad number of shelters across North Korean territory. Since the early 1980s, Pyongyang has made a NBC (Nuclear, Biological, and Chemical) drill standard in its all military exercises and even the civilian population has received protective suits and decontamination kits in preparation for such scenarios. In addition, North Korea has instructed its military and civilian population that “the future war on the peninsula would be surely a nuclear war and all preparations should be completed to survive this nuclear war.”

On the other hand, the South Korean worldview is totally different. According to a national poll, nuclear war on the peninsula seems to be unthinkable and so devastating that it is technically impossible to prepare for that conflict. Furthermore, a large portion of the young generation in the South believes that North Korea’s nuclear weapons are not aimed at Seoul. Instead, they think that North Korea would keep the weapons as a mere deterrent in pursuit of Pyongyang’s survival, since the historic summit meeting between two Koreas in 2000.\textsuperscript{186} As a result, there has been growing difference in perception and preparedness of a nuclear war between two rivals.

3) Useful as a bargaining chip

\textsuperscript{185} Several defense analysts, including Dr. Bruce Bennett in RAND Corporation, argue that North Korea may employ a number of older nuclear devices that are not deliverable by ballistic missiles. For instance, the KPA could place a truck with a nuclear device and detonate it remotely in the forward area where the ROK-US combined forces might advance in an effort to conduct a counter-offensive against North Korea. For detailed accounts regarding North Korea’s “crude” use of its nuclear device, see Bruce W. Bennett, “Military Implication of North Korea’s Nuclear Weapons,” \textit{KNDU Review}, Vol.10, No.2 (Korean National Defense University, Seoul, 2005), 7 and 10-11.

\textsuperscript{186} In a nationwide option poll conducted in April 2005, about 44 percent of South Koreans surveyed has agreed that North Korea’s nuclear weapons is defensive in nature and would be helpful to keep the independence of unified Korea once North Korea collapses. On the other hand, only 31 percent of people surveyed argued that Pyongyang’s nuclear weapons are offensive and should be stopped at any price. For a dramatic change in South Korean’s perception of North Korea’s nuclear weapons program since the June 2000 summit meeting between two Koreas, refer to the following website: http://hcy.jinbo.net/zbxr/?document_srl=269090&mid=pds2&sort_index=regdate&order_type=asc&listStyle=&cpage=.
The third reason why North Korea’s current level of nuclear capability is useful is that North Korea’s opponents implicitly acknowledge that Pyongyang may use nuclear weapons as a last resort to survive. Based on this perception, North Korea has been investing much of its scarce resources in nuclear programs, despite dire economic conditions, and has actually obtained economic and political concessions from its opponents by successfully invoking a “fear” of North Korea’s desperation.\(^\text{187}\) Shortly after the “Operation Iraqi Freedom” in 2003, one North Korean diplomat provided a meaningful comment on its nuclear programs at a news conference: “Iraq was blackmailed and finally invaded by the United States because it did not have nuclear weapons. To protect our sovereignty and deter a US invasion of North Korea, the DPRK will not dismantle its nuclear program until a complete security guarantee is provided.”\(^\text{188}\) This kind of perception increases Pyongyang’s asymmetric bargaining power.

**North Korea’s nuclear escalation strategies**

Based on the previous three elements indicating that nuclear weapons could have asymmetric advantages to North Korea, it is meaningful to anticipate Pyongyang’s potential nuclear escalation strategies prior to suggesting a new framework emphasizing the coercive nature of air power in an effort to deal with a North Korea that is armed with nuclear weapons. To predict North Korea’s potential nuclear strategies, it is first necessary to analyze the quantitative and qualitative characteristics of Pyongyang’s nuclear program.

**Capability assessment**

Starting in the mid-1980s, the DPRK has been steadily accumulating nuclear fissile materials through various routes: smuggling plutonium of 56kg (enough for 7-9 atomic bombs) from a Russian mafia in the aftermath of the collapse of Soviet Union\(^\text{189}\),

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\(^\text{187}\) Since the start of the Six-Party talks aimed at resolving North Korean nuclear crisis peacefully, Pyongyang sought to demonstrate the catastrophic outcome of military confrontation on the peninsula in an effort to make a big rift between the United States and its allies or the regional players—China and Russia. For conflicting assessments of North Korea’s nuclear intentions among the parties involved, see Chinoy, *op. cit.*, 215-224 and Phillip C. Saunders, “Confronting Ambiguity: How to Handle North Korea’s Nuclear Program,” *Arms Control Today* (Arms Control Association, March 2003),4; and for neighboring countries’ concerns about the sudden collapse of the Kim’s regime in the North, see Bennett (2005), *op.cit.*, 3.

\(^\text{188}\) On March 31st 2003, North Korean diplomats claimed in a meeting with US delegates in New York that “it will not be blackmailed like Iraq and reprocess the spent fuel rods for a nuclear deterrent.” For further details, see Chinoy, *op.cit.*, 166-167.

reprocessing plutonium of about 50-60kg from spent fuel rods from its 5-MW graphite-moderated reactor\textsuperscript{190}, and enriching uranium from secret underground centrifugal facilities. As a result, North Korea appears to retain sufficient nuclear materials to build nuclear warheads somewhere between 10 to 20 (See Figure 5-5), which means North Korea no longer considers its nuclear arsenals as a last resort, but rather a significant asset for its war-fighting capability.

\textbf{Figure 5-5: Estimate of North Korea’s Fissile Materials, 1985-2010}  

\textbf{Needs assessment}  
In qualitative analyses of North Korea nuclear program, there seems to be a common consensus that Pyongyang has much room for improvement in its nuclear technology. For instance, it needs to develop a detonating trigger, create smaller nuclear warheads, and increase its ballistic missile accuracy.

\textsuperscript{190} From three times of secret extracting efforts in 1989, 1990, and 1991, North Korea is believed to have extracted more than 25kg of plutonium. In addition, the DPRK has defueled 8,000 spent fuel rods from its reactor in an effort to “blackmail” its neighboring countries and then put into a secured facility as a result of the Agreed Framework in 1994. Since the second nuclear crisis in October 2002, however, North Korea has threatened to reprocess these fuel rods in response to the “US violation of AF” and proclaimed its completion as of early November, 2009. As a result, Pyongyang is so far believed to have extracted more than 50 kg of plutonium from its reactor, an amount enough to build more than 10 nuclear warheads. For detailed accounts of North Korea’s plutonium extraction, see Bruce W. Bennett, “Military Implication of North Korea’s Nuclear Weapons,” KNDU Review, Vol. 10, No.2 (Korean National Defense University: Seoul, Korea, December, 2005), 4-5; and Larry A. Niksch, "North Korea’s Nuclear Weapons Development and Diplomacy," \textit{Congressional Research Service} (September 9, 2009), 14-16.
1) Detonating Trigger
   Through more than 70 high-explosive trigger experiments near Yeong-byeon nuclear complex and two underground nuclear tests, Pyongyang has sought to master its technology for a boosted trigger, but failed to achieve its goal. According to seismic analyses of North Korea’s underground nuclear tests in May 2009, it was believed that the yield of those tests had been less than 2 Kilo-tons at best, an explicit indication that the DPRK will continue seeking more tests to master its trigger expertise.

2) Accuracy and Warhead Size
   The accuracy of North Korea’s ballistic missiles and shrinking the size of its nuclear warheads constitute other key problems facing the Kim’s regime in Pyongyang. Through its missile exports to the Middle East and through analyzing the ‘real-world’ test results in the regional wars, North Korea demonstrated missile accuracy and expertise to some extent for short range ballistic missiles (e.g., Scud-B/C). However, North Korea’s medium-range ballistic missile (No-dong) is believed to have more than 2 km of CEP (Circular Error Probable) in its maximum range of 1,500km. If North Korea were to target the US with ICBMs, this error is expected to increase exponentially as the flight distance increases, and a missile would have to travel at least 6,000km to hit one city in the western parts of the continental United States. Pyongyang’s inability to miniaturize its nuclear warheads is a key reason for North Korea’s lack of accuracy over large ranges, resulting in a large CEP. As a result, it is believed that current North Korean nuclear technology would be more useful in targeting cities and large-sized military complexes, instead of being employed at the battle-field for war-fighting purposes.

North Korean Nuclear Scenarios
   Overview
   Based on previous analyses regarding the asymmetric nature of North Korean nuclear weapons program and its quantitative and qualitative characteristics, all estimates would fall into three categories in the most likely order: 1) continue to seek nuclear ambiguity in an effort to avoid an international inspection regime and blackmail its neighboring countries for obtaining economic and security concessions; 2) employ its nuclear arsenals in the limited conflicts in an effort to increase its negotiation leverage with its opponents; and 3) exploit its nuclear assets both tactically and strategically in
an all-out war to meet Pyongyang’s national goals of reunifying two Koreas under its terms and perpetuating its regime (See Figure 5-6).

Figure 5-6: Purposes of North Korea’s nuclear weapons
Source: Author’s reconfiguration from the original source, Bennett (2005), op.cit. 2.

Scenario #1: Nuclear Ambiguity
Since the inception of North Korea’s nuclear crisis in 1994, Pyongyang appears to be well aware of the value of nuclear ambiguity. Given its “crude” nuclear technology, additional transparency of its nuclear programs might not have provided any bargaining power in its negotiations with its opponents, but rather would have revealed the feasibility of surgical strikes against North Korean nuclear facilities. This attitude has been strongly reflected in the subsequent dialogues with the international community since the Agreed Framework in October 1994. That is, North Korea has sought to delay inspections in an effort to maintain its nuclear ambiguity as long as possible. This nuclear agreement appears to be best fitted for Pyongyang’s such objective because it has officially postulated the delay of North Korea’s nuclear inspection for the next 10 years, which would be enough time for Pyongyang to improve its nuclear technology and increase its nuclear fissile materials.\(^{191}\)

\(^{191}\) Saunders (2003), op.cit., 1-2.
By the time it was supposed to implement its obligations in early 2000s, Pyongyang initiated a new event for continuing its nuclear ambiguity in the form of highly-enriched uranium program (HEU). In the subsequent statements and provocations since the second nuclear crisis in October 2002, the DPRK has continued to seek nuclear ambiguity by periodically claiming the presence of nuclear arsenals in the North and testing its ballistic missiles and nuclear devices, but not releasing any official data verifying its authenticity. Therefore, Pyongyang is expected to continue maintaining its nuclear ambiguity until it has reached the nuclear status similar to that of Pakistan and India, in which there should be enough reliable nuclear warheads to survive the potential first strike from the United States. In this process, North Korea would try not to cross a certain “red-lines,” such as exporting nuclear materials to “rogue” states and terrorist networks, to avoid physical military punishment and participate in a series of negotiations in an effort to show what it called ‘defensive purpose’ of its nuclear program, thus making it hard for the international community to unite in coercing Pyongyang.192

Scenario #2: Limited Deployment of Nuclear Weapons

The second scenario is to use its nuclear weapons in a very limited way in an effort to coerce its opponents into concession at a significant internal security crisis. The most probable crisis in that manner is a coup attempt—ensuring political chaos in the North. After a series of power struggles inside the Kim’s regime, strong willingness to show its power and intransigence would be needed for the prevailing party to unite the country against an external common ‘enemy.’ Firing one of its nuclear assets into the East Sea of Korea or at one of South Korea’s inhabited islands would be best fitted for this purpose. Through this provocation, the new regime, whether it is continuation of the Kim Jong-Il regime or a group of generals, could send a strong signal to its opponents not to meddle in North Korea’s domestic matters. It could also be used as an effective tool to extort some strategic resources (e.g., food and petroleum) necessary to sustain the new regime in Pyongyang from its neighboring countries, which would presumably be

192 In a series of negotiations with the United States since the second nuclear crisis in October 2002, Pyongyang has always sought to put the main cause of its nuclear pursuit on U.S. hostile policy toward North Korea. Therefore, it has tried not to cross a “red-line” postulated by the international community during its nuclear provocations. As for North Korea’s negotiating behaviors regarding its nuclear weapons program, see Chinoy, Meltdown: The Inside Story of the North Korean Nuclear crisis and Charles L. Pritchard, Failed Diplomacy: The Tragic Story of How North Korea Got the Bomb (Brookings Institution Press, Washington, D.C., 2007).
concerned about the sudden collapse of the North Korean state and ensuring chaotic situation in the North.

**Scenario #3: All-Out War on the Korean Peninsula**

The last scenario is the case of an all-out war on the peninsula, in which Pyongyang’s nuclear arsenals would be employed both operationally and strategically. Since an all-out war is so damaging and might lead to the collapse of the current regime in the North, it would likely not occur as a result of North Korea’s rational planning but rather by the misperception of current situation and failure in managing the “escalation ladder” on the part of Pyongyang. Therefore, North Korea’s nuclear weapons would be initially used in a very limited way in an effort to provide a stern warning against the international community, including China, not to cross a “red-line” for coercing its regime. It would explicitly refer to a comprehensive sanction regime, including a naval blockade, with the PRC actively participating in this initiative and to threaten the end of the DPRK regime.

**Proximate Causes**

This would probably begin as a result of North Korean provocations, which could significantly threaten several key national interests of the Chinese government: Pyongyang’s becoming an actual nuclear power and neighboring countries’ reactions of building their own nuclear arsenals to respond North Korea; North Korea’s exporting its nuclear fissile materials to international terrorist networks in an effort to earn much needed government finances; and Pyongyang’s explicit intention to use its nuclear arsenals as strong deterrence against Chinese political pressure.

Faced with worsening international pressure and domestic hardship in the form of food and fuel shortage by the Chinese decision to stop its aid to Pyongyang, the DPRK is likely to consider the most visible demonstration of its power and intransigence in the form of a limited nuclear bombing on the international waters off its East and West coast. But this kind of provocation would reflect a total failure in its escalation strategy, resulting in an all-out war across the Korean peninsula and forcing the KPA inevitably to take a large-scaled offensive to secure Seoul, the capital of South Korea, as a hostage for subsequent ceasefire dialogues. In this offensive operation, North Korea will be forced to
determine how to use its nuclear weapons: employing them to support its limited war objective from the start *Versus* retaining this weapon as a last resort to defend its regime.

**Early Deployment of Nuclear Weapons**

Unlike most military analysts, Dr. Bruce W. Bennett at RAND suggested a different prediction regarding how the KPA would use its nuclear arsenals. He put forward several reasons why North Korea would like to employ its nuclear arsenals from the beginning of hostilities in his 2005 contribution to one of the Korean military research institutions.⁴¹³ Observing several examples of modern warfare in the Middle East and Balkan states, the KPA leadership is well aware of how the U.S. military will likely employ its sophisticated conventional weapons in the future war on the peninsula. They know the ROK-US combined forces will seek to decapitate its leadership and destroy its strategic assets in an effort to deny its war objective from the start in any conflict.

**Reason #1: Neutralize ROK-US Decapitation Strategy**

Therefore, to neutralize this strategy and obtain reliable deterrent power against them, North Korea needs to show its nuclear capabilities in the early phase of conflict. With this demonstrated nuclear capability, North Korea could exploit its asymmetric advantages mentioned earlier while effectively denying the combined forces’ war objectives. This combination could help the KPA attain its limited war aims—quickly securing and isolating Seoul within a short period.⁴¹⁴

**Reason #2: “Use Them or Lose Them”**

One of the traditional concerns in warfare situations—which can colloquially be described by the phrase “Use them or lose them”— appears to play a role in this argument. Just as the KPA leadership would expect, the ROK-US combined forces will concentrate its fire power on destroying North Korea’s WMD, especially its nuclear arsenals, from the start of any hostility. Thus, North Korea will lose either most of its nuclear stocks or its operational control of nuclear arsenals due to the combined forces’ efforts to neutralize North Korea’s C3 networks. This logic would lead the KPA

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⁴¹⁴ According to various analyses on North Korea’s military doctrine, the KPA would most likely undertake an operational objective in which a rapid penetration of the defensive line north of Seoul and then securing/consolidating Seoul (strategic gains) would constitute a key element of that strategy. Given the enormous gap in military and economic power with its “opponents,” Pyongyang would likely think that this kind of a “quick occupation-and-negotiation” strategy is best fitted for achieving its war objective. For scenarios of North Korea’s military offensive, refer to the Global Security Organization at [http://www.globalsecurity.org/military/ops/oplan-5027-1.htm](http://www.globalsecurity.org/military/ops/oplan-5027-1.htm).
leadership to employ its nuclear arsenals preemptively at the start of war, which is why there has been a great deal of effort to delegate the firing authority of its WMD to local fielded commanders on the part of North Korea.

Reason #3: Undermine ROK-US alliance
Undermining the ROK-US alliance is another good reason for North Korea’s early use of its nuclear weapons. The provision of “nuclear umbrella” to the South by the United States would constitute a key part of the ROK-US defense alliance. Therefore, the failure to deter North Korea’s first nuclear strike against the South would significantly affect the nature of the defense alliance, thus causing problems in managing subsequent operations on the part of the Combined Forces. This would also give the KPA a chance to exploit its asymmetric advantages in the form of intimidating ordinary South Koreans.

Summary of Early Deployment Scenario
Combining all these factors, North Korea will use its nuclear arsenals preemptively and operationally in an effort to effectively meet its limited war objective—quickly penetrating the defense line in front of Seoul and then isolating/taking the capital city as a hostage for subsequent ceasefire dialogues. Given its conventional inferiority, the preemptive use of its nuclear arsenals would play the role of a strategic “enabler or multiplier” in the early stage of hostility. Once the KPA is successful in gaining its strategic advantages at the initial phase, they would employ nuclear weapons as a key means for escalation control by attacking airbases and naval ports—the key installations for US quick reinforcement on the peninsula—and threatening to target the major cities of South Korea and Japan in the subsequent stages of conflict.

Strategy Depends on Total Number of Warheads
Intuitively, this strategy implies that as the number of North Korea’s nuclear warheads grows, the KPA could appropriate more warheads in achieving its military operational objectives. In addition, if North Korea could build more nuclear warheads and spread them in different locations and deep underground bunkers, Pyongyang would feel more confident in its ability to survive the United States’ counter-forces. And this confidence and ability to survive the retaliatory attacks from the US military would, in turn, provide a significant deterrent power to Pyongyang, thus significantly limiting the ROK-US combined forces’ freedom of action in coercing Pyongyang to retreat back to the original status quo.
Unfortunately, there has not been any empirical research regarding the relationship between the number of nuclear warheads and the distribution ratio of nuclear weapons to specific purposes of regional adversaries like North Korea (e.g., early strategic use versus late strategic use versus operational use), except for Dr. Bennett’s 2005 paper. According to his estimate, the 10 nuclear warheads would be a critical point where both early and operational nuclear uses are superior to the ‘last-ditching’ strategic use. After this critical point, the operational use is supposed to grow exponentially compared with its two competing elements—late strategic use and early strategic use (See Figure 5-7).

Figure 5-7: The number of North Korea’s Nuclear Warheads and its Employment Strategy
3. Coercive Strategies for Dealing with North Korea

Overview

Cold War deterrence strategy will be ineffective against North Korea

Through the analyses of North Korea’s decision-making regarding its nuclear weapons program, it appears to be evident that new military strategies should be established to deal with Pyongyang armed with nuclear arsenals. With the military mindsets locked in Cold War mentality, however, it seems to be difficult to effectively/robustly/adaptively deter the DPRK from employing its nuclear arsenals for its strategic purpose because the Kim’s regime in the North is fundamentally different from those during the Cold War in various aspects: national objectives, the characteristics of internal security control, the guiding principle of a nation state, and an unique geopolitical location. A traditional military deterrence strategy heavily relying on the rationality of opponents is no longer fitted for the DPRK since it is seeking to behave irrationally to offset their conventional inferiority with asymmetric assets uniquely favorable to themselves: special operation forces, the disposition of its ground forces, its WMD capabilities, and its military doctrine to maximize its asymmetric assets.

Coercion Strategy is a more suitable alternative

To deal with the unique, unprecedented regime that is North Korea, a new military strategy should be established, one with special emphasis on how North Korean leadership perceives their current status, i.e., what they most value and what they most fear. A “coercion strategy” is an attractive candidate for this purpose: it incorporates analysis of opponents’ decision-making processes with several well-defined military operations. This coercion strategy is not new—it has a long history—but it had not been employed a great deal during the Cold War era. Recent advances in military technology have caused military planners and foreign policy makers to reexamine a coercion strategy. These technological advances enable military operations that could not have been used before. ROK policy makers hoping to achieve national security objectives of course face resource and political constraints, but the rapid advances in military technology, in particular for aviation and weapons system, change what is possible, given these constraints.

This section continues with an exploration of the definition and theoretical foundation of the coercion strategy. After this exploration, necessary conditions for
successful coercion will be posited in a context of regional adversaries. This section concludes with consideration of more detailed coercive military strategies for policy makers in both the ROK and the United States.

Definition and Theoretical Foundation

Definition

The concept of ‘coercion’ was first described in the seminal work of Thomas Schelling, *Arms and Influence* (1966), and then was characterized as an implicit means to influence the opponents so that they would change their behaviors to follow the coercing nation’s demands. Schelling sought to emphasize this means (coercive means) in achieving national interests over the opposite means for influencing opponents, ‘brute force’. Considering the previous emphasis on nuclear deterrence based on the fears of mutual retaliation and then assured destruction, it seems to be a totally different approach to achieve national security objective because this strategy tries to manipulate the decision calculus of opponents with threat of using forces and controlled use of actual forces, thus providing more flexibilities in conducting nation’s policy options. Schelling articulates the difference in the construct between two influencing means as follow. 195

"Brute force succeeds when it is used, whereas the power to hurt (coercive power) is most successful when held in reserve. It (coercive power) is the threat of damage, or of more damage to come, that can make someone yield or comply. It is latent violence that can influence someone’s choice."

Coercion versus Deterrence

It was Robert Pape who specifies this concept in a more detailed fashion and seeks to develop several variants of it, in an effort to realize this concept in a world where limited and politically restrained war prevails over a total war. In his 1996 book, *Bombing to Win: Air Power and Coercion in War*, Pape clarifies the definitions of two similar concepts—coercion and deterrence. Both coercion and deterrence are strategies for influencing the opponent’s decision calculus with threats of retaliation. In their implementation, however, they are like flip sides of the same coin: coercion involves using power to compel adversaries to return to the status quo ante, while deterrence is

the skill of using the threat of retaliation to compel adversaries not to change the status quo.¹⁹⁶

**Superiority of Coercive Strategy to Deterrence for regional adversaries**  
Pape clearly prefers the coercive strategy over deterrence to effectively deal with regional adversaries, who are generally more determined to take risks and are more motivated by regional stakes than are superpowers. Pape’s preference is due to the military options the coercive strategy provides, which are more flexible and versatile, especially in the aftermath of deterrence failure. A deterrence strategy, after all, does not provide any effective measures to deal with aggressors in the case that the original deterrence fails, except for the obvious measures of retaliation or acquiescence. In contrast, coercion retains many well-defined military options—punishment, risk, decapitation and denial (which will all be discussed in a later section)—to prepare for cases of deterrence failure. All of these could be employed in a phased manner to achieve escalation dominance against adversaries.

**Compellence versus Deterrence**  
Based on these previous studies and analyses of several modern military conflicts, including the “Operation Desert Storm” in 1991, RAND Corporation published a landmark study in 1999 which further refined the concept of coercion and identified detailed coercive tools in airpower. Like Pape, the RAND study authors try to specify the concept of coercion in detailed manner. They provide an alternate definition of coercion, one that introduces the concept of “compellence” and includes deterrence as simply a subcategory of coercion¹⁹⁷:

> “**Coercion** is the use of threatened force, including the limited use of actual force to back up the threat, to induce an adversary to behave differently than it otherwise would. **Coercion** is typically broken down into two categories. **Compellence** involves attempts to reverse an action that has already occurred or to otherwise overturn the status quo, such as evicting an aggressor from territory it has just conquered or convincing a proliferating state to abandon its existing nuclear weapons programs. **Deterrence**, on the other hand, involves preventing an action that has not yet materialized from occurring in the first place. **Deterrence** would include dissuading


an aggressor from trying to conquer a neighboring state or convincing a country that desires nuclear weapons not to seek them."

**Flexibility**

Using this definition of coercion, it seems easy and possible to produce strategies specified to a certain situation. This definition provides desirable flexibility for policy makers in dealing with regional adversaries emerging since the end of the Cold War. A traditional deterrence strategy is incomplete; addressing regional adversaries requires another strategic element to make deterrence credible. In attempting to design new, successful coercive strategies, however, there appear to be several conditions and challenges in the specific context of the Korean peninsula that policy makers should consider as in detail described in the next section.

**Requirements for Successful Coercion**

**Overview**

Traditionally, three elements have been suggested for successful deterrence: capability, credibility of threat, and communication. All three elements are needed to convince the rational adversary that the cost of attempting to alter the status quo would be greater than the benefit of doing so. To have the adversary reliably believe this, the would-be deferrer needs to retain both the military capabilities to carry out his retaliation if the status quo is altered and the political willingness to bear any damage, including human casualties, in the process of conducting retaliatory efforts. In addition, communication is needed to clearly relay these elements to the adversary so as to avoid misperception and miscalculation of the situation.

**Insufficiency of Deterrence**

But once the adversary defies this warning and violates the status quo, deterrence has failed, thus inevitably leading to the undertaking of military options that are painful to the defender. In addition, the possibility of misperception and miscalculation by an adversary regarding the stakes appears to always exist, especially in light of the cognitive biases and constraints faced by any individual decision-maker (such as incomplete information, limited time to make decisions, bureaucratic politics and organizational
processes, and loss aversion). These are causes of deterrence failure more often today than in the Cold War era, during which there had been greater certainty in terms of the decision-making processes of a nation state and rationality assumption was still considered viable due to the existence of clear nuclear devastation and retaliation.

**Complexity of Regional Adversaries requires alternative strategies**

Therefore, a simple deterrence strategy is not enough to deal with regional adversaries, who are different from the superpowers which dominated strategic thought in the Cold War era. Dealing with regional adversaries requires greater strategic emphasis on world view, value system, vulnerability, and decision-making processes heavily influenced by the *loss-aversion bias* and the *endowment effect*. These factors are reason enough to explore alternative military strategies, at least to complement a traditional deterrence strategy based on the rationality assumption of an actor.

This coercion strategy has several conditions necessary for reaching a successful outcome, and its implementation faces challenges derived from the unique attributes of regional adversaries that have emerged since the post-Cold War era. Therefore, before examining detailed military strategies, it is appropriate to address the complexities inherent in coercive dynamics, given the politically-restrained nature of contemporary limited war.

1) Escalation Dominance

**Importance of Escalation Dominance in Regional Conflicts**

According to the aforementioned 1999 RAND report, escalation dominance is one of the most important conditions for successful coercion in regional conflicts, in which uncertainties regarding the scope and intensity of violence prevail. To effectively manipulate the decision calculus of an opponent, a coercer needs to control the level of violence and deny the adversary the opportunity to neutralize counter-violence, or counter-escalation. This means the coercer has to retain the capability to afflict serious damage, neutralize the enemy’s defense systems, while defending itself from retaliatory attacks.

**Understanding Dynamic Interactions between Adversaries**

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Given the nature of regional adversaries, most conflicts at present are a game of risk-taking to manipulate the opponent’s calculus of cost and benefit. This means the understanding of the dynamic interactions between opposing rivals is a necessary prerequisite for building successful coercive options. The situation on the Korean peninsula is no exception, and far more research on its dynamic interactions, including escalation scenarios, is needed. Because of the asymmetric assets and limited war aims of the DPRK, it is likely to engage in an escalating risk-taking contest with the ROK-US combined forces. One needs to explore the conditions for successful coercion, extracting lessons from the historical cases where a coercive strategy was employed with success.

The most important element regarding the capability to impose serious damage is the presence of nuclear weapons. But to control the level of violence, some measures to control the destructive yield of nuclear weapons are needed, as emphasized in the 2002 NPR (Nuclear Posture Review) of the Bush administration. Furthermore, the increase in the lethality and accuracy of conventional weapons is another way to control the level and scope of violence, thus flexibly and adaptively influencing the strategic calculus of North Korea’s costs and benefits regarding its alternatives.

**North Korean fortifications neutralize some ROK-US capability**

As for offensive weapons, the ROK-US combined forces have an impressive array of options. However, there is still a long way to go in the development of weapons that can inflict significant damage to targets deep underground, such as bunkers. This is notable, given the fact that North Korea has, since the mid-1980s, been fortifying its entire territory with artificial and natural caves, more than 11,000-14,000 underground tunnels, and hardened shelters.²⁰⁰

As for denying the KPA the chance to neutralize the combined forces’ attacks, there has been no concern because North Korea’s defensive systems are quite antiquated and ineffective in engaging the offensive of the combined forces. But the inferiority of

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²⁰⁰ North Korea’s efforts to fortify its entire territory began shortly after the end of Korean War (1950-1953) by the order of its “Great Leader” Kim Il-Song. Experiencing a significant damage by the USAF strategic bombing during this war, he decided to place all military equipment and production infrastructure in underground tunnels and shelters in an attempt to protect them from air attacks of the ROK-US combined forces. For details regarding Pyongyang’s undergrounds tunnels and shelters, see Joseph Bermudez, *The Armed Force of North Korea* (I.B. Taulis, March 2001) and Barbara Demick, “Thousands of North Korean Tunnels Hide Arms Secrets,” Los Angeles Times, November 14, 2003.
Pyongyang’s integrated air defense systems could be offset by its fortification measures mentioned above.

**North Korean counter-escalation capabilities**
Considering the formidable asymmetric assets of the KPA, preventing Pyongyang from counter-escalating would be one of the most significant challenges facing the combined forces. Some of the most visible counter-escalatory actions would come from the asymmetric assets of the KPA: its long-range artillery and MRLS deployed close to the DMZ, a large number of well-trained and equipped special operation forces, and WMD assets.

**ROK-US currently cannot achieve escalation dominance over NK**
So far, there have not been any defensive capabilities possessed by the combined forces that effectively counter the potential attack scenarios which employ those asymmetric assets, thus making it difficult for the ROK-US combined forces to achieve complete escalation dominance against North Korea across every area of operations. Therefore, effort should be concentrated on minimizing the asymmetric advantages of the DPRK, while at the same time maximizing the counter-escalation capabilities of the combined forces. These should be the goals in establishing detailed military strategies, as will be explored later in this chapter.

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2) Threatening to Defeat North Korea’s Military Strategy

**Denial of Military Objectives**
The second element for successful coercion is to deny adversaries their military objectives. That is, this strategy is to exploit enemy’s military vulnerabilities so that they are not given any incentive for conducting military operations. Given a perception that its military operation will surely fail, any decision maker will not take a risk choice even though he is framed with a deep domain of losses. As a result, this strategy aims at neutralizing enemy’s fielded forces so that their leaders would be convinced that victory is impossible. For this purpose, denial campaigns are expected to attack military production, interdict supplies to the battle-field, shatter air defenses, disrupt communication and command, and defeat enemy’s fielded forces.\(^{201}\)

**Successful Examples**

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In the previous 1999 RAND report, three cases were suggested as successful coercion: 1) US Air Forces’ bombing on Chinese supply routes to North Korea during the Korean War; 2) British forces’ strategy to destroy Argentina’s fielded forces for defending Falkland islands in 1982202; and the destruction of Serbian fielded forces in Bosnia by a coalition force led by the NATO in 1995203. In all three cases, the key focus of each military operation was to neutralize enemy’s fielded forces so that their leadership would be convinced that there is no need for sustaining their military operations, thus resulting in a decision to come to a negotiation table in an attempt to minimize their expected costs.

**Unsuccessful Examples**
On the other hand, this paper also suggests cases where denial campaign failed due to the absence of military strategy to thwart enemy’s military objective and the lack of analysis on enemy’s political objective. In three cases—the Rolling Thunder Operation in Vietnam, the US interdiction effort in Laos, and the “Operation Strangulation” during the Korean War—the US Air Force failed to achieve its military objective of coercing adversaries into coming to a negotiation table due to the lack of analysis on enemies’ most strategic needs. That is, those enemies conducted guerrilla warfare by that time and did not need much resource, thus not being undermined by US Air Force’s massive bombing campaign on their transportation and supply storage.204 The US Air Force should have employed a different approach to effectively address this unconventional warfare.

**ROK-US strategy should employ defensive measures**
Combining lessons and politico-military implications from the previous cases, a new denial strategy could be explored to effectively deter North Korea. In this new framework, defensive measures should constitute a significant portion of this denial strategy, given North Korea’s military doctrines and capabilities where asymmetric assets are prevailing over conventional means. If the ROK-US combined forces are ready to deny Pyongyang’s asymmetric warfare (e.g., intercepting North Korea’s incoming ballistic missiles, denying the infiltration of SOF units, and neutralizing its long-range artillery

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pieces prior to being operational), therefore, North Korea has no choice but to come to a negotiation table because they know that their military operations will surely fail. In addition, the offensive forces the ROK-US combined forces have already retained, including tactical and strategic air power, would play a significant role in producing a synergistic effect because they are fairly effective in defeating the fielded forces of the KPA, given their capabilities and North Korea’s antiquated integrated air defense systems.

3) Magnifying Third-Party Threats of the North Korean regime

Increasing perception that neighbors are a threat

Exploiting a third-party threat would constitute the third element for successful coercion. This strategy is intended to force enemies to perceive that their neighboring countries are becoming another threat to their security.

Example: Serbia, 1995-1999

The “Operation Deliberate Force” in 1995 illustrates the explicit example of this strategy. Since the Balkan war began in the early 1990s, the Bosnian Serbs backed by Milosevic, President of Yugoslavia, has defied the UN and NATO ultimatum by stepping up its ethnic “cleaning” of Bosnian Muslims. Frustrated with their inability of coercing the Bosnian Serbs, coalition forces led by the NATO began a new offensive in September 1995 where air campaign was focused on destroying the fielded forces of the Serbs: communication nodes, weapons and ammunition storage areas, and line of communications.205

As these operations went on, the Serbian leadership began to perceive that its military would become more vulnerable to its neighboring enemies—the Bosnian Muslim and Croat Forces—than direct attacks of the coalition force because they can readily employ their ground forces at their discretion. In fact, Croatian forces conducted a successful offensive against the Serbs in the western Slovenia after NATO’s bombing attacks. That is, air campaigns of the coalition force altered the local military balance on the Balkan Peninsula and exposed greater military vulnerabilities in Serb defensive capabilities, thus forcing the Bosnian Serbs to come to a negotiation table.206

ROK-US: Foment North Korean domestic instability

Unfortunately, it seems impossible to apply this strategy to North Korea because there is no third party threatening Pyongyang’s security on the peninsula. Instead, fomenting domestic instability would be employed as an alternative path to magnify a third party threat. This strategy would be focused on letting ordinary North Koreans know how serious its country’s situation is, what international efforts to support the country are, and how badly the Kim Jong-II regime has treated its citizens so far. To conduct this strategy, several humanitarian missions, combined with a psychological operation, could be explored in an attempt to shake belief and loyalty of North Koreans toward the current North Korean regime:

- Sending to North Korea a balloon containing a leaflet condemning the current Kim Jong-II regime and a portable radio-set with which North Koreans could listen to South Korean radio stations.
- Periodically holding public discussions regarding the potential scenarios of North Korean collapse and international involvement to stabilize chaotic situations.
- Sending a message that North Korean officials will be given stable positions (e.g., “Golden Parachutes”) in the unified Korea once they are supportive of a reunification.
- Soliciting North Koreans to defect from the country by warranting their well-being and stable status in the South.
- Organizing an international conference concerning North Korean food crisis and involving several key countries, including China, in an effort to store food to be used for North Korean collapse.

**Detailed Coercive Military Strategies**

**Overview**

**Key characteristics of NK for strategy development**

Given the DPRK’s nuclear arsenal and its other asymmetric assets, there are several possible detailed military strategies worth exploring. As this dissertation explores...
these detailed military strategies, it is important to keep in mind certain key aspects of North Korean societal structure and military, because they constitute some of the main pressure points upon which the coercive strategy will be effectively exploited. Some of these key aspects are: a large number of internal security forces (thus, making it harder for dissident groups to rebel against the current regime), an army-centric military structure (relatively less-developed air force and navy), the acquisition of a huge amount of retaliatory means in the forms of WMD (but, the accuracy and reliability of these weapons is uncertain) and holding less-developed integrated air defense systems.210

**Airpower most effective for implementation**

Airpower would be the most effective instrument to implement coercive strategies, because of its flexibility (in its operation in time and space) and the capability to control the levels of damage (to affect the strategic calculus of opposing leaders). As airpower has, with the rapid advancement of its technology, overcome some critical restrictions characteristic of Cold War-ear conflict (involving, for instance, the accuracy and lethality of its weapons systems, building and maintaining coalition partnership, collateral damage to civilian population, and political restraints on military operations), airpower has, around the world, become a significant diplomatic instrument for coercing adversaries to make concessions without expending many resources and political costs.211

**Four coercive strategies**

With extensive analyses of several modern military conflicts, and lessons learned from them, some theorists of airpower have developed air operations which could be effectively employed against regional adversaries as coercive tools. Air strategy has followed its own evolution. The punishment strategy by air power pioneers (e.g., Douhet, Mitchell and Trenchard) in the 1920s is the earliest of airpower theories. The punishment

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210 For general analysis of North Korea’s society and military, see Ken E. Gause, *North Korean Civil-Military Trends: Military-First Politics To A Point* (Strategic Study Institute, US Army War College, 2006); Scobell (2007), *op. cit.*, North Korea’s Military Threat; and Bennett (2005), *op. cit.*, “Military Implications of North Korea’s Nuclear Weapons.”

211 The key aspects of post-Cold War conflicts is limited and politically restrained war, in which airpower could be one of the most effective instruments to achieve national objectives. Some of airpower’s attributes—speed, precision, flexibility and versatility—may help alleviate political constraints inherent in contemporary military warfare (e.g., civilian casualties, unnecessary expansion and extension of violence and managing coalition partnership). For airpower’s role in modern warfare, see Daniel Byman(1999), *op. cit.*, *Air Power: As a Coercive Instrument*, xiii-xvi; Ellwood P. Hinman, *The Politics of Coercion Toward a Theory of Coercive Airpower for Post-Cold War Conflicts* (Air University Press: Maxwell Air Force Base, Alabama, 2002), 24-26; and Daniel Byman and Matthew Waxman, *op. cit.*, *The Dynamics of Coercion*, 87-99.
strategy was followed by the risk strategy of Schelling in the 1960s, and that was followed by the decapitation or strategic paralysis strategy of John Warden III during the Gulf War in 1991. Most recently, the denial strategy has been proffered by several contemporary theorists (e.g., Pape and Hinman) in the period after the end of the Cold War (See Table 5-3).

### Table 5-3: Coercive Air Strategies

<table>
<thead>
<tr>
<th>Strategy</th>
<th>Theorist</th>
<th>Target Set</th>
<th>Mechanism</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Punishment</strong></td>
<td>Giulio Douhet</td>
<td>Cities</td>
<td>Popular revolt</td>
</tr>
<tr>
<td></td>
<td>Huge Trenchard</td>
<td>Cities</td>
<td>Popular revolt</td>
</tr>
<tr>
<td></td>
<td>Air Corps Tactical School (ACTS)</td>
<td>Critical economic nodes</td>
<td>Destruction of social and economic structure</td>
</tr>
<tr>
<td><strong>Risk</strong></td>
<td>Thomas Schelling</td>
<td>Gradual civilian and leadership damage</td>
<td>Leaving the adversary something valuable and then increasing the fear of losing them</td>
</tr>
<tr>
<td><strong>Decapitation</strong></td>
<td>John A. Warden III</td>
<td><strong>Leadership,</strong> Strategic targets deep inside enemy territory</td>
<td>Leadership change or Strategic paralysis</td>
</tr>
<tr>
<td><strong>Denial</strong></td>
<td>Luftwaffe, Robert A. Pape, Ellwood P. Hinman</td>
<td><strong>Frontline Forces</strong></td>
<td>Battlefield breakthrough, Destruction and neutralization of enemy’s fielded forces</td>
</tr>
<tr>
<td></td>
<td>Committee of Operations Analysts</td>
<td>Productions of weapons</td>
<td>Equipment Shortage</td>
</tr>
<tr>
<td></td>
<td>Economic Objectives Units</td>
<td>POL/Transportation Networks</td>
<td>Leadership change or Strategic paralysis</td>
</tr>
</tbody>
</table>

Source: Author’s reconfiguration from the original source, Pape, *op.cit.*, 57.

1) **Punishment Strategy**

**Key Logic: Overwhelming damage to civilian centers forces capitulation**

This is one of the oldest air strategies for coercing adversaries. It was first implemented by German forces in their effort to bomb major cities of Britain during World War I. The key mechanism of this air strategy is to impose maximum damage on civilian population centers with massive bombardment. The civilians would face serious degradation of their welfare due to this aerial bombardment. Then, the airpower seeks the enemy’s concessions, which would stem from strong protests and pressure from the general population. To get the general population to quickly rebel against their government, the early air theorists argue, the bombardment should be rapid and
Concentrated, so that the opposing government would not have enough time to absorb
bombing damage and restore its war efforts.

**Precursor to Punishment: Germany versus England, WW-I**

In 1917, the German military dared to take this uncharted adventure across the Dover
Strait and brought significant damage to London in terms of human casualties and
property destruction. But this punishment strategy was not successful in coercing
Britain to withdraw war efforts, because it was not destructive enough to incite general
revolt against the British government’s war activities. Instead, this action invited a
counter-aerial bombardment from Britain, thus causing the First World War to turn into a
war of attrition, without leaving any clear implications regarding the utility of a coercive
air strategy.

**Theoretical Basis: Douhet**

It was an Italian airpower pioneer, Giulio Douhet, who provided the theoretical
foundation for strategic aerial bombardment as a coercive tool to the Royal Air Force of
Britain in the early 1920s. In his work, *Command of the Air*, he emphasized the
significance of destroying the morale of general populations as a key means for achieving
a quick and decisive victory, without incurring too much cost. To shatter civilian morale,
Douhet argued that a strategic aerial bombardment against major cities is an effective
means, as cities are the centers of population and often where resources needed for war
efforts are produced. A strategic air offensive would be especially effective, according to
this argument, when conducted in a specific period of time, with fire power highly
concentrated in space. This could cause enormous fear, as well as extensive damage.
According to Douhet, the level of violence and fear should be great enough to destroy the
social structure, so that the coercive mechanism could occur as follows:

“A complete breakdown of the social structure cannot but take place in a country
subjected to this kind of merciless pounding from the air. The time would soon come

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212 In the 1917 air offensive, German military used Gotha bombers and Zeppelin air ships to attack British
population center and left more than 5,000 civilian casualties. In response to this punishment, British forces
began its city bombing operations against several major cities of German in 1918 and expanded the size
and strength of this operation in 1919. For detailed accounts regarding the origin and development of air
punishment strategy, see Pape, *op.cit.*, “Bombing to Win,” 59-66; Lawrence Freedman, *The Evolution of
Historiography of Airpower: Theory and Doctrine,” *The Journal of Military History*, Vol.64, No.2 (April,
when, to put an end to horror and suffering, the people themselves, driven by the
instinct of self-preservation, would rise up and demand an end to the war.”

Implementation: Royal Air Force
Shortly after World War I, Hugh Trenchard, the founding father of the Royal
Air Force of Britain, sought to alter this theoretical idea into a practical air strategy.
Partly, this was an effort to assert the dominance of airpower in order to prevail in the
budget competition among other the British military services that was taking place at this
time.

Identification of strategic targets
Trenchard needed to find new target sets for offensive air operations. This target
set was to include important enough assets to influence the well-being of the people.
Industrial complexes, consisting of key factories, were the most appropriate target sets,
because they were large and could be hit with the relatively-inaccurate bombs available
in this age. Furthermore, these factories, as sources of employment and livelihood, were
closely related with the well-being of the people.

On the opposite side of the Atlantic, the Army Air Corps Tactical School (ACTS)
sought to modify some previous aerial bombardment strategies in an effort to adapt to its
reduced defense budget. This reduced budget was due to the severe economic depression
of the early 1930s. To demonstrate its continued effectiveness in operations, despite the
economic situation, war planners in the Air Corps had to identify several key targets from
among previous sets of targets, and these included critical industrial nodes. According to
the school of thought that was operating here, these critical targets included important
factories and transportation centers from which all raw materials and sub-products are
distributed to other economic sectors. These Army planners thought that attacking and
neutralizing these target sets would be enough to coerce adversaries into concessions.
Accordingly, they argued this strategy would be more cost-effective in implementing war
operations than any other services’ strategies, and would also reduce the political burden
from the massive killing of aerial bombardments.

WW-II: Mixed results

These strategies were included in military operations and were practically employed in an effort to demonstrate their coercive effectiveness during World War II. As for its success or failure in wartime, the punishment strategy appears to have had mixed results, depending on the specific context of its use. In the early stages of the conflict, air offensives were focused on attacking major cities, in order to destroy the will and morale of the people. These failed, however, to induce large-scale popular uprisings, and thereby failed to change the decision calculus of leadership, as was desired.

As the war moved into later stages, though, air offensives appear to have been successful in targeting and destroying key economic and military targets, thus effectively denying adversaries the opportunity to achieve their military objectives in each theater. This is due in part to the air superiority of the Allied forces over the enemies’ air space. In this case, this strategy was effectively one of denial, although the Allies strategists did not explicitly mention the concept of denial at that time.214

**Summary: Inappropriate for post-Cold War conflict**

In sum, the punishment strategy, executed through coercive airpower, witnessed mixed outcomes, depending on the area and time it was employed. For instance, it seems to have had some positive results during the Cold War era, because of the devastating power of nuclear weapons, possessed by the two superpowers. Since the end of Cold War, however, the punishment strategy has revealed itself to be incompatible with the nature of post-Cold War conflicts, in which limited and politically-restrained war prevails over total war. Therefore, this strategy, by itself, is not a panacea to effectively and adaptively deal with nuclear-armed North Korea. This is because future conflict on the peninsula is likely to be a politically-restrained, non-protracted war.

2) Risk Strategy

**Overview**

The risk strategy is another variation on a coercive strategy with the overarching goal of changing the decision calculus of enemy leadership. The risk strategy involves

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214 In his phenomenal work, *Command of the Air*, Douhet did not suggest the detailed concept of denial operation. His key concern was to emphasize the strategic bombardment as a key instrument of ending war quickly. But he indirectly claimed the importance of denial by arguing that “destroying enemy’s airfields is a prerequisite to achieve strategic bombardment against major cities.” The ACTS is no exception. They tried to achieve denial purposes by destroying industrial hubs because those target sets were key elements to support nation’s war efforts. For detailed accounts, see Hinman, *op.cit.*, 9-15.
gradually increasing the level and scope of violence. That is, both punishment and risk strategies rely on damage to civilians, in order to coerce enemies into concessions. But their explicit difference is in the phasing of damage: direct and concentrated infliction of damage to civilian targets, as advocated by Douhet, versus the gradual infliction of damage on limited target sets theorized by Schelling.

**Key Logic: Anticipation of future damage forces capitulation**

Therefore, the key point for a successful risk strategy is to convince the enemy that grave violence would follow if they do not acquiesce to the demands of the would-be coercer. Schelling, a proponent and founder of coercion through risk strategy in the early 1960s, proposes that an anticipation of future damage would play a more important role in activating a coercive mechanism than absolute destruction: “To be coercive, violence has to be anticipated. It is the expectation of more violence that gets the wanted behavior, if the power to hurt can get it at all.”215 Therefore, he argues that leaving the enemy with something valuable is the most delicate skill required of a coercer.

**Failure in Vietnam**

This strategy was used during the “Operation Rolling Thunder” in the Vietnam War (1965-68). The Johnson Administration hoped to coerce the North Vietnamese, through gradually increasing the strength and scope of bombing against industrial and civilian targets in Hanoi. The US Air Force increased the scope and intensity of its bombing against Hanoi, but stopped a step short of mythological and total bombardment, as would be demanded by the key logic of the risk strategy. This stopping short was due to political sensitivity to civilian casualties in the United States, as well as to fear of spurring Chinese involvement in the conflict. Consequently, stopping short, combined with the complexity inherent in the asymmetric warfare of the Vietcong, led to a failure of the risk strategy to convince the North Vietnamese that future damage they faced would outweigh all potential benefits from a national reunification on their own terms.216

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216 There are other assertions regarding the cause of failure in achieving a successful risk strategy during the Rolling Thunder campaign (1965-1968). Political sensitivity to civilian casualties inevitable in the bombing, thus resulting in the failure in implementing key logics of the risk strategy—gradual increase of bombing—due to political involvement on military operation, and Vietcong’s unconventional warfare strategies significantly frustrating the utility and aims of the strategic bombing were two key reasons in the failure of the risk strategy strongly advocated by Thomas Schelling. By contrast, the Linebacker I-II campaigns (1972-1974) conducted during the Nixon administration is considered a successful risk strategy in an effort to compel Hanoi to come to the negotiation table due to the exact opposite reasons mentioned in
Mixed Results Post-Cold War

There have been mixed results for this strategy in the conflicts conducted since the end of the Cold War. In the Iraq war of the early 1990s, the risk strategy of the US Air Force proved successful, through the effective attacking of Iraqi forces deployed in Kuwait and the expansion of attacks into Iraqi territory. However, the strategy did not succeed in conveying the potential future cost and coercing the Iraqi government to make concessions while they still retained power to resist, due to the absence of capitulation terms favorable to the regime, and their lack of sophisticated military means at that time. That is, the main cause of Saddam Hussein’s capitulation to the coalition force was the destruction of his elite republican guard and the ensuing fear of rebellion inside Iraq. This outcome was obtained primarily through actions consistent with the punishment and denial strategies, not necessarily through means derived from the risk strategy.217

Success in Serbia

Another relevant experience signifies that the risk strategy has merit: the NATO coalition forces successfully coerced Milosevic’s Serbia by gradually increasing air attacks against targets in Kosovo and Serbia. Initially starting with attacks on military targets in Kosovo, this risk strategy was expanded to include valuable targets inside Serbia. These targets included military command facilities and transportation hubs, which were key military installations needed by Milosevic to defend territory against other nearby external threats. In perceiving this serious potential threat to regional

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217 There are a lot of debates regarding which was the most successful and effective air strategy during the Gulf War. John Warden III of USAF is the leading advocate of the decapitation strategy targeting leadership targets deep inside the enemy’s territory rather than denying his military objectives by destroying fielded military forces. By contrast, Robert A. Pape, the leading air theorists since the 1990s, argues that denial is one of the most effective air strategies in coercing determined adversaries due to its emphasis on enemy’s decision making process. Combining those two strategies, Hinman, USAF Lieutenant Colonel, suggests a hybrid coercion strategy employing all four air coercive strategies to maximize the coercion effect. For detailed debates regarding this, see John A. Warden III, “Success in Modern War: A Reply to Robert Pape’s Bombing to Win,” Security Studies, Vol. 7, No. 2 (Winter, 1997/98): 172-190; Pape, op.cit., pp.211-255; and Hinman, op.cit., pp.45-48.
standing, Milosevic and his Kosovo Serbian regime finally accepted the agreement in 1999 that provided a ‘face-saving’ deal to the Serbian coalitions.218

Unlikely to be effective against highly motivated adversary
Because of this experience, it would be difficult to argue that a risk strategy successfully coerces determined and highly motivated adversaries, such as Saddam Hussein and Kim Jong-Il. The likelihood of success for the strategy probably increases, however, if there exist sophisticated intelligence and weapons systems to be used for attacking highly valuable targets and inflicting significant damage to them.

Summary: Too much uncertainty about North Korea to predict success
In sum, this risk strategy seems slightly better fitted to addressing regional adversaries, armed with determined resolution and supported by their WMD assets, than the previous punishment strategy. This is because a risk strategy provides more flexibility and fine-tuning in influencing an adversary’s decision-making process. But risk cannot stand alone as the prevailing strategy to deal with regional adversaries, because there exists a great deal of uncertainty in identifying the most valuable targets (i.e., the targets most likely to trigger capitulation on the part of enemy). Also uncertain is the extent to which the regime can tolerate outside military attacks before it must surrender. These uncertainties certainly apply to North Korea; a would-be coercer would likely face the same problems mentioned above.

3) Decapitation Strategy
Key Logic: Eliminating controlling elite group forces capitulation
The decapitation strategy has recently been used to deal with regional adversaries that have emerged since the end of Cold War. In this case, the key target sets would include the leadership, internal security forces, and political apparatuses of a regional adversary. The main assumption behind this strategy is that the regional adversary is controlled by a small group of elites. Therefore, the elimination of this group would play a significant role in ending the regime without incurring costs in the form of civilian casualties and collateral damage.

218 The risk strategy is considered successful in coercing Milosevic and his Serbian coalitions in Bosnia and Kosovo in two conflicts on the Balkan Peninsula in 1994 and 1999, respectively. But other strategies, such as denial by destroying the Serbian fielded forces and threatening the third-party involvement by nearby Croatia and Muslim countries and decapitation by targeting leadership, have played some role in coercing Milosevic into concession. For detailed arguments regarding the coercive air operations on the Balkan warfare, see Hinman, op.cit., 48-54 and Kimminau, op.cit., 45-47.
Improved Intelligence and Weapon technology are crucial
Some of the key enablers for operations based on this strategy are rapid advancements in weapons systems (e.g., precision-guided weapons) and intelligence (e.g., real-time information gathering). Without these technical innovations, it would be far more difficult, if not impossible, to attack leadership targets exclusively, because they are highly protected by their national security apparatuses, even in a peacetime.

Operation Desert Storm
The public widely perceived that this decapitation strategy was a coercive tool for dealing with 'rogue' states during the “Operation Desert Storm” in early 1991. According to Colonel Warden III of the US Air force, the elimination of enemy leadership and internal security targets is the most efficient and effective way to end the war with regional adversaries, because these targets function as a control center not unlike the sensory organs of the human body. Pape made one of the clearest statements describing the decapitation strategy: “a nation’s leadership is like a body’s brain: destroy it and the body dies; isolate it and the body is paralyzed; confused it and the body is uncontrollable.”

Debate over Effectiveness of Decapitation
Although they describe the same concept, decapitation, in similar terms, both of these air theorists differ starkly in their opinion of how best to effectively employ airpower to coerce adversaries into concessions, especially in a context of limited, politically-restrained and non-protracted war. Throughout his paper, The Enemy as a System, Warden argues that airpower is best employed through attacking enemy leadership targets, rather than widely-spread field forces. He states that attacking field forces, which are greater in number than leadership targets, is not only more expensive, but also more likely to protract the conflict, given the many uncertainties involved. In contrast, Pape claims that since leadership targets deep inside the enemy territory are heavily defended by all kinds of security, and may be buried and/or mingled with civilian

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220 Warden suggested the concept of “five rings” to conceptualize his “decapitation” theory in his 1995 article. Of course, leadership targets are located at the center of the five rings, followed by less significant target set toward outside rings. With this concept, he coined the concept of strategic paralysis as a key way of ending war quickly by targeting and destroying all leadership targets simultaneously. For detailed accounts regarding Warden’s decapitation theory, see John A. Warden III, “The Enemy as a System,” Airpower Journal, Vol.9, No.1 (spring, 1995), 41-55.
targets, it is painstakingly difficult to correctly identify those targets in a timely manner. Therefore, a decapitation strategy would be more likely to lead to wasting limited resources, with the high probability of losses from enemy integrated air defense systems, which can be quite strong, especially at the outset of conflict.\footnote{Pape, \textit{op.cit.}, 79-86.}

**Three types of decapitation**

Practically, there are three possible components for decapitating an enemy, which depend on the type and scope of targets: leadership decapitation, military decapitation, and political decapitation.\footnote{\textit{Ibid.}, p 80.} Targeting a specific leader could result in replacement with another figure, one who might be more friendly and flexible to capitulation—assuming, of course, that the current leader is the driving force behind a conflict and that his absence could lead to peace. Military decapitation involves destroying the command and control system, i.e. to sever the link between leadership and field commanders, thus making it impossible to coordinate between them. Without centralized direction from the political leadership, field forces could easily collapse from even slight pressure. Employing airpower to create circumstances in which a group of dissidents could more easily wage a systemic uprising against the current regime is the political component of decapitation. Attacking internal security forces and the political regime could play a significant role in creating a favorable environment for dissenting groups to wage an anti-government movement.

**Lack of success in practice**

Despite the decapitation strategy’s host of favorable aspects, there have been few successful outcomes in the implementation of this strategy. This is due to several problems imbedded in the nature of war: the difficulty in identifying leadership targets with reliable intelligence, the inability to sever the links between leadership and field forces for a long amount of time, and the difficulty of inciting rebellion against the current regime.\footnote{For Pape’s arguments regarding why decapitation is ineffective to win coercion against regional adversaries, see Pape, \textit{op.cit.}, 84-86.}
4) Denial Strategy

Robert A. Pape concludes that the denial strategy, out of all the variants of coercive air strategies, has had the greatest success in meeting national military objectives in several conflicts occurring over the last seven decades (See Table 5-4). Therefore, when dealing with North Korea, war-planners should consider all coercive air strategies, with emphasis on any particular variant depending on the circumstances, but with the denial strategy having special emphasis regardless.

<table>
<thead>
<tr>
<th>Case</th>
<th>Punishment</th>
<th>Risk</th>
<th>Decapitation</th>
<th>Denial</th>
<th>Strategic Interdiction</th>
<th>Operational Interdiction, CAP</th>
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</thead>
<tbody>
<tr>
<td>Japan, 1944-45</td>
<td>Failure</td>
<td>Uncertain*</td>
<td>-</td>
<td>Failure</td>
<td>Success</td>
<td></td>
</tr>
<tr>
<td>Germany, 1942-45</td>
<td>Failure</td>
<td>-</td>
<td>-</td>
<td>Failure</td>
<td>Failure</td>
<td></td>
</tr>
<tr>
<td>Korea, 1950-51</td>
<td>Failure</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>Success</td>
<td></td>
</tr>
<tr>
<td>Korea, 1952-53</td>
<td>Failure</td>
<td>Success*</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>Failure</td>
</tr>
<tr>
<td>Vietnam, 1965-68</td>
<td>Failure</td>
<td>Failure</td>
<td>-</td>
<td>-</td>
<td>Failure</td>
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<td>Vietnam, 1972</td>
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<td>Iraq, 1991</td>
<td>-</td>
<td>-</td>
<td>Failure</td>
<td>-</td>
<td>Success</td>
<td></td>
</tr>
</tbody>
</table>

* Instances of nuclear coercion by the United States

Source: Author’s reconfiguration from the original source, Pape, *op.cit.*, 86.

Key Logic: Denial of military objectives causes realization that continued fighting is futile

It was during the Vietnam War that the denial strategy demonstrated its effectiveness as a coercive tool, though it was first employed during the World War II. Unlike the punishment and risk strategies, in which punishment of the civilian population was the key means to coerce adversaries, the denial strategy seeks to prevent adversaries from having the opportunity to meet their military objectives, through the destruction of military equipment and logistics, both in the theater and in rear areas. Adversaries can thereby be convinced that it is senseless and futile for them to continue fighting. This strategy can even be applied to irrational military and national leaders, who rely heavily on military means to pursue their intimidation and brinkmanship diplomacy against neighboring countries. Facing destruction of their military equipment and logistical support, adversaries have no choice but to alter their strategic calculus, in order to avoid the worst-case scenario.

Use of Airpower to implement denial
Depending on the range and scope needed, different air operations could be applied based on this strategy. But the idea common to all variations of a denial strategy is the destruction of key military equipment.

1) Close Air Support (WWII)
Supporting ground forces was one of the oldest uses for air power, dating back to World War I. It was, however, during World War II that air power first played an important role in supporting ground forces through conducting denial missions. Described today as “close air support” (CAS), these denial operations were first employed by the German forces in 1939, when German air power destroyed much of the Dutch ground forces. They were forced to capitulate. During the initial stage of the World War II, this kind of rapid and concentrated penetration with air support was widely used (“Blitzkrieg”). In the later stages of the World War II, the British and American militaries used their own denial strategy to neutralize German ground forces, with each party aiming at different target sets—the center of railway transportation systems for the RAF and the POL facilities for the Air Corps of US army.

2) Strategic Interdiction (Vietnam)
With the advance of aircraft performance and weapons technology, a new air denial operation emerged during the Vietnam War—interdiction. This operation was designed to interdict military equipment and logistics on their way to the front line, outside the range of army artillery. For targets deep inside enemy territory, airpower is the only military means for attack, and such an operation is called a “strategic interdiction.” These target sets could include important facilities (command and control centers, military equipment productions, ammunition, POL, electric grids and logistics) for supporting and guiding military operations on the front line. The goal is to effect strategic paralysis by destroying all of the adversary’s strategic assets for their war efforts. This could be effective for a war of attrition, given the impact on a country’s general economy and stockpiles of war supplies. Occasionally, strategic interdiction plays some role in punishing the civilian population, either in the form of collateral damage, due to the co-location of civilian residencies and military installations, or in the form of indirect impact on civilian welfare, due to the connection between a country’s war effort and its economy.

3) Operational Interdiction
Operational interdiction involves attacking targets closer to the frontline than the targets of strategic interdiction. Reinforcements, logistics, and the command and control facilities immediately behind the front line would constitute some of the most visible target sets for operational interdiction. Sometimes, operational interdiction involves targets inside the theater, in an effort to completely sever the communication connection between the theater and rear areas. But it is most useful in cases where a line of defense is strong and fixed, as a tool to make a weak point in the line, for a penetrating ground offensive and for establishing a second front on the flank side of the penetration. In both of these cases, airpower could maximize the flexibilities inherent in its nature—the freedom of space and the concentration of firepower within a small window. Although operational interdiction is similar to the previously-mentioned concept of CAS, it is broader and wider in scope and strategic implication. That is, CAS is for attaining a tactical advantage in a specific area, while operational interdiction is for acquiring “operational paralysis” through severing the links between the army in the front and command and control in the rear.

**Improved weapons and technology have made denial more effective**

Since the end of the Cold War, this denial strategy has reemerged as a key coercive military strategy in dealing with regional adversaries, especially due to innovative military technologies in intelligence and precision weapon delivery systems. The Gulf War was the first instance where sophisticated intelligence and weapons systems played a significant role in denying an adversary its military objectives by attacking and then neutralizing fielded forces, thus contributing to the early end of the conflict.

**Summary: All coercive strategies must be considered**

Like the other strategies, however, this denial strategy cannot stand as a universal solution in dealing with post-Cold War conflicts, in which geographic environments (e.g., weather and mountainous terrain) and political dynamics (involving regional and global superpowers) play a significant role in the process and final outcome of war.\(^{224}\) The

\(^{224}\) Unlike the Gulf War, the denial operation during the Balkan conflicts by the NATO-led coalition air forces was not initially successful in destroying the Serbian fielded forces due to adverse weather condition and mountainous topology in that theater, an environment totally different from the Middle East.
potential conflict on the Korean peninsula could have the same pathways as the wars in
the Balkans in 1995 and 1999, because several factors surrounding the conflict—
weather/geographical topology and strategic and political involvements between the
United States and China/Russia—are very similar. The most notable differences are the
type of regime and the existence of WMD. Therefore, war-planners should consider the
full spectrum of coercive air strategies to prepare for the risks and uncertainties always
inherent in war, in their effort to maximize the coercive effect under any and all
circumstance, as some airmen in the USAF suggest in their theses.\textsuperscript{225}

\footnotesize{Furthermore, Serbian forces’ efforts to counter the allied air operations (e.g., highly integrated air defense
system, camouflage and placing equipment deep inside hardened bunkers and exploiting human shields to
avoid surgical air strikes) discouraged the allied air powers to effectively implement its denial operation.
For detailed accounts regarding Serbian forces’ counter-measures against the allied air forces, see the
special report of “The Kosovo Campaign: Air Power Made It Work” at
http://www.afa.org/media/reports/april.asp.
\textsuperscript{225} For research regarding coercive air strategies inside military academia, see Kimminau (1998), \textit{op.cit.},
\textit{The Psychology of Coercion: Merging Airpower and Prospect theory} and Hinman (2002), \textit{op.cit.}, \textit{The
Politics of Coercion: Toward a Theory of Coercive Airpower for Post-Cold War Conflict}.}
Conclusion: Policy Recommendations

Coercive Strategies depending on North Korea’s actions of domains

**North Korea in the domain of gains**
- Focused on *traditional deterrence strategy* emphasizing three pillars of successful deterrence: credibility, capability and sending clear signals (mainly offensive forces)

**North Korea in the domain of losses**
- *Denial strategy* is the most appropriate option to deter North Korea because this strategy could effectively disrupt its military objective (mix of defensive and offensive forces)

**North Korea in desperate situation**
- Decapitating the current regime and replacing it with a new one supportive of peaceful negotiations would be only option to deal with this kind of desperate regime. In the process of conducting this strategy, air operations—*decapitation and strategic interdiction*—would likely be effective in deterring North Korea in the form of demonstrating the grim consequence it would have
Chapter 6: Conclusion and Policy Recommendations

“Therefore one hundred victories in one hundred battles is not the most skillful. Seizing the enemy without fighting is the most skillful.”

Chapter 3 (Attack by Stratagem) in *The Art of War*, Sun Tzu

Overview

Having reviewed North Korea’s decision-making, military assets, and different types of coercive strategies, this chapter will now suggest effective, robust, and adaptive deterrent strategies for the ROK-US combined forces.

To successfully coerce an adversary into making concessions, the first step is to examine his status at the stake of current issue. As mentioned earlier, a country’s decision is likely to change dramatically depending on its leaders’ perception of the status of their country’s stake in a certain issue. In addition, some assets of a country, in particular asymmetric ones relative to opposing rivals, would play a significant role in making a final decision because it would lack threat credibility and retaliations on the part of adversaries unless they retain enough ability to support their threats. Finally, understanding the decision-making processes of adversaries is the most important step to successfully coerce them because it is the key mechanism upon which enemy’s physical power is effectively exercised and sometimes a pressure point favorable to a coercer to attack could be identified.

Following those procedures, this dissertation sought to first examine North Korea’s domain on its nuclear confrontation with the US and its allies, and then analyze Pyongyang’s behaviors with two decision-making models. North Korea’s asymmetric assets were explored in an effort to identify its real ability to support its escalatory threats—a key element to disrupt the ROK-US escalation dominance. Finally, a new framework to deal with regional adversaries like North Korea, known as “coercive air strategies” to most air theorists, was empirically explored to find out some implications on the Korean peninsula. Next step is to classify North Korea into several different states—NK in the domain of gains, the domain of losses, and desperate situation—in an effort to suggest appropriate measures to each specific state.
1) North Korea in the domain of gains

   Possible Scenarios

   Although North Korea generally appeared to be in the domain of losses for the past two decades since the end of the Cold War, sometimes Pyongyang was in a position in which its current status quo was acceptable or a little better than in previous position. For instance, in October, 2006, when the DPRK conducted its first nuclear test in an effort to press a then reluctant Bush administration into making concessions, it appeared to have been in a better position because the US military paid a heavy cost in undertaking its two-front war on terror, and the Kim Jong-Il regime in the North had completed consolidating its power base. In addition, Pyongyang had completely restored the traditional ties with its most important allies—China and Russia—thus having reliable patrons in the UN Security Council for blocking serious sanctions against its regime. Based on these assets, North Korea might have thought that this nuclear test would not yield the serious consequence its regime can not sustain, but rather a huge amount of benefits in the forms of domestically boosting people’s morale and significantly reducing the ambiguity and uncertainty involving its nuclear programs.

   Recommended Strategy: Deterrence with Punishment

   Once perceiving it is getting better, the DPRK would be very cautious not to lose its previous hardly-earned gains, like most of the past North Korean behaviors postured after lashing out serious provocations for the last two decades. In this case, Pyongyang might find themselves on the upper side of subjective value function Prospect theory employs for its application. Faced with gains in this concave function, North Korea is likely to defend its gains or the current status quo, rather than increase them further. Deterrence with punishment strategies would be most effective for this case because the DPRK would be rational enough to calculate the cost and benefit of their provocation under this favorable situation. As have long been mentioned by rational deterrent theorists, successful deference would be a function of three elements: capability, credibility and availability for clearly communicating intentions and capability to adversaries.

   Capability: Improve ROK’s intelligence and offensive systems

   The capability is a physical means to support threats or retaliations when deterrence fails. Most of this consisted of offensive military means in order to impose as
much pain and cost as possible against the adversaries. Establishing an integrated intelligence system for identifying high-valued target sets is the most important basic requirement for implementing this deterrence strategy based on punishment. Without any knowledge of strategic targets Pyongyang most values, it seems to be impossible to effectively threaten North Korea and implement punishment attacks once deterrence fails. Considering the recent rapid advance in UAS technologies (e.g., sustainability, survivability, maneuverability, all-weather capability, real-time capability, sensor-to-shooter capability)\textsuperscript{226}, a lot of improvement on acquiring strategic targets in the North could be highly expected.

There are several offensive capabilities to inflict serious damage to the North once it violates the status quo: ground-to-ground missiles capable of covering entire North Korean territory and air power able to conduct operational and strategic interdictions deep inside North Korea. In particular, the US should allow the ROK to develop a missile capable of covering across North Korean territory by modifying the previous regulation of the Missile Technology Control Regime (MTCR)—a payload of 500kg and a range of 300km—in an attempt to alleviate South Koreans’ concerns on weakening US extended deterrence. Developing weapons systems capable of penetrating deep underground hardened hunkers and shelters, known as a “bunker-buster” with a low-yield nuclear warhead, would play a significant role in increasing a deterrence power against Pyongyang, given the fact that North Korea is seeking to place all important strategic and asymmetric assets in underground bunkers.

Out of those required assets, strengthening its intelligence capability on the part of the ROK military is the most urgently needed one, as the USFK command plans to transfer its operation control to its South Korean counterpart in 2012\textsuperscript{227}, which heavily relies on the US Air Force for gathering intelligence on North Korea’s military and


\textsuperscript{227} In fall 2009, Dr. Hong, professor at Korea National Defense University, published a report regarding historical background and debates of this operational control transition in South Korea. See Sung-Pyo Hong and Kwan Haeng Jo, “Operational Control Transition and Direction for ROK Air Force Development,” \textit{Peace Studies} (Korea University: fall, 2009).
leadership targets. Transferring operational control to the ROK military, without being equipped with this sophisticated intelligence systems until the year 2012, would seriously undermine deterrence power against North Korea once the US leaves most of its key missions to its ROK partner.

Credibility: Establish Counter-measures against NK’s Asymmetric Assets and a Joint Nuclear Planning Group between the ROK and US militaries

The second element for successful deterrence—credibility—is the ability to convince the adversary to believe that retaliations would surely happen once it violates the status quo. To make their retaliation believable, the ROK-US combined forces ought to retain the ability to disrupt all kinds of North Korean military provocations. In other words, when the ROK-US combined forces would be ready to neutralize all types of damage imposed by the North Korean military, Pyongyang will believe that retaliation would surely occur. Given a huge amount of asymmetric assets in the North, in particular special operation units and long-range artillery pieces, establishing counter-measures against these forces would be the most important first step for the combined forces to enjoy escalation dominance over the KPA. In addition, the political willingness (between ROK and the US government) to surely implement retaliation attacks no matter how much damage they face is another significant element to support this threat credibility.

In addition, the US should reveal a clear signal that it would cooperate with the ROK military in operating its nuclear arsenals on the peninsula at the similar level as NATO has had a Nuclear Planning Group since 1966. This move would play a significant role in mitigating South Korea’s concern regarding the US nuclear umbrella at a time when both the US and Russia agreed to reduce the number of their nuclear warheads to less than 1,550 on April 8th 2010 at Prague, the Czech capital (See Figure 6-

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228 In a parliamentary session of October 2008, Assemblyman Kim Jang-Su argued that “the ROK military relies on US intelligence assets (U-2, Satellites, J-STARS, Global Hawk) to acquire strategic information on North Korea at a 100 % rate.” He revealed that “the ROK military plans to acquire airborne early-warning systems by the end of 2012 with an acquisition schedule—one in 2011 and three in 2012. ibid, 218.

229 In November 2008, the ROK military released its first amendment of Defense Reform Plan 2020, in which the number of total military personnel was adjusted from 500,000 to 550,000 and several acquisition projects were canceled or delayed, including the ROK Air Force’s ambitious Global Hawk acquisition project, in an attempt to reflect the ROK Army’s concern on sudden reduction in its force. See the details at http://www.donga.com/fbin/output?n=200811240451.

230 Bennett, op.cit., Nuclear Strategy and Deterrence in Northeast Asia (September 2009), 11.
1).²³¹ On the part of Pyongyang, this initiative of getting South Korea involved in US nuclear weapons operations would make them believe that the threshold of US nuclear attack on North Korea could be lowered because the ROK could be well informed under this structure, thus increasing the credibility of the combined forces’ nuclear retaliation against North Korea.

**Figure 6-1: Nuclear Milestone between the US and Russia, April 8th 2010**

**Communication: Publish Punishment Plans and Thresholds in Official Documents**
Even if the ROK-US combined forces retain superior military capabilities relative to the KPA, there might still remain deterrence failure due to misperception and miscalculation on the part of the North Korean military. Therefore, a clear message about the combined forces’ reliable punishment plans should be periodically updated and communicated to the North Korean leadership. Sometimes such communication needs to be detailed so that North Korean leadership does not commit mistakes in understanding

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²³¹ Both US president Obama and Russian president Medvedev agreed to replace the expired 1991 Strategic Arms Reduction Treaty (START) by reducing their nuclear warheads to 1,550, respectively. See the details at [http://news.bbc.co.uk/2/hi/8607985.stm](http://news.bbc.co.uk/2/hi/8607985.stm).
those threats. In addition, the ROK-US governments need to suggest specified threshold points beyond which the DPRK will be surely given an overwhelming and credible retaliation from the combined forces because they constitute serious security threats to both the ROK and the United States. All these communications should be posted on the official security documents in both countries (e.g., Defense White Paper in the ROK and QDR in the United States) and periodically updated to reflect the changing environments as time passes.

**Summary**

In sum, the traditional deterrence strategy could be implemented to deal with North Korea in the domain of gains due to the key assumption that Pyongyang could be rational enough to calculate the cost and benefit of its actions under this favorable status. The key deterrent mechanism in this situation is to demonstrate the enormous costs the DPRK could face once it violates the status quo in the forms of offensive capabilities, thus deterring it from violating the status quo. In this process of demonstrating the offensive capabilities, the combined forces could exploit its relative advantages against the KPA—the advanced air power and intelligence warfare capability. The combined air powers could be employed to inflict significant damage against North Korea’s high-valued targets, while integrated intelligence systems would play a significant role in detecting/identifying/tracking the KPA’s asymmetric assets, which are main elements for Pyongyang’s escalatory moves against the ROK-US coalition.

2) North Korea in the domain of losses  
**Framing Effect is of Primary Importance**

When Pyongyang is in the domain of losses and perceives its future will be getting worse, it seems to be increasingly difficult to deter North Korea from violating the status quo because it tends to frame the outcomes of its options in the loss-aversion mentality. Under this condition, North Korea would likely prefer a gamble with slim chance of returning to *the status quo ante* to a sure loss, even though the standard calculus of expected utility or value of options suggests the opposite. This kind of framing effect is one of the most important characteristics in explaining cognitive decision-making processes and psychological biases for most of human-beings, including dictators in regional adversaries like Kim Jong-II. In the process of framing decisions, a
reference point or anchoring point would play a significant role and it is prone to change depending on the environments surrounding decision-makers. Once this reference point is set up, the remaining process is quite simple and straightforward because all options available are to be evaluated based on whether each option could satisfy the prescribed reference point.

**Possible Scenarios**

Based on those key arguments of prospect theory, there were two cases in which Pyongyang was in the domain of losses and compliance with the international nonproliferation initiative led by the United States would be perceived to provide even more losses in the future, as have been explored in the previous chapter: the first nuclear crisis from 1993 to 1994 and the second nuclear crisis in October 2002. In each time, North Korea took steps to escalate, ranging from proclaiming to withdraw from the NPT to reloading nuclear fuels and reprocessing them to produce weapon-grade plutonium, in an effort to convince the United States that it would have little to lose, thus seeking to neutralize the ROK-US deterrence options based on offensive retaliation. Considered retrospectively, Pyongyang’s strategy was quite effective in blunting the US pressure backed by economic and military sanctions and establishing a negotiation regime favorable to the DPRK. In the future, North Korea would continue to use this tactics in its nuclear provocations when perceiving it is in the losing grounds in an effort to minimize its vulnerability and exploit the vulnerabilities of the ROK-US governments.

**Recommended Strategy: Coercive Denial**

To effectively counter this type of North Korea’s provocation, identifying Pyongyang’s current reference point (anchoring point) would be the first step, followed by the evaluation of each option available to the DPRK. If all options available are not enough to meet its reference point, it is quite possible that North Korea would not be deterred with a traditional deterrence strategy based on retaliatory measures, thus requiring the ROK-US combined forces to establish different counter-measures. This counter-measure should be focused on denying the North Korean military its objectives to acquire escalation dominance over the ROK-US combined forces with its enormous and versatile asymmetric means. This strategy would be called as a “denial strategy” in which the combined air powers would play a significant role because of a lot of flexibilities inherent in air powers: overcoming speed and space limits, controlling the
level of violence depending on the strategic needs and being easy in swiftly moving the center of power without paying significant political costs.

In this denial strategy, defensive measures against North Korea’s asymmetric threats, in particular ballistic missiles armed with NBC warheads, would have a greater proportion than offensive means in a total mix of military capabilities, which is quite departure from the previous deterrence strategy focusing on offensive and retaliatory means. There seems to be two explicit and feasible asymmetric threats from the KPA, as explored in the previous part: 1) short-range ballistic missiles (Scud-B/C) and medium-range ballistic missiles (No-dong) armed with chemical and biological agents at present and nuclear warheads in not distant future and 2) long-range artillery and multiple rocket launcher systems armed with high explosive and chemical agents.

**Improve Intelligence System**

To counter these two asymmetric threats, establishing an integrated intelligence system would be the first step upon which remaining counter-measures rely for their effective operations. Given a lot of constraints in acquiring reliable intelligence on North Korea (e.g., Pyongyang’s efforts to conceal and camouflage its high-valued targets, dig underground tunnels for protections and highly integrated air defense systems around high-valued targets), a variety of intelligence gathering platforms are needed in an effort to overcome those obstacles imposed by North Korea and adverse weather conditions on the peninsula. In this process of building reliable integrated intelligence systems, UAS (Unmanned Aerial Systems) would play a significant role due to a host of military utilities inherent in its nature: invulnerability to human casualties, long endurance exceeding human physical limits, availability in operating under adverse weather and the foundation for realizing the “sensor-to-shooter” concept.

**Improve Missile Defense Systems**

Some measures to effectively intercept incoming North Korea’s ballistic missiles are needed to deny North Korea its military objectives. The ROK military has currently decided to replace its antiquated aerial defense systems with advanced Pac-3 systems in an effort to defend its key military assets, including air bases. But it seems to be quite limited in achieving its strategic goal of denying North Korea because it is designed to defend limited military establishments. Considering North Korea’s limited capability in missile accuracy, its missiles are supposed to be aimed at major cities in Korea and Japan
to maximize fears and chaos in an effort to press each government to sever its alliance with the United States, though one would not absolutely rule out targeting military installations. As a result, expanding the area coverage of air defense against North Korea’s incoming ballistic missiles is an important step to deny Pyongyang’s military objectives and participating in a joint TMD (Theater Ballistic Missile Defense) project with the United States and Japan appears to be one of the most feasible and practical solutions to address this problem.

Establish Counter-Measures to Long-Range Artillery and MRLS Systems
Another big challenge facing the ROK-US combined forces is to effectively counter North Korea’s long-range artillery and multiple rocket launcher systems placed in underground bunkers close to the DMZ. Across hostility on the peninsula, the DPRK is likely to exploit the strategic gains derived from these weapons systems because they are invulnerable to the existing weapons systems of the combined forces. This is the reason why the KPA has been investing so many resources in hardening and increasing its long-range artillery capability, even though it has not been in a situation to invest in modernizing its antiquated conventional forces due to severe economic recessions since the mid-1980s.

To deny North Korea’s artillery threats effectively, some of innovative technologies could be explored just as wars on terrors in Iraq and Afghanistan have done, in which UAS is widely utilized to acquire real-time target information and conduct prompt attacks against time-sensitive targets if needed. Considering the operational concepts of North Korea’s artillery, the most important factor for successful denial is to acquire real-time information about its operations and then disseminate them to appropriate counter-forces as quickly as possible so that they would be neutralized prior to being launched against major cities of South Korea, in particular Seoul, locating within less than 30 miles from the DMZ. In this process of gathering and integrating information about the KPA’s artillery pieces, utilizing various types of UAV platforms could overcome strategic obstacles inherent in manned and satellite-based intelligence assets, such as limited endurance and vulnerability to adverse weather, which is quite possible on the Korean peninsula due to its being located in the rainy monsoon region.
Summary

In sum, the denial strategy is the most appropriate option to deter North Korea when it is in the domain of losses because this strategy could effectively disrupt its military objective of imposing as much damage as possible against civilian targets of South Korea. In the process of conducting this strategy, establishing reliable and credible intelligence systems is the number one task facing the ROK-US combined forces because all remaining denial operations would heavily rely on information provided by those intelligence systems. Exploiting strategic advantages inherent in UAV systems is one of the most prominent initiatives in building reliable and credible intelligence systems, given its recent achievements in wars on terror and rapid advancement in the related technologies.

3) North Korea in desperate situation

Possible Scenarios

There are several hypothetical cases where North Korea could perceive it is in the desperate conditions: 1) a failed coup attempt to end Kim Jong-II regime in the North, thus leading to severe internal insecurity; 2) a total isolation from the international community due to its persistence on its nuclear programs, even from its one of the strongest allies, China, thus experiencing severe shortage of strategic assets, such as petroleum and food; and 3) a combination of internal and external insecurity, thus even more growing its fear of regime collapse. Under these desperate conditions, North Korea would likely take the most risky option it could do because North Korean leadership perceive it could only provide a slim chance of returning to the status quo ante. Some coercive air strategies—punishment and denial—based on the rationality of North Korean leadership are not likely to be effective to deal with North Korea framed with this “act-or-lose everything” mentality because they are not strong enough to change Pyongyang’s mindset. In this case, a strategy requiring North Korea to have rational and cognitive calculus is needed, termed as “pressing to the imminent death while providing a small exit to its survival.”

Recommended Strategy: Decapitation

To force North Korea to experience the imminent death of its regime, the ROK-US combined forces would employ “decapitation” operations where North Korea’s
leadership targets, including the life of Kim Jong-Il himself, should be attacked by using combined air assets in the form of a strategic interdiction. In the process of conducting this decapitation missions, there should be some emphases on maximizing the effect of strategic paralysis: intense concentration of fire power and simultaneous attacks against all leadership targets. To acquire the effectiveness of this mission, two key elements are needed: the exact information about the leadership targets and lethality of weapons systems enough to penetrate North Korea’s hardened bunkers.

**Improve Weapons and Intelligence Systems**

Given North Korea’s efforts to place its leadership and strategic assets into hardened underground bunkers, some measures to reinforce the lethality and penetration capability of conventional weapons systems are recommended in the forms of building small-yield nuclear bombs. In addition, a highly reliable intelligence system is needed to effectively detect/locate/tract/destroy high-valued targets, including Kim Jong-Il himself, because those are presumably well protected and often mobile in an attempt not to be detected. To address this issue, there should be an effort to incorporate all existing intelligence platforms so that information could be integrated and disseminated in a real-time manner. With this kind of a mix of innovative weapons systems and concept of operations, the ROK-US combined forces would be quickly able to convince North Korean leadership that its collapse is imminent.

Under this complete dominance of weapons and intelligence, however, there should be some efforts to control escalation so that the North Korean regime should not resort to the “last-ditching” maneuver of firing its nuclear weapons in fear of its imminent collapse. Dr. Bennett, senior defense analyst in the RAND Corporation, suggests several alternatives to meet this concept of operation: “abandoning conventional/strategic attacks in such a situation, limiting such attacks to non-leadership targets, and preparing to preemptively destroy the aggressor’s nuclear weapons before starting its attacks on the aggressor’s leadership.”

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Facilitate Internal Coup
Since this strategy seeks to build a third party inside the Kim Jong-Il regime and then urge them to rebel against the current Kim’s regime in the face of imminent death by neutralizing all internal security apparatuses, it is called an “increasing third-party threat.” It seems to be hard for a certain group of elite members in the KPA and Korean Workers Party (KWP) to rise up against the current Kim Jong-Il regime without some external elements, which would be helpful and effective in undermining the internal control regime of the current Pyongyang regime.

As a result, achieving strategic paralyses by simultaneously conducting interdiction and decapitation missions against leadership and internal security organs in the North should provide a favorable condition for a small group of elite members to successfully attempt a coup vis-à-vis the current Kim Jong-II regime and hold the power in the North. To urge this kind of coup attempt, these strategies should be accompanied by a clear message that the ROK-US government would guarantee the continuity of the new North Korean government which is ready to negotiate away its nuclear arsenals and coexist peacefully with its neighboring countries.

Summary
In sum, when the current North Korean regime is in desperate conditions, it would be impossible to deter or coerce it as any other options except violating the status quo and escalating tensions would not be able to achieve its goal of maintaining its regime. In this case, there is no longer a rational calculus mechanism on the part of the current North Korean regime, but rather a psychological one in which a gamble with a slim chance of returning to the status quo ante would be greatly preferred to a sure loss. Decapitating the current regime and replacing it with a new one supportive of peaceful negotiations would be only option to deal with this kind of desperate regime. In the process of conducting this strategy, air operations—decapitation and strategic interdiction—would likely be effective in not only deterring North Korea in the form of demonstrating the grim consequence it would have, but also coercing Pyongyang to undo the hostile behaviors it has already done in the form of getting North Korea observe the effectiveness of incapacitating the regime itself.
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- Year 2001: June 4th/5th/18th/23rd
- Year 2002: March 13th, October 25th
- Year 2005: February 10th, September 20th, November 2nd/4th/30th, December 20th
- Year 2006: January 9th/25th, October 10th/21st/25th/27th/30th, November 24th
- Year 2008: October 2nd, November 12th/17th/18th/25th/26th
- Year 2009: May 13th/26th, June 3rd/13th


