

## *Strategy Analysis for Denuclearizing North Korea*

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### **Abstract**

Issue linkage is a negotiation technique by which one issue is tied to another that is difficult to agree on, expecting to achieve agreement on both. The 'Denuclearization, Openness, 3000' is a policy of the Lee Myung-bak administration that employs issue linkage by offering economic cooperation on the premise that North Korea abandons its nuclear programs. In this paper, I consider the 'Denuclearization, Openness, 3000' as an example of issue linkage and examine its efficiency as a policy tool for denuclearizing North Korea. For the framework of analysis, I develop the game theory model of issue linkage extended from the interdependence model, which was developed by Kelly and Thibaut. The result shows that it is enough for South Korea to use issue linkage as a technique for the issue of denuclearization in order to induce cooperation from North Korea. However, the 'Openness, 3000' policy proves to be non-satisfactory as an effective "link" to the denuclearization issue.

**Key Words:** issue linkage, game theory, 'Denuclearization, Openness, 3000,' the Lee Myung-bak administration, nuclear program

## I . Introduction

North Korea launched a long-range rocket on April 5, 2009 despite a warning from the rest of the world. Although North Korea has argued that the rocket was a satellite launch, it draws our attention again to the issue of how to sketch out a policy approach towards North Korea when it comes to denuclearization. Some critics have argued that inter-Korean problems should be resolved by dialogue; but the current South Korean government's anti-proliferation policy towards North Korea (Denuclearization, Openness, 3000) basically disregards the importance of dialogue between South and North Korea. On the other hand, other critics have argued that the current stalemated nuclear crisis has its origins in the former administration's practice of shoveling aid to the North, and further argues that the South should maintain a position of mutualism as the basis for its North Korea policy. These kinds of differing perspectives result from greatly differing judgments and understandings of the intentions of North Korea. The perspective that gives weight to the importance of dialogue interprets provocative acts by North Korea as a tactic to strengthen their position at the negotiation table. However, those who favor the use of tougher sanctions argue that North Korean provocations are exactly that; provocations. It is uncertain whether any approach can be effective in dealing with the North. However, the important thing is to formulate the issues that can draw the North into understanding the value of cooperation in the issue of denuclearization. In other words, we need to devise issues that by their nature bring North Korea into a state of cooperation on the issue of denuclearization; regardless as to whether we employ dialogue or sanctions as the means of achieving this end.

For example, there exist numerous cases of negotiation in which one party has tried to promote cooperation or agreement among the

concerned parties by adding another issue to the negotiations in progress. Several years ago when the Korean government was absorbed in the process of aircraft purchases, the U.S. government proposed that it would also sell a state-of-the-art guided missile system and electronic avionic system if the Korean government chose to purchase F-15s as its next generation fighter plane. However, this kind of negotiation tactic does not necessarily bring the concerned parties to agreement. On September 25, 2003, the Korean Foreign Minister Yoon Young-kwan conveyed to the U.S. Secretary of State Colin Powell that “Korea would accept the American request for additional dispatch of Korean forces to Iraq, if the U.S. government brought to an end its hard-line policies against North Korea and would attempt to demonstrate a more flexible attitude.” Powell was reported to have expressed a sense of regret at the idea of any kind of linkage between the troop dispatch request and the U.S. policy towards North Korea.<sup>1</sup>

Why then, does adding issues at some points in history promote agreements among states, while at other times it fails to do so? Which issue should be linked and which should be excluded, if linkage of issues is to be a means of inducing an agreement? Accordingly, the objective of this paper is to analyze successful conditions for an agreement when one party has added other issues to the original matter of concern which had hitherto proved to be a difficult and challenging issue to reach an agreement on. Specifically, adding an issue to the original issue can be defined as issue-linkage. In fact, issue linkage is a negotiation technique by which one issue, which is difficult to agree on, is tied to another issue,

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<sup>1</sup>-We can also find cases that may be considered issue linkages in inter-Korean relations. Former Minister of Unification Jeong Se-Hyun revealed in an interview with *Shin Dong-A* in July 2008 that the reason why both Koreas could come to an agreement in the 2004 inter-Korean general talks, for the exchange of radio messages in order to prevent further clashes between navy ships, was because South Korea agreed to give 400,000 tons of rice in an economic cooperation committee meeting at Pyongyang at that time. *Shin Dong-A*, Vol. 586, July 2008, pp. 200-217.

with the expectation of achieving agreement on both. For the framework of analysis of issue-linkage techniques, I have employed the method of decomposing strategic interactions, as developed by Kelly and Thibaut. For this analysis, I took the 'Denuclearization, Openness, 3000' as an example of issue linkage and looked for a policy tool for denuclearizing North Korea. This analysis could be very useful for future attempts at designing a policy approach to induce North Korea to denuclearize.

## II . Issue Linkage

Issue linkage has been continuously employed in diplomatic negotiation processes. Kissinger is known to be a person who used linkage diplomacy with the Soviet Union as policy lever during the Cold War.<sup>2</sup> Additionally, it is well known that cooperation over international environmental issues was accomplished by linking them with trade issues.<sup>3</sup> Moreover, the cases of using issue linkage can be easily found within alliances. Morrow regards the support given from weak nations by providing security as a tacit issue linkage that strong powers can employ.<sup>4</sup> In fact, there are many cases, which illustrate non-military provisions included in treaties of alliance. For example, economic elements, national boundary issues, and ethnic minority issues are often linked with treaties of alliance.<sup>5</sup> According to one research study, weak

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<sup>2</sup>- For the issue-linking diplomacy of Kissinger, refers following article: William Dixon, "Reciprocity in United States-Soviet Relations: Multiple Symmetry or Issue Linkage?" *American Journal of Political Science*, Vol. 30, No. 2 (May 1986), pp. 421-445.

<sup>3</sup>- Michele M. Betsill, "Regional Governance of Global Climate Change: The North American Commission for Environmental Cooperation," *Global Environmental Politics* 7(2) (May 2007), pp. 11-27.

<sup>4</sup>- Morrow D. James, "Alliances and Asymmetry: An Alternative to the Capability Aggregation Model of Alliances," *American Journal of Political Science* 35 (1991), pp. 904-933.

<sup>5</sup>- Regarding these case, refers following articles; Douglas M. Gibling, "Alliances: Why Some Cause War and Others Cause Peace," in *What Do We Know About War* (ed.), John

nations tend to cooperate with strong powers since the former stand in fear of losing in terms of the issues that are linked with security.<sup>6</sup> There are also research studies that examine the cases of issue linkage in multinational relationships.<sup>7</sup>

Most studies on issue linkage, however, have simply dealt with issue linkage from the perspective of benefit distribution. They often neglect to investigate what characteristics the linked issue should have. As witnessed in prior studies, an issue linkage can also overturn a previously reached agreement. Therefore, it is important to look at what characteristics an original issue and a linked issue should assume. In this regard, J. K. Sebinus considers the selection of issues to be dealt with in a negotiation as another important factor for a successful negotiation. This is why, he argues, the final process of selecting and

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A. Vasquez (Lanham, MD: Rowman and Littlefield, 2000), pp. 145-164; Kathy L. Powers, "Regional Trade Agreements as Military Alliances," *International Interactions* 30 (2004), pp. 373-395; Andrew G. Long and Brett Ashley Leeds, "Trading for Security: Military Alliances and Economic Agreements," *Journal of Peace Research* 43 (2006), pp. 433-451.

<sup>6</sup>-Robert Axelrod and Robert O. Keohane, "Achieving Cooperation Under Anarchy: Strategies and Institutions," *World Politics* 38 (1985), pp. 226-254. However, there is a research that maintains weak nations also induce cooperation from the strong powers by employing issue linkage. Refer following article: Timo Menniken, "China's Performance in International Resource Politics: Lessons from the Mekong," *Contemporary Southeast Asia*, Vol. 29, No. 1 (2007), pp. 97-120.

<sup>7</sup>-In comparison with the issue linkage in the bilateral relation, the possibility of successful issue linkage increases when there is a binding power of multinational institutions. Refers following articles: A. Stone Sweet, "Judicialization and the Construction of Governance," *Comparative Political Studies* 32(2) (1999), pp. 147-184; K. W. Abbott, R. O. Keohane, A. Moravcsik, A. Slaughter, and D. Snidal, "The Concept of Legalization," *International Organization* 54(3) (2000), pp. 401-419; J. M. Smith, "The Politics of Dispute Settlement Design: Explaining Legalism in Regional Trade Pacts," *International Organization* 54(1) (2000), pp. 137-180; P. Holmes, "Trade and Domestic Policies: The European Mix," *Journal of European Public Policy* 13(6) (2006), pp. 811-827; G. Shaffer, "What's New in EU Trade Dispute Settlement? Judicialization Public-Private Networks and the WTO Legal Order," *Journal of European Public Policy* 13(6) (2006), pp. 828-846; D. Bievre, "The EU Regulatory Trade Agenda and the Quest for WTO Enforcement," *Journal of European Public Policy* 13(6) (2006), pp. 851-866; and L. Martin, "Heterogeneity, Linkage, and Common Problems," *Journal of Theoretical Politics* 6(4) (1994), pp. 473-493.

excluding issues should be carried out with utmost the attention.<sup>8</sup> Kenneth A. Oye states that since negotiators have different influences over different issues, they tend to use certain issues with superior influence to achieve their objective with an issue over which they have relatively weak influence.<sup>9</sup>

While Oye analyzes this from the perspective of who proposes the issue linkage, T. Clifton Morgan examines the linked issue from the perspective of the receiving party. According to Morgan, issue linkage is more likely to succeed when an initiator tends to link important issues, while the offered issue is considerably more likely to remain as part of the status quo by the receiver.<sup>10</sup> Which issues then, are “issues over which superior influence is exerted,” “highly important issue,” and “issues for the maintenance of status quo?” What concrete conditions are such issues endowed with? The following section deals with the game-theory model which analyzes the conditions that are favorable to the successful issue linkage.

### III. Model Building

I develop the model of issue linkage based on as well as extended from the interdependence model. Kelly & Thibaut’s interdependence model provided the momentum in analyzing the nature of the issue in terms of the dynamic structure of the relationship between the actors. The dynamic relationship between the actors can be explained by decomposing the strategic interaction in an issue into three parts –

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<sup>8</sup>-J. K. Sebenius, “Negotiation Arithmetic: Adding and Subtracting Issues and Parties,” 1983.

<sup>9</sup>-Kenneth A. Oye, “The Domain of Choice: International Constraints and Carter Administration Foreign Policy” (New York: Longman, 1979).

<sup>10</sup>-T. Clifton Morgan, “Issue Linkages in International Crisis Bargaining,” *American Journal of Political Science*, Vol. 34, No. 2 (May 1990), pp. 311-333.

Reflexive Control, Fate Control, and Behavioral Control.<sup>11</sup> Specifically, strategic interaction of an issue can be explained by reference to independence, dependence, and interdependence between actors. Independence means the degree of how much one actor can influence his payoff by choosing his own strategy while dependence implies a degree of earning payoff which is determined by the choice of his opponent's strategy. Interdependence shows the degree of payoff by coordinating the strategy with that of the opponent's. These three elements help to examine the conditions as well as strategies that promote agreements when an issue is linked with another issue.

As mentioned previously, I take 'Denuclearization, Openness, 3000' as an example of issue linkage, and examine the nature of the denuclearization issue first in section III-1. Based on this examination, I developed the model of issue-linkage in section III-2. The premise of this model reflects the argument of Haas that the result of issue linkage is not always Pareto Optimal, but overall equilibrium can be achieved when there is an increase in total payoff by the issue linkage even though there is a loss in one issue. Thus, the issue-linkage model focuses on what kind of issue is necessary for the equilibrium of issue linkage. In section III-3, the results of the issue-linkage model are compared with the issue of 'Openness, 3000.' I have summarized section policy implications which are deduced from the result of the analysis.

### ***III-1 Decompose of the Denuclearization Issue***

Figure 1 illustrates the strategies and payoffs for both South and North Korea by normal form.<sup>12</sup> I have simplified the strategies as 'Go

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<sup>11</sup>-H. H. Kelley and J. W. Thibaut, *Interpersonal Relations: A Theory of Interdependence* (New York: Wiley, 1978).

<sup>12</sup>-Strategies and their payoffs of North and South Korea are based on the interviews that I conducted with 20 North Korean experts. The payoff order is computed by ordinal

Nuclear' and 'Denuclearize' for both actors, and I organized both actors' payoffs in order.

Figure 1. Strategies and Payoffs for South and North Korea in regards to Denuclearization<sup>13</sup>

		A (North Korea)	
		a <sub>1</sub> (Denuclear)	a <sub>2</sub> (Go Nuclear)
B (South Korea)	b <sub>1</sub> (Denuclear)	15 20	20 5
	b <sub>2</sub> (Go Nuclear)	-5 15	5 -5

Payoff order for South Korea

- S① A chooses 'Denuclear' and B chooses 'Denuclear' (a<sub>1</sub>b<sub>1</sub>): 20
- S② A chooses 'Denuclear' and B chooses 'Go Nuclear' (a<sub>1</sub>b<sub>2</sub>): 15
- S③ A chooses 'Go Nuclear' and B chooses 'Denuclear' (a<sub>2</sub>b<sub>1</sub>): 5
- S④ A chooses 'Go Nuclear' and B chooses 'Go Nuclear' (a<sub>2</sub>b<sub>2</sub>): -5

Payoff order for North Korea

- N① B chooses 'Denuclear' and A chooses 'Go Nuclear' (a<sub>2</sub>b<sub>1</sub>): 20
- N② B chooses 'Denuclear' and A chooses 'Denuclear' (a<sub>1</sub>b<sub>1</sub>): 15
- N③ B chooses 'Go Nuclear' and A chooses 'Go Nuclear' (a<sub>2</sub>b<sub>2</sub>): 5
- N④ B chooses 'Go Nuclear' and A chooses 'Denuclear' (a<sub>1</sub>b<sub>2</sub>): -5

The preference of South Korea in the issue of denuclearization is inferred by the following reasoning. First of all, South Korea prefers the

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level for calculative convenience. As a matter of fact, South and North Korea are not the only actors regarding denuclearization in Korean peninsula, and thus two-actor model has a limit to represent the dynamic relationship among the actors. However, the two-actor model has strength in analyzing main feature of policy of South government towards North Korea.

<sup>13</sup> Although some literature depicts the denuclearization in the Korean peninsula as the prisoner's dilemma, I interpret it as a different game. The major reason why the dominant strategy of South Korea is 'Denuclearization' is that the former as well as the current administration did not seek nuclear armament after the nuclear crisis on the Korean peninsula. If the prisoner's dilemma is an appropriate depiction, then all actors should prefer to choose 'Go Nuclear' no matter what other actors choose. Thus, it is not an appropriate interpretation, I think, to describe the issue of denuclearization as a prisoner's dilemma between South and North Korea so far.



outcome of a nuclear free Korean peninsula. S② is a situation that South Korean strategic superiority is reversed in comparison with S③. The reason why South Korea prefers S① to S② is because trouble is possible as long as only one side has nuclear power. S③ can be a depiction of the current situation that North Korea holds a strategically prominent position on the Korean peninsula. We can easily assume that South Korea prefers S② to S③. S④ is a worst scenario for South Korea since both South and North confront each other with nuclear swords. Neither would yield to the other in their desire for nuclear armament and thus the possibility of military tension would increase, which is far from the goal of peace and reunification on the Korean peninsula. South Korea would favor S③ to S④ because there would be no justification for stimulating an armament race in Northeast Asia if both pursue nuclear armament.<sup>14</sup>

On the other hand, the preference order of North Korea is not consistent with that of the South. N① is the best preference for North Korea since it does not have to take the back seat to the South by equipping herself with nuclear weapons.<sup>15</sup> I assume that North Korea prefers N① to N② because the North loses the initiative in relation to other nations in the case of N②. Additionally, I hypothesize that the North would prefer N② to N③ since the North would derive more benefit from the South in the case of both not having nuclear weapons.

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<sup>14</sup>-Each theory of nuclear deterrence argues different explanations regarding the possibility of conflict under the conditions of nuclear parity, preponderance, and inferiority. However, most nuclear deterrence theory maintains that nuclear preponderance is better than nuclear inferiority in terms of strategic superiority. They also maintain that it cannot solidify the standing in negotiation in case of nuclear parity even nuclear parity helps to prevent the conflict. J. Kugler, "Political Conflict, War, and Peace," in Ada W. Finifter (ed.), *Political Science: The State of the Discipline* (American Political Science Association, 1993), pp. 483-510; A. F. K. Organski and J. Kugler, *The War Ledger* (Chicago, IL: University of Chicago Press, 1980).

<sup>15</sup>-The reason why North Korea pursues a nuclear capability, and its advantages is referred in following: Hong Woo-Taek, "Theoretical Analysis for Unification Diplomacy," in Hong Woo-Taek and Park Young-Ho (eds.), *The Analysis for Unification Diplomacy in Korean Peninsula* (Seoul: Korea Institute for National Unification, 2008).

N④ is assumed to be the worst scenario for the North.

If we look at the preferences and payoffs for both actors, each one has a dominant strategy as shown in Figure 1. The dominant strategy for the South is that of ‘Denuclearization,’ while for the North it is the ‘Go Nuclear’ position. In other words, the North would derive more benefit from choosing a2 strategy no matter which strategy the South chose. The same logic applies to the South, and thus the dominant strategy for the South is that of b1. Therefore, the Nash equilibrium on the issue of denuclearization is a2b1. However, the objective of the South Korean government is to induce North Korea to choose the ‘Denuclearization’ strategy. For more in-depth analysis of the issue of denuclearization, I have decomposed the strategic interaction in Figure 2.

Figure 2. B (South Korea)’s Component of Interaction

		A							
		a <sub>1</sub>	a <sub>2</sub>						
B	b <sub>1</sub>	20	5	7.5	7.5	17.5	0	-5	-2.5
	b <sub>2</sub>	15	-5	0	0	17.5	0	-2.5	-5
		B's Total		B's RC		B's FC		B's BC	

The strategic interaction can be decomposed into three components; Reflexive Control, Fate Control, and Behavioral Control. Figure 2 shows the component of the interaction of B (South Korea). First, B's Reflexive Control implies an independent element of control over his payoff no matter what A (North Korea) chooses as a strategy. It can be computed as follows:

$$\begin{aligned} \bar{B} b_1 &= (Bb_1a_1 + Bb_1a_2)/2 = (20+5)/2 = 12.5 \\ \bar{B} b_2 &= (Bb_2a_1 + Bb_2a_2)/2 = (15+(-5))/2 = 5 \\ RC_B &= | \bar{B} b_1 - \bar{B} b_2 | = | 12.5 - 5 | = 7.5 \end{aligned}$$

Thus, it can be said that actor B receives 7.5 units more from strategy  $b_1$  than strategy  $b_2$  no matter what A chooses. Second, B's Fate Control is that how much B's payoff depends on A's strategies irrespective of B's control. It is the average degree of payoff for B when actor A chooses  $a_1$  or  $a_2$ .

$$\begin{aligned}\bar{B} a_1 &= (Ba_1b_1 + Ba_1b_2)/2 = (20+15)/2 = 17.5 \\ \bar{B} a_2 &= (Ba_2b_1 + Ba_2b_2)/2 = (5+(-5))/2 = 0 \\ FC_B &= | \bar{B} a_1 - \bar{B} a_2 | = | 17.5 - 0 | = 17.5\end{aligned}$$

$\bar{B} a_1$  means that B will receive payoff 17.5 if A chooses strategy  $a_1$  and  $\bar{B} a_2$  means B will receive 0 if A chooses strategy  $a_2$ . Thus,  $FC_B$  implies that, on average, 17.5 units of B's payoff depend on the strategy chosen by A. In other words,  $FC_B$  shows that actor B prefers A to choose strategy  $a_1$  since it gives B greater payoffs. Additionally,  $FC_B$  implies that the higher number of  $FC_B$ , the more control A has over B's payoff. Third, B's Behavioral Control means that the degree of how much B's payoff depends on the coordinating its strategy with actor A. The easiest way of computing  $BC_B$  is that  $RCB + FCB + BCB = \text{Original Payoff}$ . In figure 2,  $BC_B$  implies that if B adopts a strategy different from A's strategy, then B's average payoff will be 2.5 units more.

Figure 3. Both Actors' Component of Interaction in an Issue of Denuclearization

$$\begin{array}{c}
 \begin{array}{c}
 \text{A} \\
 a_1 \quad a_2 \\
 \begin{array}{|c|c|}
 \hline
 15 & 20 \\
 \hline
 20 & 5 \\
 \hline
 \end{array} \\
 b_1 \\
 \begin{array}{|c|c|}
 \hline
 -5 & 5 \\
 \hline
 15 & -5 \\
 \hline
 \end{array} \\
 b_2 \\
 \text{Weights}
 \end{array}
 =
 \begin{array}{|c|c|}
 \hline
 0 & 7.5 \\
 \hline
 7.5 & 7.5 \\
 \hline
 \end{array}
 +
 \begin{array}{|c|c|}
 \hline
 17.5 & 17.5 \\
 \hline
 17.5 & 0 \\
 \hline
 \end{array}
 +
 \begin{array}{|c|c|}
 \hline
 -2.5 & -5 \\
 \hline
 -5 & -2.5 \\
 \hline
 -5 & -2.5 \\
 \hline
 -2.5 & -5 \\
 \hline
 \end{array}
 \end{array}$$

$WRC_B = 7.5$        $WFC_B = 17.5$        $WBC_B = -2.5$   
 $WRC_A = -7.5$        $WFC_A = 17.5$        $WBC_A = 2.5$

Using the same method, I have decomposed A's strategic component, as shown in Figure 3. Figure 3 summarizes the payoff structure for both A (North Korea) and B (South Korea) in terms of the strategic component and in terms of the issue of denuclearization. An interesting result is that control over other actors' payoffs (FC) is greater than the actors' own independent control (RC) for both actors:  $RC_A=7.5 < FC_B= 17.5$  and  $RC_B=7.5 < FC_A=17.5$ . This implies that both actors depend highly on each other in order to maximize their payoffs. Another interesting result is that the weighted score of RC for actor B ( $WRC_B$ ) has the same positive sign with the weighted score of FC for actor A ( $WFC_A$ ), while  $WRC_A$  and  $WFC_B$  have different signs. This correspondence of positive signs ( $WRC_B$  and  $WFC_A$ ) means that if B chooses a strategy for his own interest, then this strategy will also benefit A. On the other hand, the different signs of  $WRC_A$  and  $WFC_B$  imply that if A chooses the strategy that benefits its own interest will bring the worse payoff for actor B. Therefore, the question arises as to how actor B can improve his payoff by inducing actor A to choose strategy a1 in a way of issue linkage. In other words, the kinds of conditions necessary for successful issue linkage is the research question which will be dealt with in the next section.

### III-2. The Model of Issue Linkage

I assume several things for the development of the issue-linkage model. First, I simplify the issue linkage game as complete information and simultaneous game.<sup>16</sup> Second, I assume that the number of players in the game of issue linkage is just two: nation A (North Korea) and nation B (South Korea). Third, I assume that the payoff calculation of adding issue onto the original issue can be simply represented by a Cartesian product of the matrix. Thus,  $G_1$  represents game 1 regarding issue 1 and  $G_2$  represents game 2 that has a different issue at heart. After all, the resulting payoff will be  $G_1 \otimes G_2$ . Fourth,  $S_i$  represents the strategies for the players. Thus,  $S_A$  represents the strategies for nation A where  $S_A = \{a_{11}, a_{12}, a_{21}, a_{22}\}$  and  $S_B = \{b_{11}, b_{12}, b_{21}, b_{22}\}$ . Thus,  $a_{11}$  denotes the strategy of A choosing  $a_1$  on issue 1. Let's denote here that  $a_{11}, b_{11}, a_{21}, b_{21}$  is cooperative in terms of behavior while others are not. Fifth, the utilities for each player can be defined as follows:

$U_{1A} = \{a_{11}, b_{11}\}$  represents utility for player A on issue 1 when A chooses  $a_{11}$  and B chooses  $b_{11}$ .

$U_A = \{a_{11}, b_{11}, a_{21}, b_{21}\}$  represents the utility for player A on issue linkage when A chooses  $a_{11}, a_{21}$  and B chooses  $b_{11}, b_{21}$ .

Let's come back to the 'Denuclearization Game' in Figure 1. The actor who seeks issue linkage is actor B (South Korea) since he can improve his payoff if actor A (North Korea) chooses the strategy  $a_1$ . Specifically, A's independent control ( $WRC_A = -7.5$ ) over her own interest

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<sup>16</sup> - In fact, negotiation can be described as a countermovement to proposal. Moreover, payoffs of opponents are in general uncertain. Thus, Incomplete Information Sequential Game would be more relevant in order to reflect these factors. However, I constitute simultaneous model since it can reflect the situation of uncertain information. Moreover, simultaneous model has an advantage of simplicity especially in the modeling of issue linkage.

has a negative sign while A's control over B's payoff ( $WFC_B=17.5$ ) has a positive sign. This means that if A chooses the strategy that benefits her own interest, it will bring about the worse payoff to actor B. While A's payoff maximizing strategy is to choose  $a_2$ , B strongly prefers A to choose  $a_1$ . Therefore, actor B is the only actor that needs the issue linkage that also makes A choose  $a_1$  in issue 1. In other words, B may bring another issue (issue 2) and propose it to A, so that if A chooses  $a_1$  in issue 1 then, B will agree (choose  $b_{21}$ ) on issue 2; which in turn, improves A's position. The reason why actor A does not need issue linkage is that the strategy that maximizes B's own interest also benefits actor A. Thus, A has no need to bring another issue to the negotiation table. Therefore, I propose the following; conditions that both counterbalance and the disadvantages of choosing  $a_{11}$  for actor A by introducing another issue ( $G_2$ ) in the issue linkage of  $G_1 \otimes G_2$ . The conditions that enable the Nash equilibrium in the model of ' $G_1 \otimes G_2$ ' are as follows.

(1) The original issue ( $G_1$ ) should satisfy the following conditions in order to bring another issue to the original issue.

①  $WRC_{B1} < WFC_{B1}$

②  $WRC_{B1} > 0$  and  $WRC_{A1} < 0$  (under  $RC < FC$ )

**Proof 1:**

The case of ① refers to the condition that  $FC$  should be greater than  $RC$ . Actor B can get the best payoff by choosing the strategy based on his preference order if  $RC$  is greater than  $FC$ 's score. Thus, actor B does not want movement in the equilibrium of the original issue by using issue-linkage. In other words, actor B should depend on the choices of actor A in the original issue in order to achieve their ideal position.

As mentioned previously, the first condition of ' $WRC_{B1} > 0$ ' and

' $WRC_{A1} < 0$ ' in ② implies that the pursuit of a maximizing payoff by actor B brings a benefit enhancement to actor A, while the pursuit of a maximizing payoff by actor A runs counter to the benefits of actor B. If the issue has a character of ' $WRC_{B1} < 0$ ' and ' $WRC_{A1} < 0$ ,' then each actor's payoff maximizing strategy is utterly opposed to the benefit increase for all actors. This case is similar to the result of the prisoner's dilemma.<sup>17</sup> Moreover, if the property of issue is ' $WRC_{B1} > 0$ ' and ' $WRC_{A1} > 0$ ,' then actor B does not need an issue linkage on this issue in order to induce actor A to cooperate, since the payoff maximizing strategy of actor A also benefits actor B.

(2) The 'G2' issue should satisfy the following conditions in order to achieve a Nash Equilibrium ((a11, b11) and (a21, b21)) in the issue linkage ( $G_1 \otimes G_2$ ).

①  $WRC_{A2} < WFC_{A2}$

②  $WRC_{A2} > 0$  and  $WRC_{B2} < 0$  (under  $RC < FC$ )

③  $WRC_{B2} \neq WFC_{B2} \neq WRC_{A2} \neq WFC_{A2} \neq 0$  and  $WBC_{B1} \neq WBC_{A1}$

**Proof 2:**

The conditions of ① and ② are opposite conditions with issue 1 (G1). In other words, the pursuit of a maximizing payoff by actor A brings a benefit enhancement to actor B, while the pursuit of a maximizing payoff by actor B runs counter to the benefit of actor A in the issue 2 (G2). Furthermore, if the second issue has the nature of ' $WRC_{B2} = WFC_{B2} = WRC_{A2} = WFC_{A2} = 0$ ,' then the game turns out to be a zero-sum game. If the game is a zero-sum game, issue linkage may not be a useful means of modifying the Nash equilibrium in the original issue (G1).

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<sup>17</sup> - This analysis excludes an examination regarding how to get the cooperative agreement in the game of prisoner's dilemma by using issue linkage.

**III-3. The Nature of the ‘Openness, 3000’ Issue**

So far, I have examined the conditions as the second issue to be successful in issue linkage. In this section, I will compare the results of the issue-linkage model with the ‘Openness, 3000’ policy in order to examine whether ‘Denuclearization, Openness, 3000’ would be an appropriate policy tool to achieve a nuclear free Korean peninsula. For this purpose, I have calculated the strategy and payoff, and summarized both in Figure 4.<sup>18</sup>

**Figure 4. The Strategy and Payoff in the Issue of ‘Openness, 3000’**

		A (North Korea)	
		a <sub>21</sub> (cooperate)	a <sub>22</sub> (Non-cooperation)
B (South Korea)	b <sub>21</sub> (cooperate)	15 20	20 15
	b <sub>22</sub> (Non-cooperation)	-5 5	5 -5

Payoff order for South Korea

- S① A chooses ‘Cooperate’ and B chooses ‘Cooperate’ (a<sub>21</sub>b<sub>21</sub>): 20
- S② A chooses ‘Non-cooperation’ and B chooses ‘Cooperate’ (a<sub>22</sub>b<sub>21</sub>): 15
- S③ A chooses ‘Cooperate’ and B chooses ‘Non-cooperation’ (a<sub>21</sub>b<sub>22</sub>): 5
- S④ A chooses ‘Non-cooperation’ and B chooses ‘Non-cooperation’ (a<sub>22</sub>b<sub>22</sub>): -5

Payoff order for North Korea

- N① B chooses ‘Cooperate’ and A chooses ‘Non-cooperation’ (a<sub>22</sub>b<sub>21</sub>): 20
- N② B chooses ‘Cooperate’ and A chooses ‘Cooperate’ (a<sub>21</sub>b<sub>21</sub>): 15
- N③ B chooses ‘Non-cooperation’ and A chooses ‘Non-cooperation’ (a<sub>22</sub>b<sub>22</sub>): 5
- N④ B chooses ‘Non-cooperation’ and A chooses ‘Cooperate’ (a<sub>21</sub>b<sub>22</sub>): -5

The preference order of North Korea in the issue of ‘Openness, 3000’ is consistent with that of the ‘Denuclearization’ issue. This is

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<sup>18</sup>-Both actors’ choices are also simplified into two categories of cooperation and non-cooperation in the Openness, 3000 issue. In this issue, cooperation means the expansion of economic exchanges through the mutual opening of both Koreas, while non-cooperation means the opposite.



because the top priority for North Korea is regime maintenance, and thus both denuclearization and economic openness as well as cooperation with South Korea are regarded as serious matters by North Korea.<sup>19</sup> Therefore, non-cooperation is assumed to be the best strategy for North Korea in response to any strategy of South Korea in terms of the issue of economic openness and cooperation. However, I assumed that North Korea would be better off to cooperate when the South cooperated, in comparison to when the South chooses non-cooperation. In the same context, I hypothesize that N④ is the worst case for North Korea. On the other hand, the perspective of South Korea in the issue of economic openness and cooperation has a slightly different preference order as compared with the issue of denuclearization. The second preference and third preference are reversed in terms of the issue of economic openness. Although this inference can be a controversial one, I assumed this because S② reflects the belief of the previous South Korean government. Figure 5 is the summary of the strategic interaction for both Koreas in terms of the issue of ‘Openness, 3000.’

Figure 5. Both Actors’ Components of Interaction in the Issue of Openness, 3000

$$\begin{array}{c}
 \text{A} \\
 \begin{array}{cc}
 a_1 & a_2 \\
 \begin{array}{cc}
 b_1 & \begin{array}{|c|c|} \hline 15 & 20 \\ \hline 20 & 15 \\ \hline \end{array} \\
 b_2 & \begin{array}{|c|c|} \hline -5 & 5 \\ \hline 5 & -5 \\ \hline \end{array} \\
 \text{Weights} & \\
 \end{array} \\
 \end{array}
 =
 \begin{array}{cc}
 \begin{array}{|c|c|} \hline 0 & 7.5 \\ \hline 17.5 & 17.5 \\ \hline \end{array} & + \\
 \begin{array}{|c|c|} \hline 0 & 7.5 \\ \hline 0 & 0 \\ \hline \end{array} & + \\
 \begin{array}{|c|c|} \hline 17.5 & 17.5 \\ \hline 7.5 & 0 \\ \hline \end{array} & + \\
 \begin{array}{|c|c|} \hline -2.5 & -5 \\ \hline -5 & -2.5 \\ \hline -2.5 & -5 \\ \hline \end{array} \\
 \begin{array}{l}
 \text{WRC}_{B2} = 17.5 \\
 \text{WRC}_{A2} = -7.5 \\
 \text{WFC}_{B2} = 7.5 \\
 \text{WFC}_{A2} = 17.5 \\
 \text{WBC}_{B2} = -2.5 \\
 \text{WBC}_{A2} = 2.5
 \end{array}
 \end{array}
 \end{array}$$

<sup>19</sup> -Hong Woo-Taek, *ibid*, 2008.

To sum up, ‘Openness, 3000,’ which is a catchphrase for economic openness and cooperation, does not come close to the conditions necessary for successful issue linkage. First of all, the weighted score of the RC for actor B ( $WRC_{B2}$ ) has the same positive sign with the weighted score of FC for actor A ( $WFC_{A2}$ ), while  $WRC_{A2}$  and  $WFC_{B2}$  have negative and positive signs respectively. This implies that the nature of ‘Openness, 3000’ is the same as the nature of the ‘Denuclearization’ issue. Even if the second preference of South Korea is changed with that of the third preference, the result of the analysis is the same. Thus, the issues of the “Openness, 3000” policy are less desirable for issue linkage, considering the premise that issues of a structurally contradicting nature are linked.

#### IV. Policy Implications

The results of the analysis of the issue-linkage model provide the following policy implications. First, reviewing both Koreas’ preferences on the denuclearization issue, it is necessary to secure a high level of mutual interdependence in order to solve the problem. However, North Korea’s strategic choice to keep its nuclear weapons imposes a restraint on South Korea, thereby pushing her to devise a strategy which can modify North Korean options. Therefore, issue linkage is the appropriate strategy to be employed in order to induce North Korea to choose the denuclearization option.

Second, the “Openness, 3000” policy seems to be less desirable in drawing North Korea towards denuclearization. If one considers the “Openness, 3000” policy as a way to generate inter-Korean economic cooperation through the opening of the North Korean economy, both Koreas’ preferences in terms of this issue are similar to that of the denuclearization issue, and therefore the optimal conditions for issue

linkage cannot be achieved. The payoff structure of the “Openness, 3000” policy shows that the South Korean strategy of economic cooperation, intended to achieve optimum benefit from the South’s point of view, would also bring benefit to North Korea; however, from the North Korean perspective, a choice that guarantees the optimum benefit to North Korea is not one of economic cooperation through opening her economy. The result of the above issue-linkage game model shows that an issue linkage is more likely to succeed if the interest structure of the issue is such that the North Korean choice for an optimum benefit will also bring benefit to South Korea, even though South Korea’s strategic choice for its optimum benefit is not favorable to North Korean interests. The “Openness, 3000” policy, therefore, falls short of an effective “linking issue” to the ultimate goal of denuclearization.

It is also possible to divide an issue into many smaller points and come to an agreement by taking out one of the smaller issues. An important point is to note that when supplementing an issue, it should be an issue that can induce an agreement, and when taking it out, it must be one that obstructs an accord. The denuclearization of North Korea is a difficult task for North Korea to agree on. By examining the issue linkage method, it is important to determine which issues are to be linked. To sum up, issue linkage is an appropriate method to solve the denuclearization issue. However, the issue to be linked should be one in which North Korea needs cooperation from South Korea. Conditions for a successful issue linkage can be expressed by the metaphor which follows:

*Try to find out what North Korea really wants and needs.*

*Take a firm stand on the issue.*

*Then link the issue to denuclearization.*

According to Prospect Theory, the result may depend on how the issue

is embellished. For issue linkage to be meaningful, it is necessary to conduct further research on various issues as well as to study the make up of issues.

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