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국제학석사학위논문

A Game Theory Analysis of
the US-China Cooperation
in Denuclearization of North Korea

미·중의 북한 비핵화 협력에 대한 게임이론 분석

2022년 8월

서울대학교 국제대학원

국제학과 국제협력전공

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Abstract

A Game Theory Analysis of the US-China Cooperation in Denuclearization of North Korea

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For decades, North Korea's nuclear program has remained as a major security challenge for Northeast Asia region as well as the global nuclear non-proliferation regime. To resolve this issue, the international community has tried to compel North Korea to abandon its development of nuclear weapons through variety of measures such as economic sanctions and diplomatic talks. Despite such efforts, North Korea has conducted six nuclear tests since 2006 and nuclear threats by North Korea are increasing. Meanwhile, many experts view that China's role in solving nuclear issue in the North is vital as Beijing remains as the largest trading partner of Pyongyang. The puzzle is, while China had shown cooperation in adopting UN Security Council Resolutions that imposed economic sanctions against North Korea, Beijing had shown opposition to US imposed unilateral sanctions against North Korea. Why, then, does China show inconsistent level of cooperation in economic sanctions against North

Korea? When does the US impose unilateral sanctions in addition to UN sanctions? What are the conditions for the US-China cooperation on North Korean sanctions? Despite the importance of the China's role in sanctions, few studies have been conducted to analyse Beijing's cooperation in North Korean sanctions. This research takes a novel approach of game theory with case studies to explain the dichotomy of cooperation and defection by Beijing. By examining various official documents, national media reports, and scholar writings, this study reveals that when there is mutual US-China distrust, the US adopts forceful denuclearization policy followed with unilateral sanctions, to which China defects by attempting to ease sanctions on Pyongyang to ensure North Korea's regime stability. In other words, while the United States prioritizes denuclearization of North Korea, China prioritizes the regime stability of North Korea. Based on the game theoretical analysis, this paper concludes peaceful denuclearization will be more likely bring about US-China cooperation in denuclearization of North Korea.

Keywords : North Korea denuclearization, UN Security Council sanctions, US sanctions, US-China strategic competition, stag-hunt game theory

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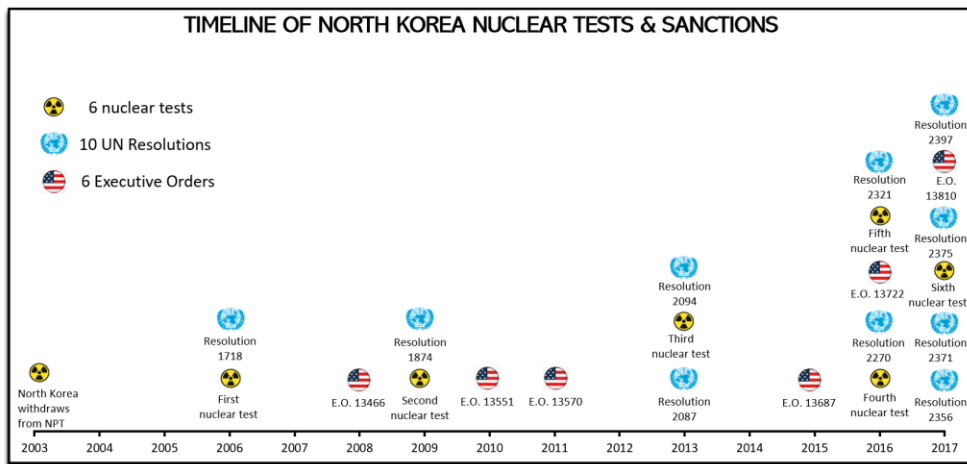
Chapter 1. Introduction

1. Research Question

China is one of the five permanent members of UN Security Council and has adopted numerous UN Security Council Resolutions that imposed economic sanctions on North Korea since its first nuclear test in 2006. However, when the US adopted its unilateral sanctions on North Korea also designed to pressure North Korea to abandon its nuclear weapons, China publicly opposed and even suggested to partially lift sanctions on North Korea.¹ As shown in Figure 1 below, North Korea has conducted the total of six nuclear tests, which were followed with 10 UN Security Council Resolutions, as well as six US six executive orders of unilateral sanctions. Sanctions are a mechanism designed to rein in North Korea from conducting nuclear and long-range missile tests. Why, then, does China show inconsistent level of cooperation in economic sanctions against North Korea? When does the US impose unilateral sanctions in addition to UN sanctions? What are the conditions for achieving US-China cooperation in denuclearization of North Korea?

¹ Charlotte Gao, "China Opposes Unilateral Sanctions on North Korea," *The Diplomat*, August 31, 2017, available from <https://thediplomat.com>.

Figure 1. Timeline of North Korea Nuclear Tests & Sanctions



Source: own elaboration.

2. Research Significance

The significance of research is as follows. First, nuclear weapon remains as one of the major security threats in the world along with the pandemic and climate change. North Korea is the only country in the world to have withdrawn from the Treaty on the Non-Proliferation of Nuclear Weapons (NPT) in 2003, and then continued to pursue developing its nuclear weapons program. Recently Pyongyang has stated that in case of conflict with South Korea, “nuclear combat force will have to inevitably carry out its duty” and leave the South’s military “little short of total destruction and ruin.”² Ever since declaring the country's nuclear arsenal "complete" after

² *Korean Central News Agency*, “Press Statement of Vice Department Director of C.C., WPK Kim Yo Jong,” April 5, 2022, available from <http://www.kcna.co.jp/index-e.htm>.

the sixth nuclear test in 2017,³ North Korean leader Kim Jong Un has also directly threatened with nuclear force in a speech during military parade on April 25, 2022: “the nuclear forces. . .should be strengthened in terms of both quality and scale, so that they can perform nuclear combat capabilities in any situations of warfare.”⁴

On the other hand, the US-China strategic competition has become a major “context” in the process of financial sanctions and nuclear negotiations with North Korea.⁵ Meanwhile, China’s role in international sanctions remains critical in pressuring Pyongyang as Beijing accounted for 88.2% of North Korea's total trade in 2020.⁶ Haggard and Noland highlight the importance of international solidarity in pressuring North Korea, as they claim that North Korea will always take advantage of the “weakest link” without a unified signal of either punishing North Korea or rewarding it in exchange for change.⁷ Therefore, this research aims to find what factors induce the US-China cooperation in denuclearization of North Korea.

³ 전봉근, 「2022년 북핵 동향 평가와 북핵협상 재개 전략」, 『IFANS 주요국제문제분석 2022-04』 (2022), 1.

⁴ *Korean Central News Agency*, “Respected Comrade Kim Jong Un Makes Speech at Military Parade Held in Celebration of 90th Founding Anniversary of KPRA,” April 26, 2022, available from <http://www.kcna.co.jp>.

⁵ 최우선, 「미중관계의 북핵문제에 대한 영향」, 『IFANS 주요국제문제분석 2018-46』 (2018), 1.

⁶ KOTRA, 「2020 북핵 대외무역 동향」, 『KOTRA자료 21-163』 (2021), 14.

⁷ Stephan Haggard and Marcus Noland, *Hard Target: Sanctions, Inducements, and the Case of North Korea* (Stanford: Stanford University

3. Literature Review

As the US-China strategic competition has intensified over the recent years, there is a growing debate whether the US and China will be able to cooperate on the North Korean nuclear issue. While Richard Gowan who views that the US-China cooperation on DPRK is possible at the international venues like the UN which “still offers a safe space for these powers to strike compromises,”⁸ the majority of experts view that the US-China strategic competition has negative impact on North Korea’s nuclear issue. Scott Snyder asserted that a downturn in the US-China relationship is likely to prevent cooperation and create a source of future instability in Korea.⁹ Such negative prospect has been more dominant among Washington policymakers, who have increasing suspicion that China prioritizes DPRK regime security over the nuclear non-proliferation regime and nuclear threats.¹⁰

Press, 2017), 8.

⁸ Richard Gowan, "Minimum Order: The Role of the Security Council in an Era of Major Power Competition," (United Nations University Centre for Policy Research (UNU-CPR) (March 2018), 3.

⁹ Scott Snyder, "The Rise of U.S.-China Rivalry and Its Implications for the Korean Peninsula," in *Korean Security Dynamics in Transition*, ed. Kyung-Ae Park and Dalchoong Kim (New York: Palgrave Macmillan, 2001), 119.

¹⁰ Susan A. Thornton, Li Nan, and Juliet Lee, “Debating North Korea: US and Chinese perspectives,” *38 North*, August 27, 2021, available from <https://www.brookings.edu>.

In academic literature on nuclear negotiations with the North, majority of literature explores the US-DPRK relationship, focusing on how the US government's North Korean different policies, such as hard line or engagement policies, affect North Korea in nuclear negotiations.¹¹ Other researches focus on US-China relations in scenarios in which China has the options of punishing North Korea or tolerating Pyongyang, while the US has the options of conducting a military response to North Korea or responding with non-military means.¹² While previous research gives a good overview of US-DPRK relations or US-China relations, there is still lack of in depth study that focuses on US-China relations in economic sanctions towards North Korea, and this study aims to fill that gap.

The organization of this paper is as follows. First, Chapter II explains the methodologies used in this paper, including the research hypothesis, which claims that the US unilateral sanctions cause China's defection in denuclearization of North Korea. This paper utilizes a stag hunt game theoretic model which has two Nash Equilibria and follows the congruence procedure to test the research

¹¹ Seong-ho Sheen, "U.S. Coercive Diplomacy toward Pyongyang: Obama Vs. Trump," *Korea Institute for Defense Analyses* vol.32, no.4 (December 2020), 518.

¹² Jooyoung Song, "Understanding China's Response to North Korea's Provocations", *Asian Survey* vol. 51, no. 6 (November/December 2011), 1135.

hypothesis that US unilateral sanctions is the deciding factor in the US-China cooperation. Chapter III then provides an overview of North Korea's nuclear capability, followed by overview of UN sanctions and US sanctions, exploring the backgrounds and procedures in adoption of the sanctions, and what differences that UN and US sanctions have. In doing so, in Chapter IV this paper explores two case studies—one risk dominant and one payoff dominant—followed with a game theoretic analysis. In conclusion of Chapter V, this paper draws implications from the case studies that US-China cooperation is still possible under the presumption that there is trust between two countries and that US adopts peaceful denuclearization efforts deviating from adopting additional unilateral sanctions against North Korea. This paper also leaves room for policy implications for other stakeholders such as the United Nations and Republic of Korea to successfully achieve denuclearization of North Korea, requiring further research in this subject matter.

Chapter II. Methodology

1. Research Hypothesis

In this paper, the following research hypotheses are proposed. The prime hypothesis is that the US unilateral sanctions cause China's defection in denuclearization of North Korea. To explain this prime hypothesis, there are three explanatory hypotheses. First, high uncertainty in US-China relations causes the US to adopt aggressive denuclearization policy, which entails additional US unilateral sanctions. Second, US unilateral sanctions multiply the effects of sanctions to cause North Korean regime instability. Third, China cooperates with measures to secure stability of North Korean regime, but China will also impose sanctions if North Korea's actions cause destabilization. To explore the above hypotheses, a game theory model and congruence procedure will be used to analyse the complex US-China cooperation and defection in North Korean economic sanctions.

2. Stag Hunt Game Theory

History

Game theory first appeared in 1944 when John von Neumann and Oskar Morgenstern published a book called *Theory of Games and Economic Behavior*. Afterwards, game theory became consistent with the theory when John Nash presented the concept of 'Nash equilibrium' through his doctoral thesis at Princeton University in the 1950s. Nash equilibrium shows that equilibrium can be reached when choosing the optimal strategy after assuming what the other party will make. Since then, game theory has spread not only to economics but also to general social sciences such as business administration, politics, and law.

In international relations, American economist Thomas Schelling, who won the Nobel Prize in Economics in 2005, first used game theory in his 1960 book *The Strategy of Conflict* to explain the nuclear strategy and arms race of the US–Soviet Cold War.¹³ Since then, game theory has been also applied to research on the North Korean nuclear issue, but most of previous studies focused on using game theory model to analyse the North Korean nuclear negotiations

¹³ Thomas C. Schelling, *The Strategy of Conflict* (Cambridge: Harvard University Press, 1960): 54.

between the United States and North Korea. As a representative example, there is a study using game theory to analyse how the US military approach and diplomatic dialogue approach affect North Korea's denuclearization negotiations.¹⁴ Also, there is a study analysing how the US moderate policy and hawkish policy interact with North Korea's slash-and-burn tactics using game theory.¹⁵

Furthermore, there are few game theory studies comparing the policies of the United States and China regarding the North Korean nuclear program. One study analysed how China responds to the US military response after North Korea's nuclear test using game theory, concluding that China is less willing to cooperate with the US when the US adopts military response measures to North Korea.¹⁶ Nevertheless, there is limited literature on the game theoretic analysis of cooperation and defection of North Korean economic sanctions by the United States and China, through which this study intends to narrow the knowledge gap.

¹⁴ Obeidi, Amer, Keith W. Hipel, and D. Marc Kilgour, "The Role of Emotions in Envisioning Outcomes in Conflict Analysis," *Group Decision and Negotiation* 14, no. 6 (2005): 485.

¹⁵ Hee Min Kim, and Jun Y. Choi, "Uncertainty in Foreign Policy Making: A Bayesian Game Analysis of Korea," *Global Economic Review* vol. 31, no. 3 (2002): 30.

¹⁶ Jooyoung Song, "Understanding China's Response to North Korea's Provocations," *Asian Survey* 51, no. 6 (2011): 1136.

Stag Hunt Game Theory

A stag hunt game is a game which describes a conflict between safety and social cooperation, also known as "trust dilemma".¹⁷ Originated from *Discourse on Inequality*, Jean-Jacques Rousseau depicts a story where there are two individuals who go on a hunt. Each individual can choose to hunt a stag or hunt a hare, which leads to different payoff values. The caveat is that each player must decide on what to hunt without knowing another individual's choice of hunt. Hunting a stag which has a higher payoff value requires cooperation between two individuals. For instance, if player 1 decides to hunt a stag successfully, the player 2 should also hunt a stag. But if only player 1 goes for hunting a stag, and player 2 does not, the stag hunt will result in failure.

Figure 2. Stag Hunt Game Payoff Matrix

		Player 2	
		Stag	Hare
Player 1	Stag	3, 3	0, 2
	Hare	2, 0	1, 1

Source: own elaboration.

¹⁷ Jean-Jacques Rousseau, *Discourse on Inequality*, (Harmondsworth, Middlesex, England: Penguin Books, 1984): 34.

On the other hand, each player can hunt hare, which can be captured individually. As such, in the payoff matrix below, if both player 1 and player 2 decide to hunt a stag together, then they will succeed and get a payoff of 3. But if the player 1 hunts a hare and the player 2 hunts a stag, then only player 1 will be able to capture hare with payoff value of 2, while player 2 will not be able to capture stag and get net payoff value of 0. And each player can decide to hunt hare individually without knowing another.

What is unique about the stag hunt game is that unlike most other games that have a single Nash equilibrium, a stag hunt game has two pure strategy Nash equilibria (NE) of risk dominant and payoff dominant cases. In detail, the payoff dominant is a case in which both players choose to hunt stag (Stag, Stag) and receive higher payoffs for both players. On the other hand, two players can also result in risk-dominant scenario where they hunt hare individually (Hare, Hare) but with less payoff values. Since uncertainty exists about the other player's action, the higher uncertainty players have about the decision of the other player, the more likely they will choose the risk-dominant hunting strategy.

Strategy and Payoff Structure

Ever since the United States and China established diplomatic ties in 1979, the political and economic factors of two countries developed into a very complex relationship in which cooperation and competition appeared simultaneously.¹⁸ In terms of game theory, two countries had shown different strategies depending on the “context” in which they would choose risk-dominant strategy if there was uncertainty about the other country’s action or pay-off dominant strategy in times of certainty. In order to apply stag hunt game theory model to US-China, two countries’ strategies and payoffs must be defined first. In this paper, the strategies and payoff values of two players are defined as follows based on literature review:

Figure 3. US-China Payoff Matrix against North Korea

		China	
		Cooperate (UN Sanctions)	Defect (Sanctions Relief)
United States	Cooperate (UN Sanctions)	3, 3	0, 2
	Defect (Unilateral sanctions)	2, 0	1, 1

Source: own elaboration.

¹⁸ 신중호 외, 「2030 미중관계 시나리오와 한반도」, 『KINU 연구총서 18-26』, (2018), p. 23.

The US and China can either choose to cooperate (stage) or defect (hare) depending on the uncertainty between two players which would result in different payoff values for each country. Here, US-China cooperation is shown by choosing same strategy of UN sanctions, while two countries have different defection strategies. For the US, the defection strategy would be adopting unilateral sanctions while for China it is sanctions relief. By comparing risk-dominant and pay-off dominant cases studies, this study will identify the condition variables to enable the US-China cooperation in efforts towards denuclearization of North Korea.

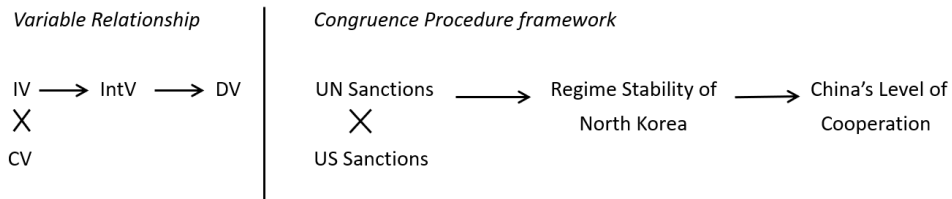
3. Congruence Procedure

In order to identify the condition variable for cooperation between competing actors of the US and China, this paper will employ Stephen Van Evera's congruence procedure. A congruence procedure model is useful for testing condition variable by comparing cases with extreme (high or low) values on the condition variable "CV" along with independent variable "IV" and its effects on dependent variable "DV".¹⁹ In addition, high value on the CV should multiply the effects of the IV on the intervening variable "IntV" and

¹⁹ Stephen Van Evera, *Guide to Methods for Students of Political Science* (New York: Cornell University Press, 2016), 13.

DV, a very low value on the CV should diminish the IV's impact on IntV and DV, as shown in figure below.

Figure 4. Congruence Procedure by Stephen Van Evera



Source: own elaboration.

For condition variable to be valid, researcher studies cases with large within-case variance on the value of the CV and little or no within-case variance on the IV. If the CV is important, the DV's value should covary with it. As my hypothesis states that the US unilateral sanctions cause China's defection in in denuclearization of North Korea, the condition variable will be set to US unilateral sanctions, an outcome of US aggressive denuclearization policy. Next, cases with extreme variance values on the US sanctions will be selected to test the candidate condition variable. Therefore, first case will be when Trump administration imposed additional US unilateral sanctions as high-level condition variable, and second case will be when Bush administration waived US unilateral sanctions as low-level condition variable as depicted by figure below.

Figure 5. Case selection with extreme values of CV

Case 1 - Risk Dominant (High CV value): Trump Administration (2017)



Case 2 - Payoff Dominant (Low CV value): Bush Administration (2008)



Source: own elaboration.

In conducting this research, this paper utilizes data sources found in the discourse in the United Nations General Assembly First Committee, Reports of the Panel of Experts under UN Security Council Sanctions Committee on North Korea (2009–2020), and archival research of UN Security Council resolutions on North Korea (2006–2017). The extracted data is then analysed under the framework of stag-hunt game theory explaining when two superpowers cooperate and compete on North Korean nuclear issue.

Chapter III. Overview of DPRK Sanctions

1. North Korea Nuclear Program

First, it is important to understand current development of North Korea's nuclear program. Experts view that Pyongyang currently possesses about 50 weapons grade nuclear material, manufacturing five to seven nuclear weapons annually.²⁰ Despite the denuclearization efforts in the past, North Korea's 5MW(e) nuclear reactor along with the reprocessing facility are fully operational according to IAEA.²¹

Figure 6. Nuclear Tests by North Korea



Source: United States Geological Survey

²⁰ Ibid.

²¹ IAEA, "Application of Safeguards in the Democratic People's Republic of Korea," GOV/2021/40-GC(65)/22 (2021), 5.

According to DPRK experts, North Korea possesses many nuclear and missile facilities which have not been disclosed. With the help of satellite images, the intelligence through space satellites has revealed numerous hidden facilities in mountain areas suspected of nuclear and missile facilities, which indicate that that North Korea has continued to pursue its nuclear program development even after the Trump–Kim summit.²² Furthermore, determining the entire picture of North Korea's nuclear and missile capability is a challenging task as DPRK possesses many hidden assets that can carry nuclear weapons such as the mobile launchers and submarines.

At this critical juncture, North Korea is clearly not in a position to immediately forgo its nuclear program as DPRK sees it as an important bargaining chip in negotiation to ease sanctions and guarantee the regime survival. As such, Pyongyang is suspected of continuing nuclear and missile development in clandestine manner as the international community has witnessed that North Korea refused the comprehensive deal to give a detailed list of nuclear facilities during the Hanoi summit in 2018. Since then, experts view that North Korea will be likely to further develop its nuclear arsenal.

²² Nikkei Inc., “A satellite view of North Korea's nuclear sites,” *Nikkei Asia*, accessed May 16, 2022, available from <https://asia.nikkei.com/static/vdata>.

2. UN Sanctions

This paper divides sanctions against North Korea into two categories—UN international sanctions and US unilateral sanctions. First, UN international sanctions have been widely used to respond to a variety of security threats to international peace and security. Understanding the background and nature of UN sanctions is essential to explain different behaviours shown by the US and China.

Before UN sanctions are enforced, the Security Council is designed to promote peaceful methods to resolve international disputes found in the UN Charter. In Chapter VI of UN Charter, it authorizes the Security Council to call on member states to seek solutions through peaceful means including negotiation or arbitration. If failed, then Chapter VII of the UN Charter gives authority to the Security Council to take more active roles including imposing sanctions or use of force “to maintain or restore international peace and security” from Article 41 under Chapter VII of the UN Charter.²³

The Security Council may decide what measures not involving the use of armed force are to be employed to give effect to its decisions, and it may call upon the Members of the United Nations to apply such measures. These may

²³ United Nations, *Charter of the United Nations*, 1 UNTS XVI, October 1945, available from <https://www.un.org/en/about-us/un-charter/full-text>.

include complete or partial interruption of economic relations and of rail, sea, air, postal, telegraphic, radio, and other means of communication, and the severance of diplomatic relations.²⁴

Based on the Article 41 of the UN Charter, the UN sanctions are not only legally binding, but they are also universally applied.²⁵ Specifically, the degree to which UN resolution becomes legally binding depends on the phrases put into the text of resolution, and resolutions which contain the phrases such as ‘decide’, ‘demand’ or ‘shall’, make the Resolution legally binding for all Member States while phrases such as ‘call upon’ and ‘urge’ do not.²⁶ Moreover, UN Resolutions are drafted based on the UN Charter which mandates the UN and all of its member states to maintain international peace and security and uphold international law to achieve "higher standards of living" for their citizens, address "economic, social, health, and related problems", and promote "universal respect for, and observance of, human rights and fundamental freedoms for all without distinction as to race, sex, language, or religion."²⁷

²⁴ Ibid.

²⁵ Biersteker, T., Eckert, S., & Tourinho, M, *Targeted Sanctions: The Impacts and Effectiveness of United Nations Action*, (Cambridge University Press, 2016), 12.

²⁶ 임갑수 외, 「유엔 안보리 제재의 국제정치학」, (한울아카데미, 2013), 32.

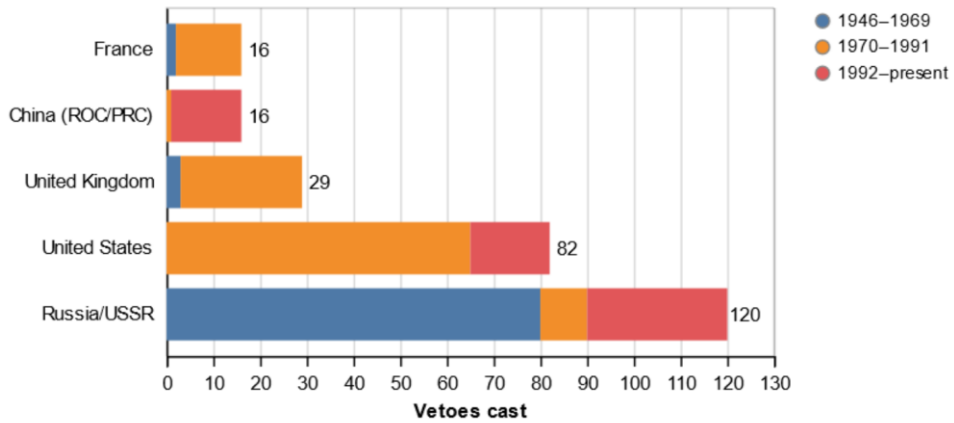
²⁷ United Nations, *Charter of the United Nations*, 1 UNTS XVI, October 1945, available from <https://www.un.org/en/about-us/un-charter/full-text>.

Structure

The structure of the UN sanctions committees is comprised of Council members that are responsible for the implementation of sanctions regimes. The UN Security Council is consisted of five permanent members including France, Russian Federation, the United Kingdom, the United States, and China, collectively known as the P5. In addition, there are ten elected members in the Council, which serve two-year yet non-consecutive terms, and the elected members typically chair the sanction committees.

The biggest difference between permanent members and elected members is that permanent members have veto power of Security Council resolutions while elected members do not. The problem is that there has been no change or reform in the permanent members of the Council since its establishment in 1945. Meanwhile, the P5 members have taken advantage of exercising the veto power. According to the UN data, Russia including the Soviet years tops the number of vetoes with 120 vetoes, followed by the United States with 82 vetoes as shown by a Figure below.

Figure 7. List of vetoed UN Security Council resolutions



Source: UN data presented by the Dag Hammarskjöld Library.

More importantly, other members like China also increased the use of veto recently, as China has sided with Russia in exercising its veto in the last 13 vetoes since 2007, forming an anti-coalition within the Council. Such lack of political consensus has formed an obstacle in successfully adopting UN resolutions that can further give legitimate grounds to put in economic sanctions. Such limitation led to many member states to criticize the Security Council's rigid structure which fails to address current geopolitical landscapes. While the Security Council had expanded to ten elected members from six in 1965, the body's composition has remained unchanged.

Other critics point out that the veto gives unequal power to the P5 members, leading to stalemate in the face of security crisis. The former UN human rights chief Zeid Ra'ad al-Husseini warned that the United Nations could collapse if there is no restructuring change due to significant power of permanent member states.²⁸

In 2021, UN General Assembly President Volkan Bozkir said that reforming the Security Council should be an important objective as he believed that “the implementation of the Council’s decisions, and its very legitimacy, could be enhanced if the Council was reformed to be more representative, effective, efficient, accountable and transparent.”²⁹ Former UN General Assembly President Volkan Bozkir also said in 2021 that reforming the Security Council should be an important objective as he believed that “the implementation of the Council’s decisions, and its very legitimacy, could be enhanced if the Council was reformed to be more representative, effective, efficient, accountable and transparent.”³⁰

²⁸ VOA News, “Outgoing UN Human Rights Chief Warns UN Could Collapse,” *VOA*, August 21, 2018, available from <https://www.voanews.com>.

²⁹ UN News, “Security Council Reforms Must Reflect 21st Century Realities, Says UN Assembly President,” United Nations, January 26, 2021, available from <https://news.un.org/en/story/2021/01/1082962>.

³⁰ UN News, “Security Council Reforms Must Reflect 21st Century Realities, Says UN Assembly President,” United Nations, January 26, 2021, available from <https://news.un.org/en/story/2021/01/1082962>.

Despite such growing calls for reforms, there has been no meaningful reform in the Security Council yet. The prospects for the structural reform of the Council are seen distant due to the fact that amending the UN Charter would require two-thirds of UN member states' affirmative vote as well as domestic ratification. Meanwhile, the permanent members are unlikely to take measures to scale down their sphere of influence.

UN Sanctions History

The UN Charter was signed in San Francisco and went into effect in October 1945, United States. Following ratification by the five permanent members of the United Nations Security Council—the United Kingdom, and the United States, the Soviet Union, China, France, the first sanctions regime of the Security Council was established in 1968.³¹ The sanctions provisions, which can be found in Article 41 of the UN Charter, were largely inactive during the Cold War, but later have become frequently used tool of the Council.

So far, there are total of 30 sanctions regimes by the UN Security Council, which include Angola, CAR, Côte d'Ivoire, DPRK, DRC, Eritrea/Ethiopia, Guinea-Bissau, Haiti, Iran, Somalia/Eritrea,

³¹ United Nations, Security Council, *Subsidiary Organs of the United Nations Security Council Fact Sheets 2022* (January 2022), 4-5.

Iraq, ISIL (Da'esh) and Al-Qaida, Lebanon, Liberia, Libya, Mali, Rwanda, Sierra Leone, South Africa, South Sudan, and Southern Rhodesia, Sudan, the Former Yugoslavia, the Taliban, and Yemen. Today, there are 14 sanctions regimes which focus on supporting political settlement of conflicts, nuclear non-proliferation, and counterterrorism.³²

Meanwhile, sanctions regimes have frequently been amended for reforms as the UN Security Council underwent through significant changes over the past decades. Most notably, over the past fifty years, the focus and scale of sanctions regimes have changed from use of comprehensive sanctions to the use of targeted sanctions.³³ In the aftermath of the comprehensive trade embargo imposed on Iraq in 1990 that resulted in devastating humanitarian consequences, a substantial review of the sanctions regime took place to transition from comprehensive to targeted sanctions.

Today, most of UN sanctions are classified as targeted sanctions, which intend to have limited, as opposed to compressive, and specific focus on individuals, entities, and institutions.³⁴ While the most frequently used types of sanctions include travel bans,

³² Ibid.

³³ United Nations, *Charter of the United Nations*.

³⁴ Biersteker et al., *Targeted Sanctions*, 11.

asset freezes, and arms embargos, there are six broad categories of sanctions from 1) individual/entity sanctions, 2) diplomatic sanctions, 3) arms embargos, 4) commodity sanctions, 5) transportation sanctions, and last but not least 6) financial sanctions, among which arms embargoes are the most frequently adopted UN sanctions.³⁵

Effectiveness of UN Sanctions

Over the past decades, the effectiveness of sanctions has garnered much debate among policymakers as to how significant changes that the UN sanctions can actually bring. The first most notable research was conducted by Hufbauer, Schott, and Elliot in *Economic Sanctions Reconsidered* who analysed 211 cases of sanctions and suggested that sanctions were effective 37 percent of the time.³⁶

According to research by Targeted Sanctions Consortium (TSC) which conducted a comprehensive assessment of UN targeted sanctions, “sanctions are effective in coercing, constraining, or signalling a target on average about 22% of the time.”³⁷ Furthermore, TSC found that targeted sanctions are more effective in constraining

³⁵ Biersteker et al., *Targeted Sanctions*, 25.

³⁶ Hufbauer, G., Schott, J., Elliott, K. and Oegg, B., *Economic Sanctions Reconsidered*, (Peterson Institute for International Economics, 2009), 13.

³⁷ Biersteker et al., *Targeted Sanctions*, 31.

target behavior (27%) than in coercing a change in behavior (10%).³⁸

On the other hand, there are other researches which claim that sanctions are effective as little as five percent.³⁹

DPRK Sanctions Regime

In response to North Korea's numerous nuclear tests and ballistic missile launches that threatened the peace and stability, the Security Council has adopted ten resolutions so far imposing multiple sanctions on Pyongyang. Since 2006, North Korea has conducted the total of six nuclear tests, the latest of which Pyongyang claimed to be a hydrogen bomb test on September 3, 2017. Since then, North Korea has also persistently conducted its ballistic missile launches. In response, the Security Council strengthened the sanctions regime by identifying and attempting to close gaps in the existing measures, resulting in adopting additional resolutions to the 1718 sanctions regime, such as UN Resolutions 2270 (2016), 2321 (2016), 2371 (2017), 2375 (2017) and 2397 (2017).⁴⁰ The UN Security Council Resolutions regarding DPRK can be summarized in a table below.

³⁸ Ibid.

³⁹ Robert A. Pape, "Why Economic Sanctions Do Not Work." *International Security* 22, no. 2 (1997): 90-136.

⁴⁰ United Nations, *Security Council Fact Sheets*, 18-19.

Table 1. UN Security Council Resolutions on DPRK

UNSC Resolution	Date	Sanctions
Resolution 1718	14 October 2006	<ul style="list-style-type: none"> • Ban direct or indirect supply, sale of heavy weaponry, materials and technologies, and luxury goods to DPRK • Sanctions do not apply where the Committee determines on the grounds of humanitarian need
Resolution 1874	12 June 2009	<ul style="list-style-type: none"> • Expand arms embargo to all arms as well as to financial transactions, and technical training • Conduct inspection on cargos if there are relevant details on use of such arms or materiel
Resolution 2087	22 January 2013	<ul style="list-style-type: none"> • Impose travel bans on four individuals and asset freezes of six entities with sanction violations
Resolution 2094	7 March 2013	<ul style="list-style-type: none"> • Ban financial services related to the DPRK's nuclear and missile programs • Freeze items, materials, equipment, goods, and technology, as well as luxury goods to DPRK
Resolution 2270	2 March 2016	<ul style="list-style-type: none"> • Expand the arms embargo to all arms and related materiel, • Impose sanctions on entities associated with prohibited activities except food or medicine
Resolution 2321	30 November 2016	<ul style="list-style-type: none"> • Limit the number of bank accounts to one per DPRK diplomatic mission and consular post • Prohibit exports of more than one million tons of coals from DPRK
Resolution 2356	2 June 2017	<ul style="list-style-type: none"> • Impose additional travel bans on 14 individuals and asses freezes of four entities
Resolution 2371	5 August 2017	<ul style="list-style-type: none"> • Designation of additional conventional arms, equipment, goods, and technology • Demand North Korea to fully comply with its obligations under the Vienna Convention
Resolution 2375	11 September 2017	<ul style="list-style-type: none"> • Ban all states from establishing joint ventures or cooperative entities with North Korea • Prohibit states from authorizing North Korean nationals to work in their countries
Resolution 2397	22 December 2017	<ul style="list-style-type: none"> • Direct states to immediately repatriate all North Korean workers from their countries • Impose additional travel bans on 16 individuals and asses freeze of one entity alleged with sanction violations

Source: United Nations Security Council Resolutions.

1718 Sanctions Committee

Among sanction committees, 1718 sanction committee was established with country specific to DPRK after adoption of UN Resolution 1718. Since its establishment, 1718 sanctions committee has introduced a variety of sanctions including materiel embargo related to nuclear, ballistic missiles, and weapons of mass destruction (WMD) programs. With the addition of resolutions, the committee has also placed sectoral sanctions on various industrial materials by restricting DPRK's energy sources including coal, crude oil, and refined petroleum products, and transportation-related sanctions such as industrial machinery, transportation vehicle, as well as assets freeze on the designated individuals and entities.⁴¹

The mandate of the 1718 Committee is to provide an oversight of the targeted sanctions against DPRK. Therefore, the Committee investigates if the sanction measures are implemented. After review, if the Committee finds that there are alleged violations of the sanctions including transporting prohibited items to North Korea, the sanctions committee then makes additional designations of the individuals and entities under the sanctions regime.⁴²

⁴¹ United Nations, Security Council Fact Sheets, 18-19.

⁴² Ibid.

1718 Sanctions List

For North Korea, as more Resolutions were adopted, the scope of UN sanctions expanded from an arms embargo, asset freeze, and travel ban on government officials engaged in nuclear or missile technology to include private sector entities and firms providing financial or insurance services, logistical support for the transport, insurance or brokering of transportation, or other proliferation-related activities.⁴³ As of 20 January 2022, there are total of 80 individuals along with 75 entities sanctioned under the 1718 sanctions committee.⁴⁴

UN Security Council Consolidated List contains the list of the sanctioned individuals and entities under the 1718 Committee. This includes not just individuals and entities as there are currently 59 vessels sanctioned due to their involvement with DPRK's nuclear and ballistic missile programs. The designation criteria can be referred to the resolution 1718 in paragraph 8(d) and 8(e), and the following criteria are applied in designation of individuals or entities:

- Individuals or entities engaged in or providing support for, including through other illicit means, the DPRK's nuclear-

⁴³ Biersteker et al., *Targeted Sanctions*, 169.

⁴⁴ United Nations, *Security Council Fact Sheets*, 19.

related, other weapons of mass destruction-related and ballistic missile-related programmes.

- Individuals or entities being responsible for, including through supporting or promoting, the DPRK's policies in relation to the DPRK's nuclear-related, ballistic missile-related and other weapons of mass destruction-related programmes.⁴⁵

Panel of Experts on the DPRK

The Council also establishes the Panels of Experts (PoE) which provides support to the committees in implementation of UN sanctions. While most of panel experts are based in their duty stations, two of experts reside in New York and Nairobi respectively to keep close contact. To support the Panel of Experts, the Security Council Affairs Division (SCAD) provides human resources support such as recruiting and managing of these expert groups.

The mandate of the Panel of Experts (Poe) is “to monitor, promote and facilitate the implementation of the Security Council measures.”⁴⁶ Panel of Experts are “independent investigative teams responsible for monitoring sanctions implementation,” and they are

⁴⁵ United Nations, *UN Security Council Resolution 1718 S/Res/1718*, October 14, 2006, available from <https://www.undocs.org>.

⁴⁶ United Nations, *Security Council Fact Sheets*, 18-19.

appointed by the Secretary-General.⁴⁷ The Panel of Experts was established on the basis of resolution 1874 (2009) and is composed of eight experts in different areas including customs and export controls, finance and economics, non-proliferation, procurement, and trade, maritime transport, non-proliferation and regional security, and other weapons of mass destruction as well as conventional arms.

3. US Sanctions

US sanctions against North Korea are also important, if not more significant than UN sanctions in terms of coercive efforts. This is because while UN sanctions are implemented after arduous negotiations among P5 members in the United Nations Security Council, the United States does not have to go through such negotiation process with other countries when putting unilateral sanctions against North Korea. Furthermore, US sanctions generally put greater pressure on North Korea in terms of the scope of sanctions in comparison to UN sanctions. Therefore, understanding what constitute US sanctions and how US sanctions are implemented are essential to know why China is against the US unilateral sanctions. US sanctions are enforced at the US Congress and the administration level.

⁴⁷ Biersteker et al., *Targeted Sanctions*, 154.

US Laws

First, the legitimacy of US sanctions comes from the US Congress which enacts laws to create a legal basis for implementing sanctions on North Korea. As shown by Table 2 below, there are seven major US laws which have been adopted since 1945 that give legal basis for putting the unilateral sanctions against North Korea. All of these laws give the authority to the administration to impose economic sanctions to North Korea, and the subjects of sanctions are detailed in the executive orders, which are signed by the US president, and implemented by the administration.

Table 2. US Statutes regarding DPRK

US Laws	Year	Provisions
United Nations Participation Act Section 5	1945	<ul style="list-style-type: none">• The President may, through any agency which he may designate, investigate, regulate, or prohibit, in whole or in part, economic relations between any foreign country involving any property subject to the jurisdiction of the United States.
National Emergencies Act (NEA)	1976	<ul style="list-style-type: none">• Authorizes the President to activate emergency provisions of law via an emergency declaration.
Antiterrorism and Effective Death Penalty Act	1996	<ul style="list-style-type: none">• Deter terrorism, provide justice for victims, provide for an effective death penalty, and for other purposes.
The International Emergency Economic Powers Act (IEEPA)	1997	<ul style="list-style-type: none">• Authorizes the president to block transactions and freeze assets to deal with an "unusual and extraordinary threat... to the national security, foreign policy, or economy of the United States."

<p>North Korean Sanctions and Policy Enhancement Act</p>	<p>2016</p>	<ul style="list-style-type: none"> • Acknowledges Security Council efforts to impose limitations on, and require enhanced monitoring of, transactions involving North Korea • Urges the President to designate North Korea as a jurisdiction of primary money laundering concern, • Adopts measures to safeguard the financial system against North Korea's evasion of sanctions and its illicit activities
<p>Countering America's Adversaries Through Sanctions Act (CAATSA)</p>	<p>2017</p>	<ul style="list-style-type: none"> • Modify and increase the President's authority to impose sanctions on persons in violation of certain UN Security Council resolutions regarding DPRK.
<p>Otto Warmbier Countering North Korean Censorship and Surveillance Act</p>	<p>2021</p>	<ul style="list-style-type: none"> • Authorize appropriations to broadcast programs into North Korea and to facilitate Internet freedom in that country. • Authorize the Administration to impose sanctions on foreign persons responsible for North Korea's censorship and surveillance activities.

Source: US Department of Treasury

Executive Orders

Based on the US statutes, the US president's executive order represents US sanctions imposed at the administration level. The president's authority delegated by the laws mentioned above enables implementing sanctions. There have been six executive orders signed by the US president, shown by Table 3 below. The executive orders are mainly carried out by the Office of Foreign Assets Control (OFAC) in the US Treasury Department. The Office of Foreign Assets Control's (OFAC's) current North Korea sanctions program

began in 2008 when the President issued Executive Order (E.O.) 13466. OFAC administers a number of US economic sanctions programs, such as a program that blocks the entire government of a country and includes broad geographically based trade restrictions, to being fairly limited, such as a program that targets only specific individuals and entities.

Table 3. US Executive Orders on DPRK

US Executive Orders	Year	Sanctions
E.O. 13466	2008	<ul style="list-style-type: none"> • Ban exports of heavy weaponry, some materials and technologies, and luxury goods to DPRK • Freeze financial assets of entities supporting DPRK nuclear programs
E.O. 13551	2010	<ul style="list-style-type: none"> • Expand arms embargo to imports and exports of weapons • Inspect DPRK cargo if needed • Prohibit financial support for DPRK except for aid purpose
E.O. 13570	2011	<ul style="list-style-type: none"> • Impose stricter sanctions based on UNSCR 1718 and UNSCR 1874
E.O. 13687	2015	<ul style="list-style-type: none"> • Limit DPRK regime from bulk cash transfers and international banking system
E.O. 13722	2016	<ul style="list-style-type: none"> • Expand the arms embargo to small arms and light weapons • Obligate inspections on cargo to or from DPRK • Freeze assets of North Korean government and Worker’s Party entities associated with prohibited activities
E.O. 13810	2017	<ul style="list-style-type: none"> • Prohibit DPRK from exporting minerals and iron ore • Limit bank accounts held by diplomats and missions • Suspend scientific and technical cooperation with DPRK

Source: US Department of Treasury

Secondary Sanctions

Secondary sanctions are imposed on third-country institutions (companies and banks) dealing with North Korea. The legal basis of secondary sanctions stem from the Patriot Act of the United States, The Otto Warmbier North Korea Nuclear Sanctions and Enforcement Act, and Executive Order 13722 generating extraterritorial effect. The US sanctions against North Korea traditionally take the form of targeted sanctions through the Export Administration Act and Trading with the Enemy Act. Unlike the existing sanctions method, the secondary sanctions target the financial institutions in third countries conduct trade with DPRK.

DPRK's fourth nuclear test served as a watershed for US sanctions against North Korea, and the US Congress passed the North Korea Sanctions and Policy Enhancement Act (NKSPEA) in 2016. Since then, the US utilized secondary sanctions as a means of expressing dissatisfaction and also to complement the limitations of UN sanctions on the DPRK since UN sanctions could not guarantee the full implementation by China.⁴⁸ In the words of the United States

⁴⁸ Min, Tae Eun, "U.S. sanctions on North Korea : Analysis of Political and Legal Background," Korea Institute for National Unification: 2020.

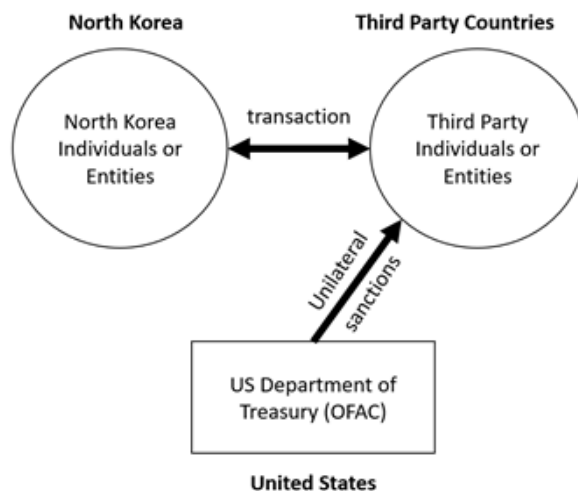
ambassador to the United Nations Linda Thomas-Greenfield: “While the United States prefers that the Council impose sanctions, some situations require countries to use leverage to address such threats as nuclear proliferation, corruption and human rights abuses” and “sanctions imposed by individual countries and regional groups are legal and helpful when the Council remains deadlocked.”⁴⁹

Mechanism of the Secondary Sanctions

The US secondary sanctions target third parties dealing with North Korea, not North Korea itself. In other words, the US government imposes sanctions on institutions or individuals in third countries if they trade with North Korea. The US Department of Justice and Treasury Department oversee the enforcement of the US sanctions, which is followed by the Office of Foreign Assets Control (OFAC) to investigate any transactions with North Korea to impose secondary sanctions. The mechanism of secondary sanctions by the US is shown by figure below.

⁴⁹ United Nations, Security Council 8962nd Meeting Press Release, *SC/14788*, February 7, 2022, available from <https://www.un.org/press>.

Figure 8. Mechanism of US Secondary Sanctions



Source: own elaboration

The US secondary sanctions are based on the United States' supremacy over the international financial system. In response to US unilateral sanctions, China has certainly expressed their disapproval. As a matter of fact, Zhang Jun, Permanent Representative of China to the United Nations, described that “Unilateral sanctions have caused great disasters and chaos in some countries, undermining the Council’s own regimes. . . This damages multilateralism, runs counter to the United Nations Charter and reflects hegemonism.”⁵⁰ Since US unilateral sanctions are unilateral, they also do not need to consider international consensus like the UN international sanctions do.

⁵⁰ United Nations, Security Council 8962nd Meeting Press Release, *SC/14788*, February 7, 2022, available from <https://www.un.org/press>.

On the other hand, implementing secondary sanctions at the international community level is unlikely as China views unilateral sanctions fundamentally different from UN sanctions. China has different goals for sanctions against North Korea. Zhang Jun adds that “sanctions must be designed to dovetail with the core issues at hand and desired objectives to minimize collateral damage, and Member States must faithfully implement them without misinterpretation or ‘overcompliance’.”⁵¹ While the US claims to utilize unilateral sanctions when there is stalemate at the Council overcome expected limitations, the US-led sanctions mechanism will be challenging to derive continuous cooperation from the international community.

Therefore, in this paper, research on the US-China cooperation economic sanctions depending on the type of sanctions will be carefully analysed using game theory and case studies. It is necessary to establish a US-China cooperation in sanctions first before these efforts will expand to the formation of a global sanction regime for successful nuclear non-proliferation regime. Only when such consensus is formed then it will lead to solve the nuclear issue in North Korea and achieve peace of stability in the region.

⁵¹ United Nations, *SC/14788*.

Chapter IV. Case Study

1. Case 1: US–China Defection (Risk Dominant)

Context

Trump administration can be regarded as a risk-dominant case in stag-hunt game theory model due to the high uncertainty in US–China relations. Since President Trump assumed the US presidency, Trump administration adopted “a competitive approach to the PRC”⁵² and was soon engaged in a trade war with China. In January 2018, US President Donald Trump began placing tariffs and other trade barriers on China with the goal of forcing it to make changes to what the US says are "unfair trade practices" and intellectual property theft.⁵³ In response to US trade measures, the Chinese government accused the Trump administration of engaging in nationalist protectionism and took retaliatory action.⁵⁴

⁵² US National Security Council, *United States Strategic Approach to the People's Republic of China*, May 26, 2020, available from <https://trump.whitehouse.archives.gov>.

⁵³ Ana Swanson, “Trump’s Trade War with China Is Officially Underway,” *The New York Times*, July 5, 2018, available from <https://www.nytimes.com/2018/07/05/business/china-us-trade-war-trump-tariffs.html>.

⁵⁴ Keith Bradsher, “China Retaliates With Tariffs on \$60 Billion of U.S. Goods,” *The Wall Street Journal*, Sep. 19, 2018, available from <https://www.wsj.com/articles/chinese-officials-scramble-to-respond-to-trumps-new-tariffs-1537275015>.

The tensions caused by the US-China trade war were clearly visible in public perception. In the United States, many Americans have developed negative feelings toward China, up substantially since 2018. According to Pew Research Center, 67% of Americans in 2021 felt “cold” toward China, which has increased by 21 percent from the 46% in 2018.⁵⁵ Also in China, according to poll conducted by London-based advisory firm Brunswick during the trade war in 2019, 56% have responded that they avoided buying anything made in the United States in support of their country.⁵⁶ Similarly, a survey conducted in 2020 by *The Global Times* in China found that 65.6% of the respondents disapproved of Trump administration due to the trade war, with more than 70% of the respondents who believed that the US-China tensions will have negative impact on the world.⁵⁷ These negative public perceptions are an reflection of high uncertainty in the US-China relations.

⁵⁵ Laura Silver, et al., “Most Americans Support Tough Stance Toward China on Human Rights, Economic Issues,” Pew Research Center, March 4, 2021.

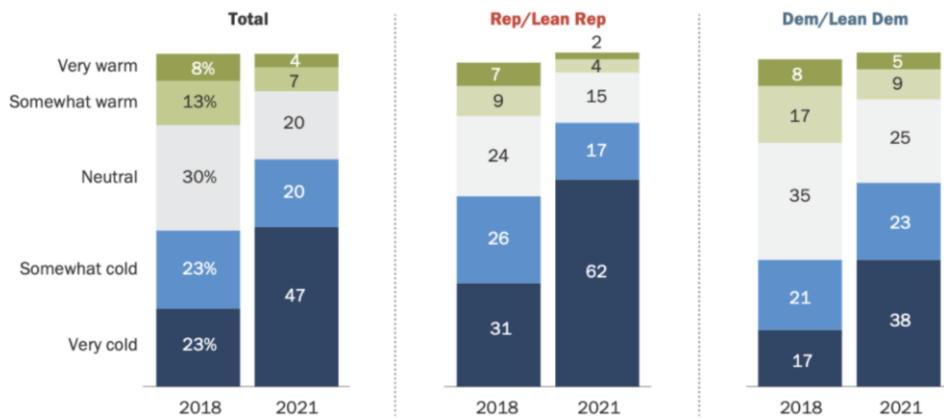
⁵⁶ Brenda Goh, “More than half Chinese consumers shun U.S. goods due to trade war: survey,” *Reuters*, June 26, 2019, available from <https://www.reuters.com/article/us-usa-trade-china-survey-idUSKCN1TR1EJ>.

⁵⁷ 环球舆情中心发布, 《中国人看世界》, 新闻中心-腾讯网, December 30, 2020, available from <https://new.qq.com/omn/20201230/20201230A018YQ00.html>.

Figure 9. US Survey of Public Perception Towards China

Negative views of China up substantially since 2018

% who rate China as ___ on a feeling thermometer from 0 (coldest rating) to 100 (warmest rating)



Source: Pew Research Center.

In the midst of high uncertainty between the US and China, North Korea’s nuclear threat became more serious. In a new year’s speech in 2017, North Korean leader Kim Jong-un reaffirmed further advancement of North Korea’s nuclear weapons program as part of his proclaimed goals for North Korea.⁵⁸ Compared to previous new year’s address in 2016, Kim made highlighted the successful hydrogen bomb test that was conducted in September 2016, claiming that DPRK was now in the “final stage of preparation for the test launch of an intercontinental ballistic missile (ICBM).”⁵⁹

⁵⁸ The National Committee on North Korea, “Kim Jong Un’s 2017 New Year’s Address,” 1 January 2017, available from www.ncnk.org.

⁵⁹ Ibid.

On July 3, 2017, North Korea launched the Hwasong-14 ballistic missile, which is an intercontinental ballistic missile that has range over 10,000 km to reach mainland North America.⁶⁰ More importantly, on August 8, 2017, the US Defense Intelligence Agency report found that North Korea had succeed in miniaturizing nuclear warheads to be able to equip it on an ICBM.⁶¹ On the same day, President Trump famously told reporters that if Pyongyang made any more nuclear threats against Washington, “[North Korea] will be met with fire and fury like the world has never seen,” signalling aggressive denuclearization policy against North Korea.⁶²

On 3 September 2017, North Korea conducted its sixth nuclear test at Punggye-ri. According to initial US intelligence assessments, the test released 140 kilotons of TNT equivalent, making it larger in explosive yield than the previous five tests combined.⁶³ North Korea claimed that it was a thermonuclear

⁶⁰ Choe Sang-Hun, “U.S. Confirms North Korea Fired Intercontinental Ballistic Missile,” *The New York Times*, July 4, 2017, available from www.nytimes.com.

⁶¹ Joby Warrick, Ellen Nakashima and Anna Fifield, “North Korea now making missile-ready nuclear weapons, U.S. analysts say,” *The Washington Post*, August 8, 2017, available from www.washingtonpost.com.

⁶² Peter Baker and Choe Sang-Hun, “Trump Threatens ‘Fire and Fury’ Against North Korea if It Endangers U.S.,” *The New York Times*, August 8, 2017, available from www.nytimes.com.

⁶³ Tom O’Connor, “North Korea’s Latest Nuclear Bomb is Stronger Than All Its Previous Tests Combined,” *Newsweek*, September 5, 2017, available from www.newsweek.com.

warhead test, which the US intelligence officials confirmed it as an “advanced nuclear device.”⁶⁴ Following another launch of ICBM the Hwasong-15 in November 2017, Pyongyang proclaimed that it had “finally realized the great historic cause of completing the state nuclear force,” further raising nuclear tensions.

US Strategy

Amid the high uncertainty with China, Trump administration’s strategy toward North Korea can be characterized as an aggressive denuclearization policy of “maximum pressure” toward DPRK. The official US document *US Nuclear Posture Review* best shows such US strategy, which outlines the US administration’s approach to nuclear weapons policy. In *Nuclear Posture Review 2018*, Trump administration explicitly laid out its nuclear policy towards DPRK:

For North Korea, the survival of the Kim regime is paramount. Our deterrence strategy for North Korea makes clear that any North Korean nuclear attack against the United States or its allies and partners is unacceptable and will result in the end of that regime. There is no scenario in which the Kim regime could employ nuclear weapons and survive.⁶⁵

⁶⁴ Damin Jung, "Kim Jong Un inspects thermonuclear weapon to be loaded in ICBM warhead," *NK News*, 3 September 2017, available from www.nknews.org.

⁶⁵ US Department of Defense, *Nuclear Posture Review 2018*, February 2018,

In the NPR document, Trump administration gives a clear warning towards North Korea, articulating its US policy and intentions to end the regime of North Korea if Pyongyang conducts any nuclear attacks against the US or its allies. Moreover, the aggressive denuclearization policy of Trump administration was followed up with the addition of US unilateral sanctions against North Korea. On September 25, 2017, President Trump signed the Executive Order 13810, which contains the following unilateral sanctions:

Executive Order 13810 of September 20, 2017

Imposing Additional Sanctions with Respect to North Korea

...

(ii) block all property and interests in property that are in the United States, that hereafter come within the United States, or that are or hereafter come within the possession or control of any United States person of such foreign financial institution, and provide that such property and interests in property may not be transferred, paid, exported, withdrawn, or otherwise dealt in.⁶⁶

available from <https://media.defense.gov/>.

⁶⁶ Executive Office of the President, *Exec. Order No. 13810*, 82 Fed. Reg. 184 (September 25, 2017); available from US Federal Register Documents.

The US unilateral sanctions articulated in the Executive Order are different from the UN sanctions in that the scope of US unilateral sanctions is much greater in terms of sanctioned items including banning the humanitarian assistance against North Korea. While exports for humanitarian aid can be waived under UN sanctions, the US unilateral sanctions prohibit all of export and trade of any items to North Korea. Furthermore, Trump administration has mandated “secondary boycotts” which imposed sanctions not only on North Korea but also on countries that conduct business with North Korea. Executive Order 13810 further provides the Secretary of the Treasury with the authority to designate any person the Secretary determines to be engaged in certain activity involving North Korea, including certain commercial activity. The Secretary of the Treasury is authorized to block anyone the Secretary determines to:

- operate in the construction, energy, financial services, fishing, information technology, manufacturing, medical, mining, textiles, or transportation industries in North Korea;
- own, control, or operate any port of entry in North Korea;
- have engaged in at least one significant importation from or exportation to North Korea of any goods, services, or technology;
- be a North Korean person; **OR**

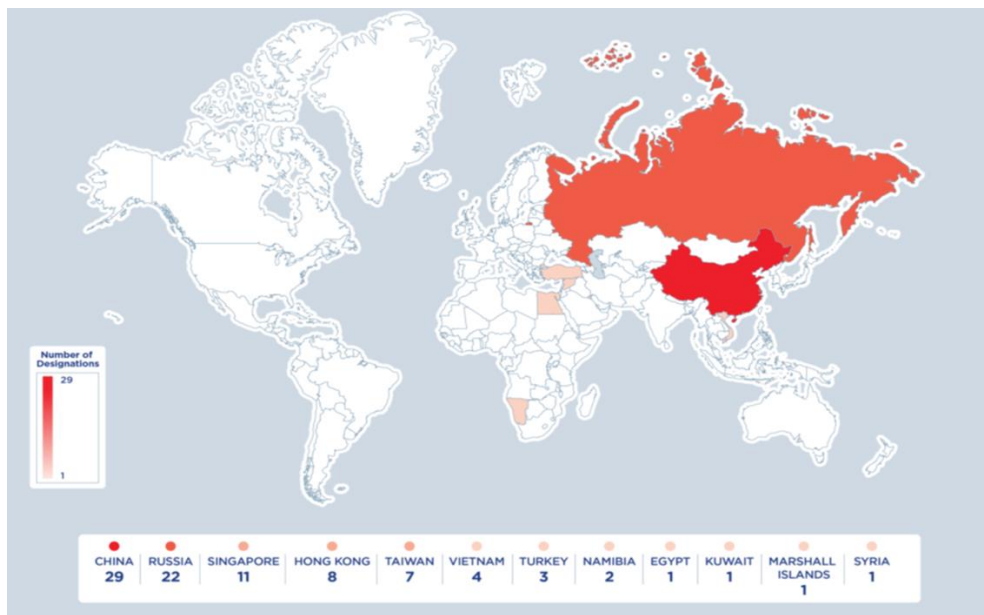
- have materially assisted, sponsored, or provided financial, material, or technological support for, or goods or services to or in support of, any person designated pursuant to the Executive Order, or to be owned or controlled, or to have acted or purported to act for or on behalf of, directly or indirectly, any person whose property and interests in property are blocked pursuant to the Executive Order.⁶⁷

In 2018, President Trump delivered a statement which said that while North Korea was under "tremendous pressure" from China, which has an ongoing trade dispute with the US, Beijing was supplying the North Korean regime with "considerable aid," including fuel, fertilizer and commodities, which he said were "not helpful!"⁶⁸ And as shown in the figure below, the country with the highest designations for secondary sanctions is China. Such unilateral sanctions which include secondary boycotts including China are options that the US can take to maximize pressure on North Korea without requiring any help from China.

⁶⁷ Executive Office of the President, *Exec. Order No. 13810*, 82 Fed. Reg. 184 (September 25, 2017); available from US Federal Register Documents.

⁶⁸ "Trump accuses China of stalling progress with North Korea," *BBC News*, August 30, 2018, available from <https://www.bbc.com/news/world-asia-45351356>.

Figure 10. DPRK-related Sanctions Outside North Korea



Source: US Department of the Treasury Office of Foreign Assets Control, 2009–2020.

Such mistrust of China in denuclearization of North Korea through implementation of UN sanctions was found throughout during the Trump administration. In 2020, the United States accused China on Tuesday of “flagrant violation” of its obligation to enforce international sanctions on North Korea and offered rewards of up to \$5 million for information about sanctions evasions. Deputy Assistant Secretary for North Korea Alex Wong accused China of seeking to undo a United Nations sanctions regime aimed at persuading North Korea to give up its nuclear weapons. Wong said China “increasingly allows” its companies to conduct trade with North Korea in a broad

spectrum of U.N.- prohibited goods, including seafood, textiles, iron and steel, industrial machinery, vehicles, sand and gravel.⁶⁹

In response to such mistrust, Trump Administration has signed the executive order of placing unilateral sanctions on North Korea, and also put pressure on China to do more than implementing the UN sanctions. In 2017, Secretary Tillerson, the first Secretary of State under the Trump administration, emphasized during a high-level meeting of the UN Security Council that China must apply pressure beyond simply implementing UN Security Council resolutions.⁷⁰ At the International Atomic Energy Agency (IAEA), the United States also demanded the greatest possible pressure from the international community, saying that faithful implementation of the UN Security Council resolutions is not the “ceiling”, which is the maximum effort, but the “floor” or “baseline” which states should go beyond and adopt more “far-reaching measures” past its “minimal threshold,” calling for more aggressive measures.⁷¹

⁶⁹ David Brunnstrom, “U.S. accuses China of 'flagrant' N.Korea violations, offers \$5 million reward,” *Reuters*, December 1, 2020, available from <https://www.reuters.com/article/usa-northkorea-china-idUSKBN28B540>.

⁷⁰ United States Department of State, *Remarks at the UN Security Council Ministerial Meeting on D.P.R.K.*, December 15, 2017.

⁷¹ IAEA, “Application of Safeguards in the Democratic People’s Republic of Korea Atoms for Peace and Development,” September 11, 2017; Biersteker, *Targeted Sanctions*, 169.

Another important difference is that when the US devises sanctions policy against North Korea, it does not see it as collective security but as collective defence for the US and its allies. While the United States recognizes the North Korean issue as an important issue to be resolved by the international community, the United States continues to declare that it will strive to resolve the North Korean issue within the framework of the United States' alliance and will defend its allies if North Korea threatens it with nuclear weapons.⁷² Notably, former President Trump addressed the UN General Assembly in 2017 as follows:

The United States has great strength and patience, but if it is forced to defend itself or its allies, we will have no choice but to totally destroy North Korea. Rocket Man is on a suicide mission for himself and for his regime. The United States is ready, willing and able, but hopefully this will not be necessary. That's what the United Nations is all about; that's what the United Nations is for. Let's see how they do.

It is time for North Korea to realize that the denuclearization is its only acceptable future. The United Nations Security Council recently held two unanimous 15-0 votes adopting hard-hitting resolutions against North Korea, and I want to thank China and Russia for joining the vote to impose

⁷² *ibid.*

sanctions, along with all of the other members of the Security Council. Thank you to all involved.

But we must do much more. It is time for all nations to work together to isolate the Kim regime until it ceases its hostile behavior.⁷³

Here, while President Trump acknowledges China for adopting UN Security Council sanctions, he also demands that China should do more to stop North Korea from developing nuclear weapons. Second, President Trump also highlights collective defence by warning that the United States will “totally annihilate” North Korea through military action to defend its allies. In fact, the US repeatedly stressed that it would protect its allies through military options whenever North Korea conducts provocations such as nuclear tests and missiles.⁷⁴

However, as the competition for hegemony between the US and China intensifies, the US is launching a free and open Indo-Pacific (FOIP) strategy and promoting collective defence alliances such as Quad to contain China. Above all, the United States is trying

⁷³ United Nations, General Assembly, *General Assembly official records*, 72nd session : 3rd plenary meeting, New York, A/72/PV.3 (19 September 2017), available from digitallibrary.un.org/record/1305714?ln=en.

⁷⁴ U.S. Embassy in Egypt, *Secretary Mattis Statement at the White House* September 5, 2017; available from eg.usembassy.gov/secretary-mattis-statement-white-house/.

to solve the North Korean nuclear issue in a collective defence system that excludes China, not in terms of collective security, including countries around the world, and this leads to a betrayal between the United States and China in game theory, where mutual trust is essential.

China's Strategy

In response to Trump administration's forceful denuclearization policy which put unilateral sanctions on North Korea, it is important to identify what China's strategy is in this risk-dominant case. As a permanent member of the UN Security Council, China has voted in favour of resolutions on sanctions against North Korea nine times. However, China insisted on easing sanctions on DPRK after the United States adopted unilateral sanctions.⁷⁵ Unlike Trump administration that warned with the military force to protect allies, China clearly shows different stance by demanding the US to ease tensions on the Korean Peninsula. Therefore, it is important to identify how China approaches the denuclearization issue in the risk-dominant scenario.

⁷⁵ Agence France-Presse, "China calls for easing of United Nations sanctions on North Korea," *South China Morning Post*, February 17, 2020; available from <https://www.scmp.com>.

In order to understand the background of China's opposition to additional sanctions, it is necessary to examine in detail the principles of China's foreign policy, how it perceives the North Korean nuclear issue, and what solutions it seeks. The biggest difference is that while the US views the rise of China as a zero-sum game that will harm US national interests, China has consistently opposed the zero-sum game. Chinese President Xi Jinping has declared the Five Principles of Peaceful Coexistence in China.

坚持和平共处五项原则……走对话而不对抗、结伴而不结盟的国与国交往新路，不搞唯我独尊、你输我赢的零和游戏，不搞以邻为壑、恃强凌弱的强权霸道，妥善管控矛盾分歧，努力实现持久和平。⁷⁶

China's five principles of peaceful coexistence include mutual respect for territory and sovereignty, mutual nonaggression, non-interference in internal affairs, equality and reciprocity, and peaceful coexistence.

President Xi also made remarks at the 70th United Nations General Assembly in September 2015: "Build a new type of international relations with win-win cooperation as the core, and build a community with a shared future for mankind."⁷⁷ In other

⁷⁶ 刘叶婷 崔越 肖骁, "中国外交为什么'结伴不结盟'?" 人民网, November 16, 2019; available from politics.people.com.cn/n1/2019/1116/c429373-31458749.html.

⁷⁷ 华中科技大学国家传播战略研究院, "中国公众的世界观念调查报告," 《学术前沿》, May, 2019.

words, China's official position has been consistent that it will never compete for hegemony with the United States as China rises. China denies the theory of “China threat,” which sees the rise of China as a threat and repeatedly reiterates that China does not seek hegemony.

With the rapid increase of China’s comprehensive national strength and international influence, some people worry that China will fulfil the outdated expectation that a country will invariably seek hegemony when it grows strong, so they have created what they call the “China threat” theory. The causes of this theory include cognitive misunderstanding, deep-rooted prejudice, a psychological imbalance brought about by the prospect of falling power, and deliberate distortions by vested interests...China will never pursue hegemony or expansion, nor will it seek to create spheres of influence, no matter how international situation changes, how China develops itself.⁷⁸

Above all, it was during the high-level talks between the US and China in Alaska earlier this year that China's foreign policy was most markedly different from that of the US. At the Alaska summit, China explained in detail how China's foreign policy differs from that

⁷⁸ State Council Information Office of the People’s Republic of China, *China and the World in the New Era*, September 27, 2019; available from https://english.www.gov.cn/archive/whitepaper/201909/27/content_WS5d8d80f9c6d0bcf8c4c142ef.html.

of the United States and strongly criticized the zero-sum, unilateral foreign policy of the United States.

What China and the international community follow or uphold is the United Nations-centered international system and the international order underpinned by international law, not what is advocated by a small number of countries of the so-called rules-based international order... we have engaged in tireless efforts to contribute to the peace and development of the world, and to upholding the purposes and principles of the U.N. Charter... So what we need to do is to abandon the Cold War mentality and the zero-sum game approach.⁷⁹

An important difference here is that while China directly criticizes the “rules-based international order” of the US, China is advocating for an international order based on the United Nations. In other words, China does not recognize the “rules-based international order” of the United States as a fair world order and recognizes a zero-sum order that prioritizes the United States and perceives it as a loss otherwise, while China recognizes the United Nations international community as equal status. This is in line with what China has expressed in its defence white paper, and China's position

⁷⁹ “Transcript of the US-China Opening Remarks in Alaska,” *Nikkei Asia*, March 19, 2021; available from asia.nikkei.com/Politics/International-relations/US-China-tensions/How-it-happened-Transcript-of-the-US-China-opening-remarks-in-Alaska.

is that it will respond to the North Korean nuclear issue based on the principle of peaceful coexistence.

China has played a constructive role in the political settlement of regional hotspots such as the Korean Peninsula issue, the Iranian nuclear issue and Syrian issue. China opposes hegemony, unilateralism, and double standards, promotes dialogues and consultations, and fully and earnestly implements UNSC resolutions. China has actively participated in multilateral dialogues and negotiations on cyberspace and outer space and pushed for the formulation of widely accepted international rules that are fair and equitable.⁸⁰

In other words, while China supports North Korea's denuclearization through the means of multilateral sanctions by the Security Council, Beijing does not want economic pressure to the degree of causing the North Korean regime collapse or any military activity that escalates tensions on the Korean Peninsula. Against this background, it can be interpreted as a case of defection to the stag hunt game when the United States attempts to introduce unilateral sanctions, China appears to ease sanctions.

First, China approaches the North Korean nuclear issue from the perspective of collective security, whereas the United States

⁸⁰ State Council Information Office of the People's Republic of China, *China's National Defense in the New Era*, July 24, 2019; available from english.www.gov.cn/archive/whitepaper.

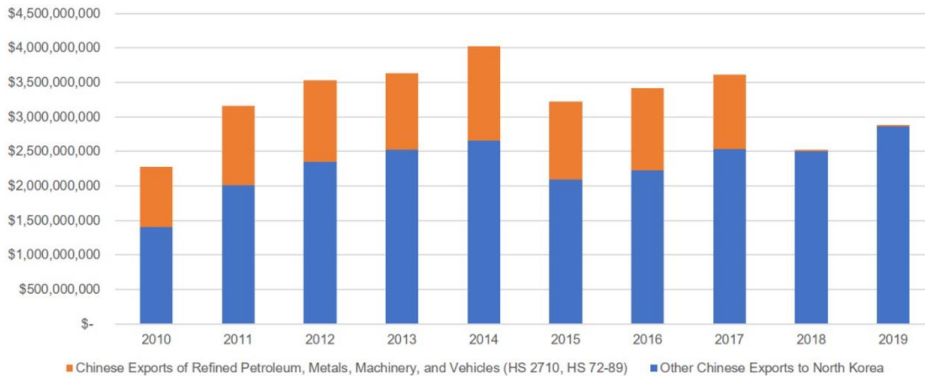
took the North Korean nuclear issue as a collective defence. Just as former President Trump addressed the United Nations in 2017, Chinese Foreign Minister Wang Yi addressed the United Nations in the same year:

We call on the United States to honour its formal commitment and on all the parties to play a constructive role in easing tensions.... In China's view, the day when the denuclearization of the peninsula is achieved should also be the day when a peace mechanism is established. China has always been a force for peace... China will stay firmly committed to the denuclearization of the peninsula, to dialogue and negotiations and to regional peace and stability.⁸¹

In the speech, contrary to President Trump's warning of using military options to annihilate North Korea and also pressuring China to go beyond the UN sanctions, China demands the US to ease tensions on the Korean peninsula. Since North Korea conducted its first nuclear test in 2006, the UN Security Council including China has shown unified stance in criticizing North Korea's nuclear development-related activities, and a total of 10 UN Security Council resolutions containing sanctions against North Korea have been adopted.

⁸¹ United Nations, General Assembly, *General Assembly official records*, 72nd session : 3rd plenary meeting, New York, A/72/PV.12 (19 September 2017); available from <https://undocs.org/en/A/72/PV.12>.

Figure 11. Reported Chinese Exports to North Korea (USD)



Source: Chinese Customs, KOTRA, UN Comtrade.

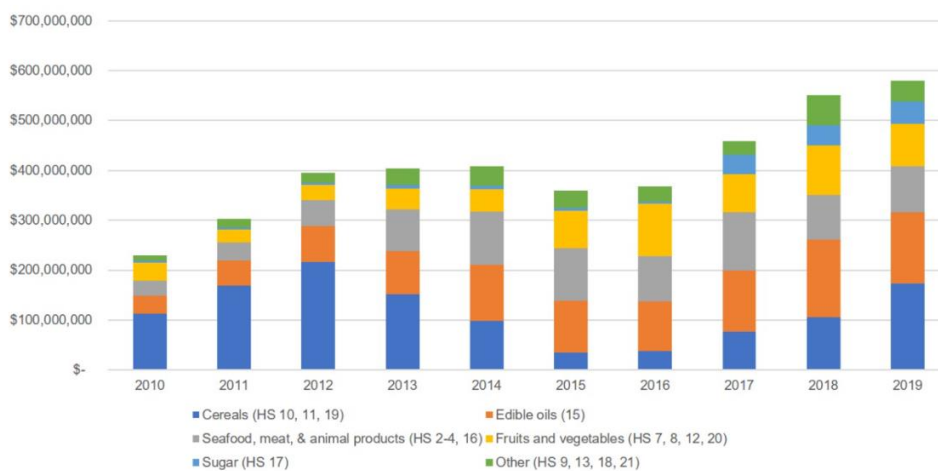
The UN Security Council Resolution 2397, adopted in 2017, limited oil exports to North Korea to 500,000 barrels per year and other essential raw materials and equipment necessary for DPRK’s nuclear development.⁸² As shown below, China’s trade with North Korea saw a sharp decrease in exports of items such as oil, metals and machinery to North Korea from the end of 2017.

On the contrary, China’s humanitarian exports such as food to North Korea have increased in the recent years, as shown by a figure below. This is because while UN sanctions target oil and equipment that can be used to develop North Korea’s nuclear weapons, they allow humanitarian assistance. Such data has important implications for China’s approach to sanctions against

⁸² UN Security Council resolution 2397, S/Res/2397 (22 December 2017), available from [https://www.undocs.org/S/RES/2397%20\(2017\)](https://www.undocs.org/S/RES/2397%20(2017)).

North Korea. While China approves and implements UN sanctions to resolve the North Korean nuclear issue, China also opposes elements that may destabilize the North Korean regime, such as imprisoning North Korea to the point where its citizens might starve to death or create mass refugee crisis, and therefore maintains humanitarian assistance to North Korea.

Figure 12. Chinese Food Exports to North Korea



Source: Chinese Customs, KOTRA, UN Comtrade.

After US put additional unilateral sanctions since 2017, China has even drafted resolutions which called for lifting ban on exports of seafood and textiles, a cap on imports of refined petroleum products and a prohibition on its citizens working overseas and sending home their earnings, stressing the economic difficulties in North Korea “with the intent of enhancing the livelihood of the

civilian population.”⁸³ Doug Bandow, a senior fellow at Cato Institute, also points out that “Beijing fears an unstable DPRK more than a nuclear DPRK . . . [due to] possible consequences of a North Korean collapse—loose nukes, mass refugee flows, conflict spilling over its border.”⁸⁴

2. Case 2: US–China Cooperation (Payoff Dominant)

Context

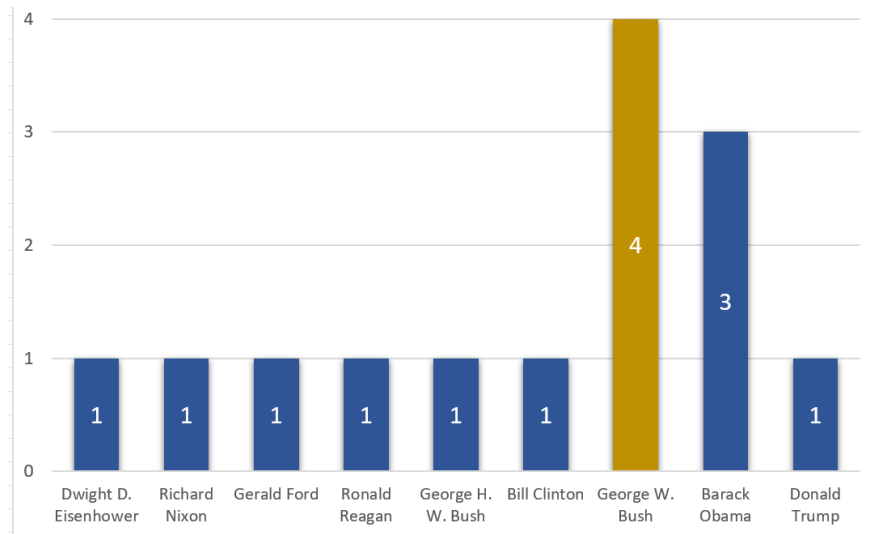
The US–China cooperation in efforts towards denuclearization of North Korea is not impossible. In fact, in the past, the US and China had shown high level of cooperation to solve the North Korean nuclear issue, and the Bush administration is a good example of US–China cooperation. First of all, unlike Trump administration that had shown high level of uncertainty with China, Bush administration had maintained one of the most friendly and certain relations in with China. In the history of US presidency, President George W. Bush made more visits to China than any other

⁸³ “China, Russia urge UNSC to end key sanctions on North Korea,” *The Asahi Shimbun*, November 3, 2021, available from <https://www.asahi.com/ajw/articles/14474345>.

⁸⁴ Doug Bandow, “Will China Solve the North Korea Problem? The United States Should Develop a Diplomatic Strategy to Persuade Beijing to Help,” *Cato Institute Policy Analysis* no. 806 (December 2016): 11.

US president, which showcases such close relations, as shown by chart below.

Figure 13. US President’s Visit(s) to China (1950–2020)



Source: own elaboration.

While Bush administration had maintained relations with China, the relations with North Korea was at its worst as President George W. Bush in his first State of the Union address referred to North Korea as the “axis of evil” in 2001.⁸⁵ Soon after, North Korea's development of highly enriched uranium led to the second North Korean nuclear crisis. Shortly thereafter, as the Bush administration designated North Korea as a target for a pre-emptive nuclear attack in its Nuclear Posture Report, North Korea strongly protested that

⁸⁵ The White House, *President Delivers State of the Union Address*, February 1, 2002, available from <https://georgewbush-whitehouse.archives.gov/news/releases/2002/01/20020129-11.html>.

the US had violated the NPT. In the end, North Korea lifted the nuclear freeze and declared the restart of its nuclear facilities. Shortly thereafter, North Korea announced its withdrawal from the NPT through a government statement on January 10, 2003. But more importantly in 2003, the US and China initiated multilateral efforts to resolve the North Korean nuclear issue through the six-party talks.

Six Party Talks

In early 2003, US intelligence detected that DPRK was reprocessing estimated amount of 8,000 spent fuel rods in Yongbyon reprocessing facility.⁸⁶ In September 2003, Pyongyang announced completion of the reprocessing of this spent fuel enough plutonium material to produce approximately four to six nuclear devices.⁸⁷ Later in January 2004, a delegation of invited US experts conducted investigation of canisters in the temporary storage pond which were found to be empty, raising nuclear tensions further.⁸⁸

In April 2003, a multilateral dialogue known as Six Party Talks initiated by China began in Beijing with the aim of finding a

⁸⁶ William Perry, "Crisis on the Korean Peninsula: Implications for U.S. Policy in Northeast Asia," Brookings Institution, January 24, 2003.

⁸⁷ David E. Sanger, "North Korea Says It Has Made Fuel from Atom Bombs," *The New York Times*, 15 July 2003, available from www.nytimes.com.

⁸⁸ Barbara Slavin, "Scientist Describes N. Korea Nuclear Evidence," *USA Today*, January 22, 2004, available from <https://www.usatoday.com/>.

peaceful resolution to the security concerns regarding Pyongyang's nuclear weapons program. Six Party Talks initially began with three countries (China, North Korea and the United States), and the negotiation later expanded to a six-party format with the inclusion of Japan, Russia and South Korea. There were total of five rounds of talks from 2003 to 2007 which produced little net progress until the third phase of the fifth round of talks, On 19 September 2005, the fourth round of Six-Party Talks concluded, and the six parties signed a Joint Statement, whereby six parties reaffirmed "the verifiable denuclearization of the Korean Peninsula in a peaceful manner."⁸⁹ The United States stated that it has "no intention to attack or invade the DPRK with nuclear or conventional weapons."⁹⁰

Unlike Trump administration that adopted maximum pressure by adding unilateral sanctions, Bush administration chose peaceful denuclearization policy through dialogues and lifting sanctions. Not only the Joint Statement reaffirmed the importance of no military confrontation on the Korean peninsula, "China, Japan, the ROK, Russia and the United States stated their willingness to provide

⁸⁹ *Joint Statement of the Fourth Round of the Six-Party Talks*, September 19, 2005, available from <https://www.fmprc.gov.cn/ce/cgvienna/eng/xw/t212692.htm>.

⁹⁰ *Ibid.*

energy assistance to the DPRK.”⁹¹ Furthermore, when North Korea submitted its declaration of alleged uranium enrichment program on 26 June 2008, the Bush administration notified the US Congress that it planned to remove North Korea from the US list of state sponsors of terrorism⁹², and then issued a proclamation to lift sanctions under the *Trading with the Enemy Act*.⁹³ As a reconciliatory measure, North Korea brought down the cooling tower at the Yongbyon 5MW(e) reactor in return for the US government’s actions.

Although Washington and Pyongyang had disagreements over the detailed implications of economic cooperation for light water reactor to Pyongyang, China and the US were very in aligned with the same goal of peaceful denuclearization of North Korea. President Bush was “pleased” with the agreements reached at the Six Party Talks in Beijing, and “agreed to cooperate in economic, humanitarian, and energy assistance to North Korea.”⁹⁴ Assessing the

⁹¹ Ibid.

⁹² Glenn Kessler, "U.S. Ready to Ease Sanctions on N. Korea; Pyongyang Would Have to Acknowledge Evidence About Nuclear Activities," *Washington Post*, April 11, 2008, available from <http://www.washingtonpost.com>.

⁹³ Norimitsu Onishi and Edward Wong, "U.S. to Remove North Koreans from Terror List; Nuclear Declaration is Rewarded as Disarmament Effort Advances," *International Herald Tribune*, June 27, 2008, available from <https://www.nytimes.com/column/iht-retrospective>.

⁹⁴ George W. Bush, “Statement by President Bush on Six Party Talks,” *The White House*, February 13, 2007, available from <https://2001-2009.state.gov/p/eap/rls/ot/2007/80491.htm>.

achievements made from Six Party Talks, Chinese Foreign Minister Yang Jiechi said in a meeting with US Secretary of State Condoleezza Rice that the six-party talks and the denuclearization progress on the Korean Peninsula achieved "significant progress", which accords with the interests of all parties.⁹⁵ In return, US Secretary of State Condoleezza Rice said the Korean Peninsula issue is at the crossroad of turning "a source of conflict" into "a source of cooperation," and thanked China for "the leading role" it has taken in the six party talks.⁹⁶

Although the six-party talks have not resumed since 2007, they created an opportunity for multilateral cooperation on the North Korean nuclear issue between the US and China. In fact, after North Korea's first nuclear test in 2006, the United States and China adopted Resolution 1718 as permanent members of the UN Security Council to introduce sanctions against North Korea. Also, as shown in the table below, all resolutions adopted by the UN Security Council include support for the Six-Party Talks.

⁹⁵ "FM: Six-party talks achieve 'significant progress'," *Xinhua News Agency*, June 30, 2008, available from http://www.china.org.cn/international/news/2008-06/30/content_15907442.htm.

⁹⁶ Ibid.

Table 4. UN Resolutions Reference to Six Party Talks

UNSC Resolution	Contents Related to Six-Party Talks
Resolution 1718 (2006)	"Calls upon the DPRK to return immediately to the Six-Party Talks. . . to achieve the verifiable denuclearization of the Korean Peninsula and to maintain peace and stability on the Korean Peninsula and in northeast Asia;"
Resolution 1874 (2009)	"Supports peaceful dialogue, calls upon the DPRK to return immediately to the Six Party Talks without precondition"
Resolution 2087 (2013)	"Reaffirms its support to the Six Party Talks...denuclearization of the Korean Peninsula in a peaceful manner and to maintaining peace and stability on the Korean Peninsula and in northeast Asia;
Resolution 2094 (2013)	"Reaffirms its support to the Six Party Talks...denuclearization of the Korean Peninsula in a peaceful manner and to maintaining peace and stability on the Korean Peninsula and in northeast Asia;
Resolution 2270 (2016)	"Reaffirms its support to the Six Party Talks...denuclearization of the Korean Peninsula in a peaceful manner and to maintaining peace and stability on the Korean Peninsula and in northeast Asia;
Resolution 2321 (2016)	"Reaffirms its support to the Six Party Talks...denuclearization of the Korean Peninsula in a peaceful manner and to maintaining peace and stability on the Korean Peninsula and in northeast Asia;
Resolution 2371 (2017)	"Reaffirms its support to the Six Party Talks...denuclearization of the Korean Peninsula in a peaceful manner and to maintaining peace and stability on the Korean Peninsula and in northeast Asia;
Resolution 2375 (2017)	"Reaffirms its support to the Six Party Talks...denuclearization of the Korean Peninsula in a peaceful manner and to maintaining peace and stability on the Korean Peninsula and in northeast Asia;
Resolution 2397 (2017)	"Reaffirms its support to the Six Party Talks...denuclearization of the Korean Peninsula in a peaceful manner and to maintaining peace and stability on the Korean Peninsula and in northeast Asia;

Source: own elaboration.

According to the contents of the UN Security Council resolution, it can be seen that all of the UN resolutions contain not only sanctions against North Korea, but also calls for resuming six-party talks. Furthermore, the UN resolutions emphasize achieving denuclearization of the Korean peninsula “in a peaceful manner” and “maintaining peace and stability” on the Korean peninsula through dialogues. Such emphasis of peaceful method is not always aligned with forceful denuclearization that US adopts, as shown by Trump administration. On the other hand, the Resolutions can also be seen as an compromise and possible area of cooperation between the US and China since the resolutions are an outcome of negotiations among the P5 members including the US and China.

3. Game Theory Analysis

In this paper, two case studies of stag hunt—risk-dominant and payoff dominant—were conducted following the congruence procedure, which gave the following analysis implications. First, while the maximum payoff value of the US policy toward North Korea is focused on the denuclearization of North Korea, China is focused on the peace and stability of the North Korean regime. As shown in

the payoff matrix below, peaceful denuclearization is shared by both countries. However, when the US adopts aggressive denuclearization policy and imposes additional unilateral sanctions, this becomes a source of conflict which undermines China's payoff of the North Korean regime stability.

Figure 14. US-China Payoff Matrix against North Korea

		China	
		Cooperate (UN Sanctions)	Defect (Sanctions Relief)
United States	Cooperate (UN Sanctions)	3, 3	0, 2
	Defect (Unilateral sanctions)	2, 0	1, 1

Source: own elaboration.

In other words, depending on the type of denuclearization, peaceful or aggressive, the US has met with cooperation or defection from China. Moreover, risk perception also differs between two countries as the United States perceives North Korea's nuclear development as the greatest risk, while China perceives the collapse of the North Korean regime as the greatest risk. Such different perception of risk inherently results in asymmetric defection strategies by two countries, as the US chooses aggressive policy to achieve forceful denuclearization and China tolerates nuclear North Korea to preserve the regime stability.

Figure 15. US–China Payoff Matrix Scenarios

		China	
		Cooperate (UN Sanctions)	Defect (Sanctions Relief)
United States	Cooperate (UN Sanctions)	Peaceful Denuclearization	Nuclear North Korea Buffer
	Defect (Unilateral sanctions)	Forceful Denuclearization	Limited North Korea Denuclearization

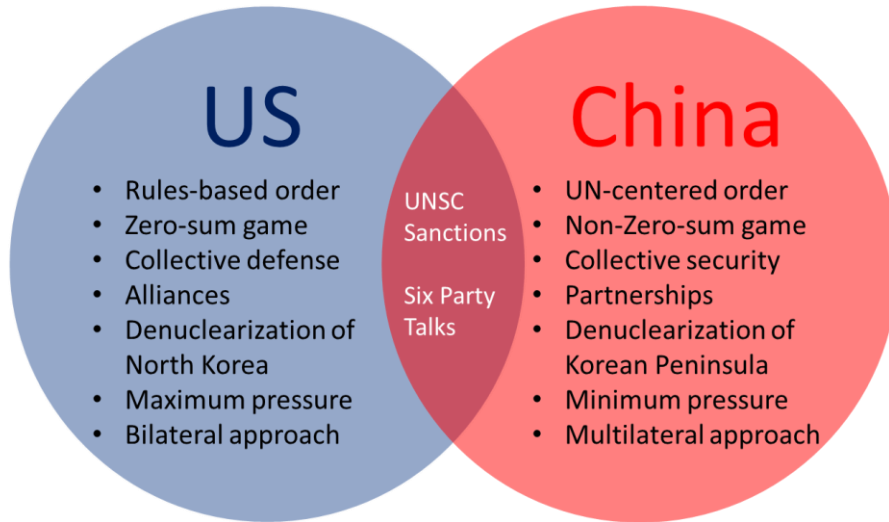
Source: own elaboration.

Such complex relationship of cooperation and competition between the US and China in regard to North Korea nuclear issue can be visualized in the framework of the stag hunting game matrix above. As shown by matrix above, there are only two possible scenarios, or two Nash equilibria in stag hug game theory model, when two players both cooperate or defect. When two players choose to cooperate, they can achieve peaceful denuclearization, shown by UN Sanctions and Six Party Talks that call for peaceful denuclearization of North Korea. However, when there is high uncertainty which leads two players defect, we see that the US pursues aggressive denuclearization by adopting unilateral sanctions while China tries to establish North Korea buffer state. And the absence of empirical evidence of China cooperating with US aggressive denuclearization policy that potentially can result in North Korean regime change supports this claim that China does not

support any aggressive denuclearization policy. Furthermore, the increasing scepticism within the US regarding China's enforcement of sanctions as well as unilateral sanctions by the US explains why there is no empirical case when US only adopts peaceful denuclearization when China can defect by tolerating nuclear North Korea as a buffer state.

The United States and China's stances toward North Korea's nuclear issue can be summarized in the Venn diagram below, showing how while their goal of denuclearization might be same, but different in the methods. Trump administration case showed the maximum pressure approach by adding unilateral sanctions against North Korea and warned that military measures may be available. On the other hand, while China has reaffirmed its support for denuclearization of North Korea, China prefers peaceful means through dialogue that can guarantee the North Korean regime stability. While the UN sanctions for the US have been considered "baseline" for the US, they have been considered "ceiling" for China.

Figure 16. Same Bed, Different Dreams



Source: own elaboration.

On the other hand, the US-China cooperation with North Korea is not impossible, as Bush administration was able to achieve cooperation with China. As shown by the shared area in the middle of Venn Diagram, when the US adopts peaceful denuclearization policy through UN sanctions and Six Party Talks aimed to deter further North Korea nuclear tests and peaceful denuclearization, there is certainly room for cooperation with China. From the Chinese official documents that were reviewed in this paper, China has consistently shown support for peaceful denuclearization of North Korean nuclear issue in both UN Resolutions and Six Party Talks.

Chapter V. Conclusion

1. Implications for US–China Cooperation

Currently, the intensifying strategic competition between the US and China is making US–China cooperation in denuclearization of North Korea more difficult. As a matter of fact, when North Korea launched an intercontinental ballistic missile in March 2022, China opposed the US proposal to reinforce sanctions against Pyongyang during the U.N. Security Council emergency meeting.⁹⁷ However, given China’s economic leverage with North Korea, cooperation from China in imposing sanctions is key in the success of such strategies. In this paper, a game theory analysis showed that the US–China cooperation can be possible when there is high certainty between two countries with mutual trust, and therein adopt peaceful denuclearization policy towards North Korea.

Such peaceful methods to engage China in the process include diplomatic talks like Six Party Talks, and also UN sanctions that are imposed to deter North Korea from conducting further

⁹⁷ Hiroshi Minegishi, “A seventh North Korean nuclear test would carry ‘China risk’,” *Nikkei Asia*, April 23, 2022, available from <https://asia.nikkei.com/Spotlight/Comment/A-seventh-North-Korean-nuclear-test-would-carry-China-risk>.

nuclear tests while ensuring North Korean regime stability. As the two countries formulate policies without fully knowing each other's intention in the midst of growing distrust of each other, it is easy to for both countries to fall into defection trap. In this paper, we saw that the US defection strategy is by pursuing aggressive denuclearization with unilateral sanctions, while the Chinese defection strategy is tolerating North Korea with nuclear weapons as a buffer state. Based on such game theoretic analysis, this paper provides the following implications for the future US-China cooperation.

First, mutual trust is fundamental for US-China cooperation, but the current level of uncertainty between US and China remains to be an obstacle to cooperation in denuclearization policy. The higher uncertainty there is in US-China relations, the greater mistrust of China that the US will have, leading to defection strategy. President Joe Biden singled out a “growing rivalry with China” as a key challenge facing the United States and has indicated it will broadly continue a tough approach to China taken by Trump.⁹⁸

⁹⁸ Simon Lewis, Humeyra Pamuk, “Biden administration singles out China as 'biggest geopolitical test' for U.S.,” *Reuters*, March 4, 2021, available from <https://www.reuters.com/article/us-usa-china-blinken/biden-administration-singles-out-china-as->

Meanwhile, according to the survey 《中国人看世界》 (Chinese People View the World) conducted by The Global Public Opinion Center in China, about 40.6% of the respondents believe that Sino-US relations during the Biden administration will be met with "overt and covert disputes," and 21.9% of the respondents believe that Sino-US relations will "continue to be tense."⁹⁹ What is worse is that only 23.9% of the respondents believe that the Biden administration will work together with China on the North Korean issue, which is lower than coping with pandemic (48.7%) and climate change (39.9%).¹⁰⁰

Second, while North Korean issue should be a non-zero-sum game in order to draw cooperation from China, the US approach to North Korean issue is becoming more zero-sum. In March 2021, Secretary of State Anthony Blinken said that "[US] relationship with China will be competitive when it should be, collaborative when it can be, and adversarial when it must be."¹⁰¹ North Korean nuclear issue

biggest-geopolitical-test-for-u-s-idUSKBN2AV28C.

⁹⁹ 环球舆情中心, 《中国人看世界》, 环球网, December 29, 2021, available from <https://baijiahao.baidu.com/s?id=1720433480863061093&wfr=spider&for=pc>.

¹⁰⁰ Ibid.

¹⁰¹ Phelim Kine and Gavin Bade, "Blinken to unveil 'no surprises' China strategy pre-Asia push," *The Politico*, May 2, 2022, available from <https://www.politico.com/news/2022/05/02/antony-blinken-china-asean-summit-00029368>.

should be a collaborative issue with China, not competitive, in order to achieve cooperation with China. Nevertheless, the Biden administration's approach to North Korean nuclear threat is showing more of collective defence which excludes China. This can be found most notably Indo-Pacific Strategy in which the US highlights the importance of "close cooperation among the United States' allies and partners" to respond to the North Korean nuclear issue.¹⁰²

Third, international organizations like the United Nations have an important role and responsibility to effectively manage and implement UN sanctions. UN resolutions are an outcome of political consensus between two countries that is not easily achieved, as they are a compromise between the "baseline" of the US and "ceiling" of China. Thus, the UN Secretariat should have clear communication to support the UN sanction committees and Panel of Experts to promote consistent standards to implement UN sanctions agreed by two nations. Some scholars warn that unilateral sanctions that 'go beyond' UN measures can be "counterproductive in achieving the objectives set out in UN resolutions."¹⁰³

¹⁰² U.S. National Security Council, *Indo-Pacific Strategy of the United States*, February 2022, available from <https://www.whitehouse.gov>.

¹⁰³ Biersteker et al., *Targeted Sanctions*, 268.

Based on the implications of game theory analysis, China's cooperation can be achieved when pursuing peaceful denuclearization policy, not aggressive denuclearization one. For now, multilateral approach through international organizations like the United Nations or resuming Six Party Talks can be a good starting point. Furthermore, the United States can and should try to convince China that North Korea's possession of nuclear weapons, even without conducting nuclear tests, can pose a grave threat to the regime stability of the North Korea, discouraging China's defection to tolerate nuclear North Korea.

2. Policy Implications for ROK

The denuclearization of North Korea is a challenging task. Based on the past decades of denuclearization efforts, it seems highly possible that North Korea will be recognized as a de facto nuclear power, and the international community will likely engage in nuclear arms reduction talks in the future. President Yoon also said he will expand communication and cultural exchanges with North Korea based on the principle of mutual reciprocity. The biggest challenge facing the Yoon administration is to establish a strategic position amid the deepening US-China conflict. Amid intensifying

US-China tensions, South Korea is likely to be put in a strategic dilemma as a Washington-friendly policy would trigger Beijing to respond with hostility and vice versa. Based on game theory analysis, this paper gives the following policy implications for South Korea.

First, Seoul should strive to promote US-China cooperation in denuclearization of North Korea by maintaining a strategic balance between Washington and Beijing. Prior to inauguration, then President-elect Yoon Suk-yeol has written a *Foreign Affairs* article in which he said that “South Korea should actively promote a free, open, and inclusive order in the Indo-Pacific.”¹⁰⁴ Meanwhile, China’s *The Global Times* published a commentary on the day of President Yoon’s inauguration on May 10, 2022, which said that “Washington wants to turn South Korea into a pawn in its ‘Indo-Pacific Strategy,’” which will become “the biggest variable affecting South Korea’s relations with China.”¹⁰⁵ While the US remains as the closet ally to South Korea, the Yoon administration should strive to solve the North Korean nuclear issue from the collective security approach, not collective defence one. China now has a stronger reason to solve

¹⁰⁴ Yoon Suk-yeol, “South Korea Needs to Step Up - The Country’s Next President on His Foreign Policy Vision,” *Foreign Affairs*, February 8, 2022.

¹⁰⁵ “Yoon most likely to handle relations with China well: Global Times editorial,” *The Global Times*, May 10, 2022, available from <https://www.globaltimes.cn/page/202205/1265213.shtml?id=12>.

the North Korean nuclear crisis with the US and South Korea. It is time to fundamentally reconsider diplomatic options based on multilateral cooperation to solve the issue. This will create strategic space for South Korea to avoid the label of proclaiming a complete pro-American policy that excludes China and prevent from further aggravating the US-China competition.

Second, South Korea should prioritize in strengthening its own national defence to deter North Korea's increasing threats. Developing South Korea's new indigenous artillery and short-range rocket defence system modelled after Israel's Iron Dome is a good example, which the ROK military plans to strengthen its missile defence system similar to Israel's Iron Dome, in order to protect its capital Seoul, which is within the range of DPRK's long-range rockets.¹⁰⁶ During presidential campaign, President Yoon has repeatedly expressed his views in further deployment of the Terminal High Altitude Area Defense (THAAD) missile defence system, which China views as threat to its national security. Not only South Korea-China relations will quickly deteriorate as they did after Seoul introduced the Terminal High Altitude Area Defense (THAAD) system in 2016, THAAD deployment will also carry heavy economic

¹⁰⁶ Frank Smith, "Why is South Korea developing an Israeli-style Iron Dome?" *Al Jazeera*, Jul 16, 2021, available from <https://www.aljazeera.com>.

costs. South Korea's supply chain still heavily relies on China with 29.3% of South Korea's material parts imports come from China in 2020, higher than Japan and the United States.¹⁰⁷ Therefore, South Korea should craft a pragmatic North Korea policy that deters threats from North Korea while minimizing economic costs.

Lastly, the Yoon administration should strive towards peaceful denuclearization of North Korea. The game theory analysis showed that China desires peaceful method like dialogues to solve the nuclear issue. During a meeting with President Yoon, Chinese Vice President Wang Qishan reaffirmed that "China sincerely supports efforts by South and North Korea to improve their relations and seek reconciliation and cooperation and aims to strengthen communication to pursue denuclearization and lasting peace on the Korean Peninsula."¹⁰⁸ Initiating to resume Six-Party Talks to bring North Korea to peaceful dialogues can be a good start.

As such, new South Korean administration should also emphasize that its policy toward North Korea is one of reciprocity, not escalation in tension. During a press conference, President Yoon

¹⁰⁷ Erika Na, "South Korea's supply chain reliance on China leaves it more exposed than the US, Japan: report," *The South China Morning Post*, January 13, 2022, available from <https://www.scmp.com/>.

¹⁰⁸ "Xi invites Yoon to visit China at convenient time," *Yonhap News*, May 10, 2022, available from <http://m.koreaherald.com>.

explained his foreign policy of establishing a trilateral South Korea–US–North Korea liaison office in the demilitarized Panmunjom area. He also pledged humanitarian support to North Koreans if deemed necessary. While engagement policy has been traditionally promoted by progressive administrations in South Korea, peaceful engagement policy which defuses tension on the Korean peninsula should be adopted regardless of political ideologies for the national security.

Economic incentives such as sanctions relief may be contingent on progress toward denuclearization, but humanitarian assistance can be offered separate from politics and dialogue is possible without preconditions. Therefore, the Yoon administration must craft a sophisticated and complex North Korean policy, not lean to one side, a balance between peace and security, engagement and deterrence, and carrots and sticks.

3. Future Research

This paper analysed the complex relationship between the US and China in multilateral and unilateral sanctions against North Korea. Nevertheless, due to the complex nature of this issue, there is still room for further research that will include, but not be limited, to the following below.

First, as the US-China strategic competition is intensifying, it is important to further research how much impact it really has on the North Korean nuclear issue. While many scholars and experts view that there will be negative impact on the US-China cooperation, both countries have still view that the North Korean nuclear issue is a common concern which they both share and claim to work together. It would be worthwhile to conduct further research how much limitation that the US-China competition brings into solving the North Korean nuclear issue, whether it is only limited to failing to reach a consensus on the scope of sanctions or other methods as well.

Second, there has been a lot of debate on the effectiveness of sanctions in general. While the US has adopted unilateral sanctions believing that they will complement the limitations of UN sanctions, it is important to also analyse the effects of the US unilateral sanctions on DPRK quantitatively. In this paper, while the effectiveness of targeted sanctions by the UN was researched and found to be limited in effectiveness, it would be also worthwhile to explore how effective the US unilateral sanctions are, including the secondary boycotts to third party countries that have trade with the originally sanctioned nation.

Third, as both the US and Republic of Korea elected new presidents, it will be important to analyse how new North Korean policies interact with longstanding Xi government in China. New leadership in administration often brings new North Korean policies and analysing the developments of DPRK policies by Biden administration and Yoon administration and how they interact and draw what kind of response from China—whether it is cooperation nor defection—will be valuable to build upon this research.

Fourth, it will be also worthwhile to find what other areas of US-China cooperation can be possible regarding DPRK nuclear issue. As sanctions are mainly a tool to pressure DPRK to prevent conducting further nuclear tests and bring DPRK back to negotiant table, researching areas of cooperation such as peaceful use of nuclear energy would be worthwhile. As a matter of fact, such attempt did occur under the 1994 Agreed Framework in construction of light water reactors in return for the closing of North Korea's Yongbyon nuclear power plant. As nuclear power is a dual-use technology that can be a military weapon but also source of efficient clean energy, finding ways for peaceful nuclear energy that does not violate the NPT and also provide energy to North Korean citizens in need under the supervision of the international watchdog like IAEA.

Fifth, further research on North Korea nuclear issue utilizing game theory will be valuable. For this paper, there were only two players—the US and China—but other countries like South Korea and Japan also have an important task of promoting multilateral cooperation in denuclearization of North Korea. Therefore, further research and data examination of the game theory with an increase in number of players in nuclear negotiation will be valuable. As the world waits to see if and when North Korea will reengage in denuclearization dialogues, the US and China should work together to overcome obstacles to cooperation and draw a common blueprint for a sustainable roadmap of denuclearization of North Korea.

Bibliography

- 김승욱. 「게임이론과 그 응용」. 『정보와 통신 : 한국통신학회지 v.30 no.12』 (2013): 66-75.
- 신중호 외. 「2030 미중관계 시나리오와 한반도」. 『KINU 연구총서 18-26』 (2018): 18-26.
- 임갑수 외. 「유엔 안보리 제재의 국제정치학」. (한울아카데미 2013): 1-326.
- 전봉근. 「2022년 북핵 동향 평가와 북핵협상 재개 전략」. 『IFANS 주요국제문제분석 2022-04』 (2022): 1-35.
- 최우선. 「미중관계의 북핵문제에 대한 영향」, 『IFANS 주요국제문제분석 2018-46』 (2018): 1-19.
- 刘叶婷 崔越 肖骁. “中国外交为什么‘结伴不结盟’?”. 人民网. November 16, 2019. Available from politics.people.com.cn.
- 环球舆情中心发布. 《中国人看世界》. 新闻中心-腾讯网. December 30, 2020. Available from new.qq.com.
- 环球舆情中心发布. 《中国人看世界》. 环球网. December 29, 2021. Available from baijiahao.baidu.com.
- 华中科技大学国家传播战略研究院. “中国公众的世界观念调查报告.” 《学术前沿》. May 2019.
- Baker, Peter and Sang-Hun, Choe. “Trump Threatens ‘Fire and Fury’ Against North Korea if It Endangers US” *The New York Times*. August 8, 2017. Available from www.nytimes.com.
- Bandow, Doug. “Will China Solve the North Korea Problem? The United States Should Develop a Diplomatic Strategy to Persuade Beijing to Help.” Cato Institute Policy Analysis no. 806, December 2016.

- Biersteker, T., Eckert, S., & Tourinho, M. (Eds.). *Targeted Sanctions: The Impacts and Effectiveness of United Nations Action*. Cambridge: Cambridge University Press, 2016.
- Bradsher, Keith. "China Retaliates With Tariffs on \$60 Billion of US Goods." *The Wall Street Journal*. September 19, 2018. Available from <https://www.wsj.com>.
- Brunnstrom, David. "US accuses China of 'flagrant' N.Korea violations, offers \$5 million reward." *Reuters*. December 1, 2020. Available from <https://www.reuters.com>.
- Bush, George W. "Statement by President Bush on Six Party Talks." *The White House*. February 13, 2007. Available from <https://2001-2009.state.gov/p/eap/rls/ot/2007/80491.htm>.
- China, Russia urge UNSC to end key sanctions on North Korea." *The Asahi Shimbun*. November 3, 2021. Available from <https://www.asahi.com>.
- Choe, Sang-Hun. "US Confirms North Korea Fired Intercontinental Ballistic Missile." *The New York Times*. July 4, 2017. Available from www.nytimes.com.
- Executive Office of the President, *Exec. Order No. 13810*, 82 Fed. Reg. 184, September 25, 2017. Available from *US Federal Register Documents*.
- FM: Six-party talks achieve 'significant progress'." *Xinhua News Agency*. June 30, 2008. Available from http://www.china.org.cn/international/news/2008-06/30/content_15907442.htm.
- France-Press, Agence. "China calls for easing of United Nations sanctions on North Korea." *South China Morning Post*. January 4, 2020. Available from <https://www.scmp.com>.
- Gao, Charlotte. "China Opposes Unilateral Sanctions on North Korea." *The Diplomat*. August 31, 2017. Available from <https://thediplomat.com>.

- Goh, Brenda. "More than half Chinese consumers shun US goods due to trade war: survey," *Reuters*. June 26, 2019. Available from <https://www.reuters.com>.
- Gowan, Richard. "Minimum Order: The Role of the Security Council in an Era of Major Power Competition." United Nations University Centre for Policy Research, 2018.
- Haggard, Stephan and Noland, Marcus. *Hard Target: Sanctions, Inducements, and the Case of North Korea*. Stanford: Stanford University Press, 2017.
- Hufbauer, G., Schott, J., Elliott, K. and Oegg, B. *Economic Sanctions Reconsidered*, Peterson Institute for International Economics, 2009.
- IAEA. "Application of Safeguards in the Democratic People's Republic of Korea Atoms for Peace and Development." September 11, 2017.
- IAEA. "Application of Safeguards in the Democratic People's Republic of Korea." GOV/2021/40-GC(65)/22. August 27, 2021.
- Joint Statement of the Fourth Round of the Six-Party Talks*. September 19, 2005. Available from <https://www.fmprc.gov.cn/>.
- Jung, Damin. "Kim Jong Un inspects thermonuclear weapon to be loaded in ICBM warhead." *NK News*. September 3, 2017. Available from www.nknews.org.
- Kessler, Glenn. "US Ready to Ease Sanctions on N. Korea; Pyongyang Would Have to Acknowledge Evidence About Nuclear Activities." *Washington Post*. April 11, 2008. Available from <http://www.washingtonpost.com>.
- Kim, Hee Min, and Jun Y. Choi. "Uncertainty in Foreign Policy Making: A Bayesian Game Analysis of Korea." *Global Economic Review* vol. 31, no. 3 (2002): 25-40.

Kine, Phelim and Bade, Gavin. “Blinken to unveil 'no surprises' China strategy pre-Asia push.” *The Politico*. May 2, 2022. Available from <https://www.politico.com>.

Korean Central News Agency. “Press Statement of Vice Department Director of C.C., WPK Kim Yo Jong.” April 5, 2022. Available from <http://www.kcna.co.jp/index-e.htm>.

Korean Central News Agency. “Respected Comrade Kim Jong Un Makes Speech at Military Parade Held in Celebration of 90th Founding Anniversary of KPRA.” April 26, 2022. Available from <http://www.kcna.co.jp/index-e.htm>.

KOTRA. 「2020 북핵 대외무역 동향」. 『KOTRA 자료 21-163』 (2021):1-125.

Lewis, Simon., Pamuk, Humeyra. “Biden administration singles out China as 'biggest geopolitical test' for US” *Reuters*. March 4, 2021. Available from <https://www.reuters.com>.

Minegishi, Hiroshi. “A seventh North Korean nuclear test would carry 'China risk'.” *Nikkei Asia*. April 23, 2022. Available from <https://asia.nikkei.com>.

Na, Erika. “South Korea’s supply chain reliance on China leaves it more exposed than the US, Japan: report.” *The South China Morning Post*. January 13, 2022. Available from <https://www.scmp.com/>.

National Committee on North Korea. “Kim Jong Un’s 2017 New Year’s Address.” January 1, 2017. Available from www.ncnk.org.

Nikkei Inc. “A satellite view of North Korea's nuclear sites.” *Nikkei Asia*. Accessed May 16, 2022. Available from <https://asia.nikkei.com/static/vdata>.

O’Connor, Tom. “North Korea’s Latest Nuclear Bomb is Stronger Than All Its Previous Tests Combined.” *Newsweek*. September 5, 2017. Available from www.newsweek.com.

- Obeidi, Amer, Keith W. Hipel, and D. Marc Kilgour. "The Role of Emotions in Envisioning Outcomes in Conflict Analysis." *Group Decision and Negotiation* 14, no. 6, 2005.
- Onishi, Norimitsu and Wong, Edward. "US to Remove North Koreans from Terror List; Nuclear Declaration is Rewarded as Disarmament Effort Advances." *International Herald Tribune*. June 27, 2008. Available from <https://www.nytimes.com>.
- Perry, William. "Crisis on the Korean Peninsula: Implications for US Policy in Northeast Asia." Brookings Institution. January 24, 2003.
- Quad Leaders' Joint Statement: 'the Spirit of the Quad.'* The White House. March 12, 2021. Available from: <http://www.whitehouse.gov>.
- Rousseau, Jean-Jacques. *Discourse on Inequality*. (Harmondsworth, Middlesex, England: Penguin Books, 1984): 1-117.
- Schelling, Thomas. *The Strategy of Conflict*. Cambridge: Harvard University Press, May 15, 1960.
- Sheen, Seong-ho. "US Coercive Diplomacy toward Pyongyang: Obama vs. Trump." *Korea Institute for Defence Analysis* vol.32, no.4, 2020.
- Silver, Laura, et al. "Most Americans Support Tough Stance Toward China on Human Rights, Economic Issues." Pew Research Center. March 4, 2021. Available from <https://www.pewresearch.org>.
- Slavin, Barbara. "Scientist Describes N. Korea Nuclear Evidence." *USA Today*. January 22, 2004. Available from <https://www.usatoday.com/>.
- Smith, Frank. "Why is South Korea developing an Israeli-style Iron Dome?" *Al Jazeera*. Jul 16, 2021. Available from <https://www.aljazeera.com/>

- Snyder, Scott. "The Rise of US–China Rivalry and Its Implications for the Korean Peninsula." in *Korean Security Dynamics in Transition*. (New York: Palgrave Macmillan, 2001): 119–131.
- Song, Jooyoung. "Understanding China's Response to North Korea's Provocations." *Asian Survey* vol. 51, no. 6 (2011): 1134–1155.
- State Council Information Office of the People's Republic of China. *China and the World in the New Era*, September 27, 2019. Available from <https://english.www.gov.cn>.
- State Council Information Office of the People's Republic of China. *China's National Defence in the New Era*. July 24, 2019. Available from english.www.gov.cn/archive/whitepaper.
- Swanson, Ana. "Trump's Trade War with China Is Officially Underway." *The New York Times*. July 5, 2018. Available from <https://www.nytimes.com>.
- The White House. *President Delivers State of the Union Address*. February 1, 2002. Available from <https://georgewbush-whitehouse.archives.gov>.
- Thornton, Susan A., Nan, Li, and Lee, Juliet. "Debating North Korea: US and Chinese perspectives." *38 North*. August 27, 2021. Available from <https://www.brookings.edu>.
- "Transcript of the US–China Opening Remarks in Alaska." *Nikkei Asia*. March 19, 2021. Available from asia.nikkei.com.
- "Trump accuses China of stalling progress with North Korea." *BBC News*. August 30, 2018. Available from <https://www.bbc.com>.
- US Congress. House. *Supplemental Appropriations Act*. H.R.2642. June 30, 2008. Available from <https://www.congress.gov>.
- US Embassy in Egypt. *Secretary Mattis Statement at the White House*. September 2017. Available from eg.usembassy.gov.

- US National Security Council. *Indo-Pacific Strategy of the United States*. February 2022. Available from <https://www.whitehouse.gov>.
- UN News. “Security Council Reforms Must Reflect 21st Century Realities, Says UN Assembly President.” United Nations. January 26, 2021. Available from <https://news.un.org>.
- United Nations. *Charter of the United Nations* 1 UNTS XVI. October 1945. Available from <https://www.un.org>.
- United Nations. General Assembly, General Assembly official records 72nd session: 3rd plenary meeting, New York, *A/72/PV.3* September 2017. Available from digitallibrary.un.org/.
- United Nations. General Assembly. General Assembly official records 72nd session: 3rd plenary meeting. New York, *A/72/PV.12*. September 2017. Available from <https://undocs.org>.
- United Nations. Security Council 8962nd Meeting Press Release. *SC/14788*. February 7, 2022. Available from <https://www.un.org/press>.
- United Nations. Security Council, Subsidiary Organs of the United Nations Security Council Fact Sheets 2022 (January 2022). Available from <https://www.un.org/securitycouncil>.
- United Nations. *UN Security Council Resolution 1718 S/Res/1718*. October 2006. Available from <https://www.undocs.org>.
- United Nations. *UN Security Council Resolution 2397 S/Res/2397*. December 2017. Available from <https://www.undocs.org>.
- United States Department of State. *Remarks at the UN Security Council Ministerial Meeting on D.P.R.K.* December 15, 2017.
- US Department of Defense. *Nuclear Posture Review 2018*. February 2018. Available from <https://media.defense.gov>.

US National Security Council. *United States Strategic Approach to the People's Republic of China*. May 26, 2020. Available from <https://trumpwhitehouse.archives.gov>.

Van Evera, Stephen. *Guide to Methods for Students of Political Science*. (Ithaca, NY: Cornell University Press, 2016).

VOA News. "Outgoing UN Human Rights Chief Warns UN Could Collapse." *VOA*. August 21, 2018. <https://www.voanews.com>.

Wagner, Alex. "Bush Outlines Resuming Talks with North Korea." *Arms Control Today*. July/August 2001.

Warrick, Joby, Nakashima, Ellen, and Fifield, Anna. "North Korea now making missile-ready nuclear weapons, US analysts say." *The Washington Post*. August 8, 2017. Available from www.washingtonpost.com.

"Xi invites Yoon to visit China at convenient time." *Yonhap News*. May 10, 2022. Available from <http://m.koreaherald.com>.

"Yoon most likely to handle relations with China well: Global Times editorial." *The Global Times*. May 10, 2022. Available from <https://www.globaltimes.cn>.

Yoon, Suk-yeol. "South Korea Needs to Step Up – The Country's Next President on His Foreign Policy Vision." *Foreign Affairs*. February 8, 2022. Available from www.foreignaffairs.com.

Appendix 1. List of Abbreviations

CV	Condition Variable
DPRK	The Democratic People's Republic of Korea
DV	Dependent Variable
EO	US Executive Order
FOIP	Free and Open Indo-Pacific Strategy
IAEA	International Atomic Energy Agency
ICBM	Intercontinental Ballistic Missile
IV	Independent Variable
NE	Nash equilibria
NPT	Non-Proliferation Treaty
OFAC	Office of Foreign Assets Control
PRC	The People's Republic of China
ROK	The Republic of Korea
SCAD	Security Council Affairs Division
THAAD	Terminal High Altitude Area Defense
TSC	Targeted Sanctions Consortium
UNSC	UN Security Council

국문초록

미·중의 북한 비핵화 협력에 대한 게임이론 분석

북한의 핵무기는 동북아 지역과 핵 비확산 체제의 평화와 안정에 주요 위협 중 하나이다. 이와 같은 엄중한 안보문제를 해결하기 위해 국제사회는 경제제재 및 대화 등 다양한 노력을 시도하였지만 북한은 총 여섯 번의 핵 실험을 강행하였으며 최근 들어 북한의 핵 위협은 되레 증가하고 있다. 다른 한편, 다수의 전문가들은 북핵 문제를 해결하기 위해 북한의 가장 큰 교역국가인 중국의 역할이 중요하다고 보고 있다. 다만 궁급증은 중국이 유엔 안전보장이사회 결의안을 채택하여 대북 유엔제재를 도입하는 데는 협력하였지만 미국의 단독 대북제재는 반대한다는 것이다. 그렇다면 중국은 왜 일관되지 않은 대북제재 협력 수준을 보이는 것일까? 반면 미국은 단독 대북제재를 언제 도입할까? 그리고 미·중의 대북제재 협력 조건은 무엇일까? 이 글은 오늘날 국제사회에서 북한 핵 문제에 대해 가장 큰 영향력을 행사하는 미국과 중국의 대북제재의 입장 차이를 유엔 공식자료와 양국의 정부공식 문서를 바탕으로 분석함으로써 향후 북한 비핵화에 대한 국제협력의 가능성과 그 형태를 전망하는 것을 목적으로 하고 있다. 본 주제가 갖는 모호성을 명확하게 설명하기 위해 먼저 유엔 제재와 미국 제재가 어떤 면에서 다른지를 살펴본 후, 게임이론 적용과 사례분석을 통해 미·중의 북한 비핵화 협력과 변질을 분석

한다. 이 연구는 미·중 간의 신뢰가 저조할 시 미국은 강압적인 비핵화 정책을 채택하여 단독 대북제재를 도입하는 반면에 중국은 역으로 북한 정권의 안정성을 보장하기 위해 대북제재를 완화하려 하는 등 양국의 변절로 귀결된다는 것을 밝힌다. 다시 말해, 미국은 북한 비핵화를 최우선으로 생각하는 반면에 중국은 제재 이행에서 북한 정권의 안전성을 가장 우선적으로 생각한다는 것이다. 이를 바탕으로 앞으로 북핵 대북제재를 위한 미·중 협력에 있어서는 강압적인 비핵화 정책보다는 평화적인 정책을 토대를 이룰 것으로 주장한다. 이 연구의 결과는 게임 이론적 분석을 통해 미·중의 협력 조건을 식별함으로써, 미래에 북한의 비핵화를 위한 국제협력을 도모할 수 있는 참고 자료로 사용될 수 있다.