North Korea as a Nuclear State:
A Predictive Study on
Possible Japanese, Taiwanese and South Korean Responses

Ann T. Brigati

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"It is easier to denature plutonium than to denature the evil spirit of men"
Albert Einstein

Introduction

Nuclear proliferation is a major concern to all nations in regard to their own national security. Due to the devastating nature of nuclear weapons, the United States (U.S.) became one of the main architects of the Nuclear Non-proliferation Treaty (NPT), which was signed in 1968 and entered into force in 1970. The NPT is a complex variety of international agreements, domestic laws and export regulations, administered by national and international agencies, primarily the International Atomic Energy Agency (IAEA). The main goal of the NPT is to stop the spread of nuclear weapons to states that do not possess them. Since the origination of the NPT, at least 183 countries have agreed to forego the pursuit of nuclear weapons. Some countries, such as Iran and North Korea, however, have changed their minds and decided to violate their commitments to the treaty or withdraw from the agreement and pursue their own independent nuclear weapons capabilities.

There are two schools of thought in regards to proliferation of nuclear weapons, known as the optimism-pessimism debate. The optimists claim that proliferation has a positive effect on international and regional stability because the chief impact of the weapons is to deter war between those that are in possession of the weapons. The

pessimist view argues that proliferation is dangerous because it produces international and regional instability.

Regardless of the viewpoint, nuclear proliferation should be a major concern to all nations. The more nuclear states that exist, the higher the risk that some state will go beyond having the weapon for deterrence and use it, despite national interests to the contrary. There is also the risk of the domino effect, which in simple terms, means that as more states become declared nuclear powers, more will then seek to go down the same road. Other risks involved in proliferation are accidents or weapons getting into the hands of rogue states or terrorist groups due to lack of command and control structures. It is obvious, due to the nature of nuclear weapons and the strategic implications resulting from possession of these weapons, that this topic of study is of major significance, both in a general sense and in regards to particular states or regions, as this paper will address.

A particular region of concern in today's national security environment is Northeast Asia. Northeast Asia is at high risk of becoming one of the most volatile regions in the world in regard to nuclear weapons. Most countries in the region, including Russia, China, North Korea, South Korea, Japan and Taiwan, already have civilian nuclear power infrastructures. Russia and China are also already established nuclear weapons states. Japan, South Korea and Taiwan are "threshold" states. All have previously had nuclear weapons development programs in the past and can resume them relatively easily should they feel threatened.

North Korea, though not an established nuclear weapons state, is a presumed nuclear power, which is the issue of this study. North Korea's withdrawal from the NPT in 2003, its subsequent nuclear weapons test in 2006, and its very recent underground

nuclear test, followed by the test firing of three short-range ground-to-air missiles, on May 25, 2009, has caused serious international security concerns and may cause nearby concerned states to re-evaluate their own decisions to halt nuclear weapons programs.

This study examines the potential plausible scenarios that could result should North Korea be officially declared a nuclear weapons state. Though this really would affect the strategic balance worldwide, this study specifically examines the areas that would be affected the most and the most immediately. Therefore, we will address the affects of North Korea becoming a declared nuclear weapons state on the nearby countries of Japan, Taiwan and South Korea, in regards to whether or not they will pursue their own independent nuclear weapons programs.

In order to have an effective understanding of the issue facing Northeast Asian governments and the international community in general, a review of the available literature on nuclear proliferation and the problems associated with proliferation will follow.

Literature Review

According to Clay Moltz, the nuclear tinderbox in Northeast Asia can easily be set off, giving rise to regional tensions and widespread nuclear power capabilities. Moltz believes that it is important to continue current emphasis on supply side constraints, however, he also feels that new efforts need to be made to address the demand side. He states that these efforts should include shoring up currently weakened global non-proliferation norms, facilitating direct talks among states on issues of military concern and renewing efforts to address the underlying sources of regional conflict, such as historical problems, territorial disputes and the still unresolved Korean War. Moltz

believes these new approaches are the best chance of keeping two and a half nuclear states in Northeast Asia from becoming six.[1]

Moltz's study examines potential nuclear proliferation trends among the states of Northeast Asia to 2016, from the early post Cold War predictions, to current capabilities, to possible future "trigger" events. Moltz believes that the nuclear materials and know-how that the "threshold" states of Japan, Taiwan and South Korea might bring to a renewed weapons program is significant. Moltz concludes that several realistic scenarios could stimulate horizontal or vertical nuclear proliferation. He claims that if left unaddressed, the existing political and security tensions could cause Northeast Asia to become the world's most nuclearized area by 2016, with six nuclear weapons states.[2]

Another author, Peter R. Lavoy, also believes that the intensification of North Korea's nuclear crisis causes concern that deteriorating security conditions in Northeast Asia will lead additional nations to seek nuclear weapons. Lavoy's study looks at the factors that are likely to shape nuclear proliferation in the next ten years. The study analyzes the conditions and events that may drive new countries to pursue nuclear weapons. The study also introduces a new analytical approach that focuses on the role of nuclear myths and mythmakers, in an effort to help analysts better understand and policymakers better manage nuclear proliferation matters over the next decade.[3]

According to Lavoy, nuclear mythmakers are the national elites who want their state to acquire nuclear weapons as a part of their national security strategy and therefore participate in what he calls "nuclear mythmaking". Lavoy states that this is done by the

[1] James Clay Moltz, "Future Nuclear Proliferation Scenarios in Northeast Asia," *Nonproliferation Review* 13, no.3 (November 2006): 591.
[2] Moltz, "Future Nuclear Proliferation Scenarios in Northeast Asia," 592.
[3] Peter R. Lavoy, "Nuclear Proliferation Over the Next Decade," *Nonproliferation Review* 13, no. 3 (November 2006): 433.

mythmakers first emphasizing their countries insecurities and poor international standing and then portraying this strategy as the best corrective for the problem. The mythmaker also articulates the political, economic and technical feasibility of acquiring nuclear weapons and successfully associates these beliefs and arguments (nuclear myths) with existing cultural norms and political priorities. Finally, the mythmaker convinces senior decisionmakers to accept and act on these views.[4]

Lavoy's study also provides a summary of possible indicators that could provide early warning that proliferation is occurring.[5] This section is very helpful for any analyst attempting to predict future proliferation activities of various states, such as those states that are being examined as the focus of this study.

According to Mitchell B. Reiss, in our current environment, any number of events could catapult countries into a mad dash to acquire independent nuclear weapon capabilities. He specifically states that a single new entrant to the limited circle of nuclear powers could affect a similar response by others in the region, with the Middle East and Northeast Asia being the most likely candidates. Reiss feels that even if countries don't make a made dash toward acquisition, he believes they will hedge their bets by working quietly and methodologically to acquire the technology and materials necessary to build a bomb on short notice. He claims that states that adopt this approach could remain poised on the non-nuclear precipice for years, awaiting a political decision to go over the edge. Reiss calls the situation, whether it be fast or slow, of countries acquiring nuclear arsenals, thereby triggering a proliferation epidemic, the nuclear "tipping point". Reiss and the other authors of this study, along with their colleagues in

[4] Lavoy, "Nuclear Proliferation Over the Next Decade," 435.
[5] Lavoy, "Nuclear Proliferation Over the Next Decade," 433.

and out of government, have a consensus of opinion that we are on the verge of a new nuclear age that will be characterized by more nuclear weapons states and a much greater chance that the weapons may be used.[6]

Reiss' study examines the transnational influences on nuclear policy, including local, regional and international economics, as well as political, military and cultural factors. The study then sets out a methodological framework for understanding why certain countries originally renounced nuclear weapons acquisition, but may be reconsidering and gives particular case studies.[7]

In counterpoint to the previously mentioned authors, not everyone agrees that the acquisition of nuclear weapons by North Korea will become a major threat to the strategic stability of Northeast Asia. According to author Andrew O'Neil, the perspective that a nuclear-armed North Korea will threaten the stability of the region is based on an excessively pessimistic response to nuclear proliferation in general and a misunderstanding of the factors driving North Korea's nuclear program. O'Neil claims that current perspectives overlook what he considers the inherently defensive objectives that underpin North Korea's national strategy.[8]

O'Neil believes it is how other Northeast Asian nations react to the reality of a nuclear-armed North Korea that will shape the security environment in Northeast Asia for years to come. O'Neil's study suggests that the advent of a nuclear-armed North Korea is not necessarily the dire prospect observers presume and it may in fact be managed

[6] 1. Mitchell Reiss, "The Nuclear Tipping Point: Prospects for a World of Many Nuclear Weapons States," *The Nuclear Tipping Point: Why States Reconsider Their Nuclear Choices,* ed Kurt M. Campbell, et al (Brookings Institution Press, 2004), 4.
[7] Reiss, "The Nuclear Tipping Point," 4.
[8] Andrew O'Neil, "Learning to Live with Uncertainty: The Strategic Implications of North Korea's Nuclear Weapons Capability," *Contemporary SecurityPolicy* 26, no. 2 (August 2005): 323.

without provoking irresolvable regional tensions. He supports his theory with two closely interrelated variables, Korea's national strategy and motives for going nuclear. O'Neil feels that understanding the core motives underlying North Korea's acquisition is critical because it goes to the heart of whether or not North Korea, as a nuclear state, can be deterred against using the weapons in a crisis and therefore has an affect on the reaction of other regional states.[9]

Actors & Perceptions

Every nation in the world should have concern whenever any country develops nuclear weapons. A few states, however, have more vital interests and concerns should this situation develop within a regionally neighboring nation. In Northeast Asia, if North Korea should officially be declared a nuclear weapons state, Japan, Taiwan and South Korea will likely rethink their own nuclear policies. Each of these states has their own reasons for concern and their own viewpoints on the issue. In order to effectively predict the responses of these states to this scenario, it is essential to analyze these actors' current domestic situations, policies and perspectives. It is also necessary, for a better understanding of the situation, to analyze the current domestic, political and economic situation in North Korea. Also, in order to conduct thorough research into this situation it is important to review the nuclear proliferation histories of the affected actors.

North Korea

North Korea is an Asian Leninist Dynasty with an isolated leadership. Its closed society poses many challenges in obtaining information and developing the understanding necessary for effective international relations. North Korean citizens have

[9]Andrew O'Neil, "Learning to Live with Uncertainty: The Strategic Implications of North Korea's Nuclear Weapons Capability," *Contemporary SecurityPolicy* 26, no. 2 (August 2005): 324.

very little contact with the outside world. The media, access to telecommunications and the internet are all controlled. Travel by foreigners is also strictly controlled. The country also has an economic strategy of "self reliance", therefore, curtailing any business contacts within the state. All of these factors combined, promote excessive speculation as to the happenings in North Korea.[10]

Lack of information and the secretive nature of the North Korean regime have led many to conclude that leader Kim Jong Il is crazy and irrational. This atmosphere has promoted widespread fear that there is no hope for a peaceful resolution of the current nuclear crisis. Therefore, gaining a better understanding of North Korea's politics, national security concerns and economy will put the issue into better perspective.[11]

Politics, National Security and Economics

Since the late 1800s the Korean peninsula has been victim to a number of wars between external powers, often with dire consequences over the sovereignty of the Korean people. As a result of the Chinese defeat in the Sino-Japanese War (1894-1895), Korea was declared independent. Ten years later, however, after the Russo-Japanese War (1904-1905), when Japanese forces defeated Russia, the Portsmouth Peace Treaty was created. This treaty recognized Japan's "paramount interest" in Korea and in 1910 Korea was formally annexed by Japan. The Korean peninsula was under Japanese colonialism for 35 years.[12]

When Japan lost WWII in 1945, it was stripped of all its colonial possessions. Korea was then split at the 38th parallel, between the Soviet Union and the U.S. The

[10] Daniel Pinkston and Philip Saunders, "Seeing North Korea Clearly," *Survival* 45, no. 3 (Autumn 2003): 79.
[11] Pinkston and Saunder, "Seeing North Korea Clearly," 80.
[12] Linus Hagstrom, and Marie Soderberg, "Taking Japan-North Korea Relations Seriously: Rationale and Background," *Pacific Affairs* 79, no. 3 (Fall 2006): 376.

allied powers administered the nation for five years, but could not agree upon how to appoint an independent government. The peninsula, therefore, remained divided through a proclamation creating the ROK and the DPRK. Both governments, however, made claim to the whole peninsula, eventually leading to the Korean War. Fighting continued until an armistice agreement was reached in 1953. However, tense relations have existed between the two Koreas ever since.[13]

Initially, due to assistance from the Soviet Union and China, North Korea was able to hold its own. Since the end of the Cold War, however, North Korea's strategic circumstances have shown dramatic deterioration. It suffers from a marked economic decline and acute isolation. North Korea's economy has been in serious trouble since the end of the Cold War due to its structural economic problems, severe energy shortages and loss of foreign assistance. Famine killed at least one million people in the mid 1990s. The government's failure to export products that earn sufficient foreign exchange to import food is one reason for the food shortage. North Korea is dependent on substantial amounts of external aid to feed its own people.[14]

Due to these economic woes, North Korea has recently expressed a desire to open their economy and increase exports. Unfortunately, ballistic missiles are arguably North Korea's single most competitive export being produced.[15] This does not bode well in the realm of nuclear proliferation and causes concern that if North Korea had nuclear weapons, they might sell these weapons to other rogue states or terrorist organizations.

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[13] Linus Hagstrom, and Marie Soderberg, "Taking Japan-North Korea Relations Seriously: Rationale and Background," *Pacific Affairs* 79, no. 3 (Fall 2006): 376.
[14] Andrew O'Neil, "Learning to Live with Uncertainty: The Strategic Implications of North Korea's Nuclear Weapons Capability," *Contemporary SecurityPolicy* 26, no. 2 (August 2005): 325.
[15]Daniel Pinkston and Philip Saunders, "Seeing North Korea Clearly," *Survival* 45, no. 3 (Autumn 2003): 79.

North Korea joined the Non-Proliferation Treaty in 1985. In early 1993, however, based on indications that North Korea was being deceptive regarding its nuclear program, the IAEA demanded unlimited access to its nuclear facilities. At this point North Korea refused authorities entry to two undeclared nuclear waste facilities, suspected of holding fissile material. Shortly, thereafter, it announced a planned withdrawal from the NPT. Withdrawal, however, did not occur at that time.[16] In 2002 North Korean officials acknowledged the existence of a clandestine uranium enrichment and plutonium program. In December 2002, all IAEA inspectors were expelled from North Korea and in January 2003, they declared their automatic and immediate withdrawal from the NPT. Statements were then made by the North Korean government to the official news media that North Korea was seeking to acquire nuclear weapons.[17]

Shortly after these actions, resolution talks began between the U.S., North Korea and China. In August 2003, the first Six Party talks were convened, the actors at these talks were China, North Korea, Japan, Russia, South Korea and the U.S. No concrete agreements were reached but additional talks were held on an irregular basis.[18]

In February, 2005, North Korea declared that it had now manufactured "nukes for self defense" and that it was suspending indefinitely its participation in the Six Party process.[19] As of that date, North Korea was a self-proclaimed nuclear power. However, doubts still remained about their actual capabilities. In September, after the fourth Six Party Talks, a new agreement was reached in which North Korea committed to ending

[16]Andrew O'Neil, "Learning to Live with Uncertainty: The Strategic Implications of North Korea's Nuclear Weapons Capability," *Contemporary SecurityPolicy* 26, no. 2 (August 2005): 318.
[17] O'Neil, "Learning to Live with Uncertainty," 319.
[18] Robert A. Scalapino, "North Korea-Challenge for the Major Powers," *Asian Security* 3, no. 1 (February 2007): 6.
[19] James Cotton, "North Korea and the Six-Party Process: Is a Multilateral Resolution of the Nuclear Issue Still Possible?" *Asian Security* 3, no. 1 (February 2007): 27.

moves to produce nuclear weapons and to give up existing nuclear weapons, to rejoin the NPT at an early date and to accept IAEA safeguards. It appeared as though the North Korean nuclear crisis was en route to a resolution. However, at the fifth round of the Six Party Talks, held in November 2005, it became clear that there was no progress in moving from general principles to implementation of the previous agreement.[20]

By spring 2006, advances were again stalemated and financial sanctions were put into place against North Korea. The North Korean response, however, was largely one of continued militancy. In early July, North Korea launched seven missiles, including one long range missile. This brought isolation and condemnation upon North Korea and a resolution was passed to halt all missile and missile related goods from being transferred to North Korea. Further penalties were also imposed. South Korea suspended food and fertilizer aid and China also reduced its economic assistance.[21]

Three months later, on October 9, 2006, North Korea conducted an underground nuclear test. Again condemnation and sanctions were imposed against North Korea. In December, the Six Party Talks reconvened, however, no agreements were reached. The questions now are whether or not resumption of the Six Party Talks can result in genuine progress and whether or not North Korea has a deliverable nuclear weapons capacity.[22] As this paper is being written, North Korea, on May 25, 2009, again conducted an underground nuclear weapons test and test fired three short-range ground-to-air missiles. Obviously, the regime in North Korea intends to remain defiant.

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[20]Robert A. Scalapino, "North Korea-Challenge for the Major Powers," *Asian Security* 3, no. 1 (February 2007): 6.
[21] Scalapino, "North Korea-Challenge for the Major Powers," 7.
[22] Scalapino, "North Korea-Challenge for the Major Powers," 11..

Japan

Japan is a country believed to be a strong barometer in terms of a shift in nuclear policy within the Northeast Asia region. According to the 2008 CRS Report for Congress, Japan probably will not pursue nuclear weapons capabilities due to its security guarantee from the United States. Japan is currently under the "nuclear umbrella" and security guarantee of the U.S. government. Under the terms of the Mutual Security Assistance Pact of 1952 and the Treaty of Mutual Cooperation and Security of 1960, Japan grants the U.S. military basing rights in its territory in exchange for a U.S. pledge to protect Japan's security. If Japan made the decision to pursue a nuclear weapons program, this action could erode the U.S.- Japan alliance, and upset the geopolitical balance in Northeast Asia.[23] The political, economic and national security climate of Japan, as well as its current state of nuclear capabilities, will ultimately determine whether or not it will change its current course and pursue an independent nuclear weapons program.

Politics, National Security and Economics

During WWII, Japan clandestinely developed two separate plans for atomic weapons development. This was discovered and dismantled by the allied forces at the end of the war. Since then, Japan has traditionally been one of the most prominent advocates of non-proliferation. In 1955, Japan adopted the Atomic Energy Basic Law, which clearly stated "the research, development and utilization of atomic energy shall be limited to peaceful purposes." They joined the International Atomic Energy Agency (IAEA) in 1957. The Japanese also adopted the "Three Non-nuclear Principles". These

[23] CRS Report, Emmy Chanlett-Avery and Mary Beth Nikitin, "Japan's Nuclear Future: Policy, Debate, Prospects and U.S. Interests," *CRS Report for Congress* Congressional Research Service (May 9, 2008).

stated that Japan would not manufacture, possess or permit the introduction of nuclear weapons on Japanese soil. Not everyone agreed with the total restrictiveness of these principles, however. Prime Minister Sato, believing these principle might be too constraining, clarified these non-nuclear principles in 1968, by declaring the "Four Nuclear Policies." These were as follows: 1) the promotion of the peaceful use of nuclear energy; 2) efforts toward global nuclear disarmament; 3) reliance and dependence on U.S. extended deterrence based on the U.S. Japan Security Treaty; and 4) support for the Three Non-nuclear Principles under the circumstances where Japan's national security is guaranteed by the other three policies.[24]

Sato, at this point, wanted to re-emphasize that the Three Non-nuclear Principles could only be sustained in conjunction with the other policies. This left the door open for Japan to develop nuclear weapons if the situation mandated it. One such situation would be if there was significant regional proliferation or if there was a "malfunction" of the U.S. nuclear umbrella, both of which are currently occurring with the situation involving North Korea. In line with Sato's views at the time, a secret study was then authorized to explore the costs and benefits of Japanese nuclearization. The report, however, confirmed that it was in Japan's best interest to maintain a non-nuclear status. Japan signed the Non-Proliferation Treaty in 1970. The nuclear debate then lay dormant for many years.[25]

In 1994, American intelligence discovered that North Korea had a secret nuclear weapons development program. Also, in the 1990s, China was rapidly modernizing its

[24]9 Kurt M. Campbell and Tsuyoshi Sonohara, " Japan: Thinking the Unthinkable," *The Nuclear Tipping Point: Why States Reconsider Their Nuclear Choices*, ed Kurt M. Campbell, et al (Brookings Institution Press, 2004), 223.
[25] Campell and Tsuyoshi, "Japan: Thinking the Unthinkable," 223.

nuclear weapons and other military capabilities, presenting a dangerous and realistic threat to Japan. Due to these events, the Japanese Defense Agency conducted another secret investigation into Japan's nuclear options. This study again re-affirmed Japan's non-nuclear status and outlined the drawbacks that would result from nuclearization.[26] Japan again chose to refrain from acquisition of its own nuclear weapons arsenal and, in 1995, further supported the NPT by supporting an indefinite extension of the NPT.[27]

Two events occurred in 1998, however, that shocked the Japanese public and caused the reconsideration of Japan's non-nuclear strategy. First, in May, India and Pakistan conducted back-to-back nuclear tests. Then, even more disturbing to the Japanese, in August, North Korea launched a Taepo Dong missile over Japan. The debate about a Japanese nuclear weapons program was suddenly revived.[28]

Even though the debate was revived, Japan again remained committed to nuclear restraint. According to Mochizuki, three factors continued to restrain Japan from seeking independent nuclear weapons capabilities. First is its national identity as a leader in non-proliferation. Second is its commitment to global nuclear non-proliferation and disarmament. Third is its realistic security calculations.[29]

Recently, however, as a result of a nuclear weapons test conducted by North Korea in 2006, several officials and leaders have again urged an open debate on the topic. Despite this recent trend, however, there still remains a strong consensus, both in

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[26]9 Kurt M. Campbell and Tsuyoshi Sonohara, " Japan: Thinking the Unthinkable," *The Nuclear Tipping Point: Why States Reconsider Their Nuclear Choices*, ed Kurt M. Campbell, et al (Brookings Institution Press, 2004), 227.
[27]Campbell and Sonohara, "Japan: Thinking the Unthinkable," 228.
[28] ampbell and Sonohara, "Japan: Thinking the Unthinkable," 228.
[29] Mike M. Mochizuki, "Japan Tests the Nuclear Taboo," *Nonproliferation Review* 14, no. 2 (July 2007): 303.

and outside of Japan, that Japan will not pursue the nuclear weapons option in the short-to-medium term.[30]

According to the CRS report, current reasons for Japan's continued reluctance to pursue nuclear capabilities include the fact that public opinion polls suggest a reluctance to abandon the established non-nuclear policy and its economic status. Japan is a country poor in natural resources, but with a high level of energy consumption. Japan has relied on nuclear power since the 1960s, for a significant portion of its energy. Nuclear power currently provides 35% of its electricity. Japan is the third largest user of nuclear energy in the world. In respect to this, Japan has bilateral civilian nuclear agreements with the U.S., France, the U.K., China, Canada and Australia, depending on these nations for supplies for their nuclear energy program. If the Japanese declared a nuclear weapons program or nuclear program for military purposes, or if this type of covert activity were discovered, Japan would have to return materials supplied to them by the other countries. Japan's civilian nuclear program, which supplies over a third of Japan's energy, would be cut off from world supplies of uranium, enriched uranium and related equipment.[31]

Japan's Current Nuclear Capabilities:

Japan currently has an extensive civilian nuclear energy program, leading the region among the non-proliferation states in terms of capabilities. Japan operates 67 nuclear reactors and has a stockpile of 41 tons of plutonium in mixed oxide reactor fuel, which could be separated out for a weapons program.[32] Even with these capabilities,

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[30]CRS Report, Emmy Chanlett-Avery and Mary Beth Nikitin, "Japan's Nuclear Future: Policy, Debate, Prospects and U.S. Interests," *CRS Report for Congress* Congressional Research Service (May 9, 2008).

[31] CRS Report, Emmy Chanlett-Avery and Mary Beth Nikitin, "Japan's Nuclear Future: Policy, Debate, Prospects and U.S. Interests," *CRS Report for Congress* Congressional Research Service (May 9, 2008).

[32]James Clay Moltz, "Future Nuclear Proliferation Scenarios in Northeast Asia," *Nonproliferation Review* 13, no.3 (November 2006): 594.

Japan would have to overcome many challenges to transfer the current program into a nuclear weapons or military program. Japan currently lacks expertise on bomb design, reliable delivery vehicles, an intelligence program to protect and conceal nuclear assets and sites for nuclear testing. Additionally, there are a range of legal and political constraints on the development of nuclear weapons, including adverse public opinion, restrictive laws and practices and negative diplomatic consequences.[33](CRS) With consideration of all of these challenges, it is estimated that based on Japan's advanced nuclear knowledge and accessibility to fissile material, it would not take long to convert its current capabilities into a weapons program. The estimated time to create a bomb is considered to be less than one year.[34]

Taiwan

Taiwan is another northeast Asian country that may shift its non-nuclear policy should it feel its national security status is becoming more threatened. Taiwan previously had a nuclear program, however, it was renounced in 1988, due to strong pressure from the U.S. and the IAEA. There is currently no indication that Taiwan authorities are revisiting this decision, however, as in Japan, Taiwan's political, national security and economic concerns may alter this reality in the future.

Politics, National Security and Economy

Taiwan's main concern and threat to its national security, does not come from North Korea, but from mainland China. The Peoples Republic of China (PRC) and

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[33]CRS Report, Emmy Chanlett-Avery and Mary Beth Nikitin, "Japan's Nuclear Future: Policy, Debate, Prospects and U.S. Interests," *CRS Report for Congress* Congressional Research Service (May 9, 2008).
[34]James Clay Moltz, "Future Nuclear Proliferation Scenarios in Northeast Asia," *Nonproliferation Review* 13, no.3 (November 2006): 595.

Taiwan remain in a stalemate over the sovereignty of Taiwan, left over from the Chinese civil war. During the Chinese civil war, the communist party claimed victory over mainland China and the Nationalist government escaped to the offshore island of Taiwan. A dispute over sovereignty has existed ever since. Taiwan's consideration of its national security, including the development of nuclear weapons, currently occurs within the single context of its fundamental battle of sovereignty. [35]

Currently, the U.S. is bound by a formal defense treaty and provides a nuclear umbrella to protect Taiwan from the PRC. Taiwan, however, has had its doubts about the U.S. commitment for several reasons, the main reason being the normalization of relations between the U.S. and the PRC. Taiwan signed the NPT in 1968, however mistrust in the U.S. commitment to protect Taiwan, has in the past, caused Taiwan to participate two times in clandestine nuclear programs. These were supposedly permanently dismantled in the 1980s.[36] Since 1988, Taiwan's official position has been that it will not apply its scientific know-how to build nuclear weapons. Defense minister Tang Fei, stated in January 2000, "the ROC government would never develop nuclear arms". Some observers, however, are still not convinced. Some experts claim that if Taiwan changed its stance and decided to build nuclear weapons it may be able to do so within a year or two.[37]

Currently, political, rather than technological concerns are what is keeping Taiwan from revisiting its nuclear policy. The most significant is mainland China's past assertion that nuclearization of Taiwan would serve as a criteria for launching an attack

[35] 11 Derek J. Mitchell, "Taiwan's Hsin Chu Program: Detterence, Abandonment and Honor," *The Nuclear Tipping Point: Why States Reconsider Their Nuclear Choices,* ed Kurt M. Campbell, et al (Brookings Institution Press, 2004), 293.
[36] Mitchell, "Taiwan's Hin Chu Program," 295.
[37] Mitchell, "Taiwan's Hin Chu Program," 301.

on the island.[38] There is also a strong anti-nuclear sentiment among the military, the public and the legislature of Taiwan.[39]

Another consideration is the resulting action of the U.S. should Taiwan decide to pursue nuclear weapons. The U.S. has agreed to defend Taiwan from unprovoked aggression, however, the U.S. is not looking to pick a fight with China. China would consider Taiwan's acquisition of nuclear weapons as a provocation that may lead to war. Therefore, the U.S. might impose sanctions, freeze and/or cut defense assistance to Taiwan should they attempt to create a nuclear weapons program.[40]

As with Japan, Taiwan would also have to consider the economic impact that would result should they decide to procure nuclear weapons capabilities. Taiwan's nuclear energy plants account for 20% of the island's total electricity needs and all of their fuel comes from the U.S. If the U.S. were to cut off these supplies it would cause substantial harm to Taiwan's economy and society.[41]

Though, Taiwan does not currently appear to be revisiting its nuclear policy, any drastic changes in the above political, national security and economic sectors may change this status. Even though the actions of North Korea do not currently seem to have a direct impact with the situation in Taiwan, it is believed that the development of nuclear weapons by North Korea may lead to a domino effect in the region, causing Japan, South Korea and Taiwan to follow suit. Though direct linkage is weak, there can be an indirect impact caused by decreasing the stigma against nuclear weapons.[42]

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[38]11 Derek J. Mitchell, "Taiwan's Hsin Chu Program: Detterence, Abandonment and Honor," *The Nuclear Tipping Point: Why States Reconsider Their Nuclear Choices*, ed Kurt M. Campbell, et al (Brookings Institution Press, 2004), 303.
[39]Mitchell, "Taiwan's Hin Chu Program," 305.
[40] Mitchell, "Taiwan's Hin Chu Program," 305.
[41] Mitchell, " Taiwan's Hin Chu Program," 305.
[42] Mitchell, " Taiwan's Hin Chu Program," 307.

Taiwan's Current Nuclear Capabilities

Taiwan's current nuclear capabilities are not as advanced as Japan's, however, they currently have eight reactors and 22 tons of spent fuel. They lack access to significant uranium supplies and would have difficulties setting up large enrichment enterprises. They also lack scientists capable of doing advanced weapons work. Even though Taiwan would need to make a more concerted effort to get a nuclear weapons program off the ground, it is estimated that they could create a bomb in 2-3 years.[43]

South Korea

For the past fifty years, as a legacy of the Korean War, the Korean peninsula has been divided into two Korea's, North and South. The two are dramatically different in terms of politics, economics and social organization. South Korea's economic standing and democratic pluralism stand in stark contrast to the destitution and totalitarianism in North Korea. Neither, North Korea, nor South Korea has ever been reconciled to permanent partition, hence the stalemate still lingers, 50 years after the war.[44] This tension filled co-existence is cause of concern, especially in relation to North Korea's development of a nuclear weapons program. The reaction to North Korea's development of nuclear weapons by South Korea, will as is the case with Japan and Taiwan, be ultimately decided based on the political, economic and national security concerns within South Korea.

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[43]James Clay Moltz, "Future Nuclear Proliferation Scenarios in Northeast Asia," *Nonproliferation Review* 13, no.3 (November 2006): 595.

[44]10 Jonathan D. Pollack and Mitchell B. Reiss, "South Korea: The Tyranny of Geography and the Vexations of History," *The Nuclear Tipping Point: Why States Reconsider Their Nuclear Choices,* ed Kurt M. Campbell, et al (Brookings Institution Press, 2004), 255.

Politics, National Security and Economics

South Korea today is a vibrant democracy, enjoying decades of economic achievement and diplomatic recognition. Though there are mounting concerns about North Korea's pursuit of nuclear weapons, the prevailing attitude in South Korea is that North Korea is no longer perceived as a major threat. Many South Korean officials seem intent on transcending or denying that the North still represents a major threat.[45]

North Korea, however, has repeatedly tried to pursue reunification on the Korean peninsula by attempting to undermine, intimidate and psychologically, as well as militarily, overwhelm South Korea. Their attempts have been through both conventional and unconventional means. North Korea has used hostile propaganda, acts of terrorism, commando infiltration and forward deployment of troops, putting Seoul within easy reach of heavy artillery. To make matters worse, North Korea has complemented its military forces with chemical and biological weapons programs and a ballistic missile program. Added to these already existing threats, is North Korea's nuclear weapons potential.[46]

Since the end of the war, South Korea has responded to North Korea's aggression by three principle means. First, South Korea maintains a close alliance with the U.S. The U.S. has deployed major military forces on the Korean peninsula and has also provided a security guarantee to South Korea. Second, South Korea has maintained very large conventional forces. Third, South Korea has periodically sought to open political and diplomatic channels with North Korea, even providing economic and humanitarian

[45] 10 Jonathan D. Pollack and Mitchell B. Reiss, "South Korea: The Tyranny of Geography and the Vexations of History," *The Nuclear Tipping Point: Why States Reconsider Their Nuclear Choices*, ed Kurt M. Campbell, et al (Brookings Institution Press, 2004), 255.
[46] Pollack and Reiss, "South Korea: The Tyranny of Geography and the Vexations of History," 255.

aid to North Korea under the "Sunshine Policy". Despite South Korea's generosity, North Korea has not reciprocated the gestures or initiatives of the South. Due to this strained security environment, a nuclear armed North Korea would have leverage in inter-Korean relations. This situation may lead to military conflict or a chain reaction of proliferation in the region.[47]

Another national security concern of South Korea is the perceived strain in the Korean-U.S. Alliance. Divergent threat assessments of North Korea, along with friction from accidents and incidents involving U.S. troops have contributed to these tensions. There is also fear that due to the U.S. facing more immediate challenges in the Persian Gulf, there will be a further process of disengagement, leaving South Korea to fend for itself.[48]

A similar concern occurred in the early seventies, due to partial U.S. troop withdrawal out of South Korea and U.S. accommodations with China. At this point South Korea decided to undertake a secret nuclear weapons option due to its lack of trust in the Korean-American alliance. [49] Before long, however, the U.S. became aware of this program and began to pressure South Korea to do away with it, threatening to terminate all civilian nuclear energy cooperation and to end the bilateral relationship with South Korea.[50] Faced with the prospect of total abandonment by the U.S., South Korea slowed down its active development of nuclear weapons in 1976, but continued missile

[47]10 Jonathan D. Pollack and Mitchell B. Reiss, "South Korea: The Tyranny of Geography and the Vexations of History," *The Nuclear Tipping Point: Why States Reconsider Their Nuclear Choices,* ed Kurt M. Campbell, et al (Brookings Institution Press, 2004), 255.
[48]Pollack and Reiss, "South Korea: The Tyranny of Geography and the Vexations of History," 255.
[49] Seung-Young Kim, "Security, Nationalism and the Pursuit of Nuclear Weapons and Missiles: The South Korean Case, 1970-82," *Diplomacy and Statecraft* 12, no. 4 (December 2001): 53.
[50] Pollack and Reiss, "South Korea: The Tyranny of Geography and the Vexations of History," 263.

development. In 1980, however, the new administration of South Korea froze all weapons related nuclear research and the missile program.[51]

Economically speaking, though South Korea has one of the most dynamic and technically sophisticated systems in the world, with the industrial infrastructure and manufacturing base to underwrite an independent nuclear program, it has no significant oil or gas deposits therefore, it is dependent on nuclear power to address 40% of its energy needs. South Korea joined the IAEA in 1957 and imports all its low enriched and natural Uranium for its reactors from the U.S., France, Russia and China. As with Japan and Taiwan, if nuclear energy supplies were to be cut off as a sanction for violation of proliferation agreements, it would cause substantial harm to South Korea's economy and society.[52]

As evidenced from past history, the shifting strategic balance on the peninsula and the uncertain security environment in South Korea may cause some South Koreans to again conclude that nuclear weapons, or preservation of a nuclear option are necessary. Ultimately though, the decision to pursue these capabilities will be shaped by a complex mix of political and security calculations, domestic attitudes, scientific capabilities and the symbolic significance of obtaining such capabilities.

South Korea's Current Nuclear Capabilities

South Korea currently has 22 reactors and 44 tons of spent fuel. South Korea, like Taiwan, also lacks access to significant uranium supplies and would have difficulty

[51] Seung-Young Kim, "Security, Nationalism and the Pursuit of Nuclear Weapons and Missiles: The South Korean Case, 1970-82," *Diplomacy and Statecraft* 12, no. 4 (December 2001): 54.
[52]10 Jonathan D. Pollack and Mitchell B. Reiss, "South Korea: The Tyranny of Geography and the Vexations of History," *The Nuclear Tipping Point: Why States Reconsider Their Nuclear Choices,* ed Kurt M. Campbell, et al (Brookings Institution Press, 2004), 258.

setting up large enrichment enterprises. They would have a head start in the process, over Taiwan however, since its scientists separated plutonium in 1982 and have, as recently as 2000, enriched small amounts of uranium. It is estimated that it would take South Korea one to two years to build a bomb.[53]

Research Design

There are several different analytical models that can be used when conducting a predictive study. For this study, the author has chosen the Lockwood Analytical Method for Prediction, hereinafter referred to as the LAMP method. This method seems best suited for studies such as this that are based on international predictions and processes. A differentiation between the LAMP method and other analytical methods is that it forces the analyst to take into account the perceptions of all the actors in the scenario, instead of focusing just on one perspective. Another differentiation is that LAMP does not focus on quantitative analysis, which is not really suited to this particular type of study. Instead, LAMP focuses on relative probability. LAMP is a twelve step program as follows:

1. Determine the issue for which you are trying to predict the most likely future.
2. Specify the national actors involved.
3. Perform an in-depth study of how each national actor perceives the issue in question.
4. Specify all possible courses of action for each actor.
5. Determine the major scenarios within which you will compare the alternate futures.

[53] James Clay Moltz, "Future Nuclear Proliferation Scenarios in Northeast Asia," *Nonproliferation Review* 13, no.3 (November 2006): 595.

6. Calculate the total number of permutations of possible alternate futures for each scenario.
7. Perform a pairwise comparison of all alternate futures to determine their relative probability.
8. Rank the alternate futures for each scenario from highest relative probability to the lowest based on the number of votes received.
9. Assuming that each future occurs, analyze each alternate future in terms of its consequences for the issue in question.
10. Determine the focal events that must occur in our present in order to bring about a given alternate future.
11. Develop indicators for the focal events
12. State the potential of a given alternate future to "transpose" into another alternate future.

Although LAMP is particularly suited for this type of study, it should be noted that there is always cause for concern in predictive studies. While LAMP attempts to address the "free will" of the various actors, it is impossible to conceive of every possible behavior for each actor. Another concern is that the perception of each actor is solely based on the analyst's understanding of those perceptions and can therefore be consciously or subconsciously skewed. The author has made every effort to avoid this by conducting thorough research into the past and present behavior of each actor. In the field of general research, there is also a variety of possible sources of bias and error. Again, the author can only assure that conscious effort was made to avoid these issues.

Potential Courses of Action for Interested Actors

In this study, the three actors that would be affected the most and the most immediately by North Korea becoming a declared and confirmed nuclear weapons state are Japan, Taiwan and South Korea. The fourth step of LAMP is to determine all possible courses of action for the interested actors as a result of the occurrence of this scenario.

For Japan, Taiwan and South Korea there are three courses of action that they could take should North Korea be officially declared a nuclear weapons state. The first course of action would be to pursue their own independent nuclear capabilities; the second would be to continue with further development of their currently existing peaceful nuclear programs; and the third would be to maintain their currently existing peaceful nuclear programs without any further expansion. Some of these actions may seem unlikely in relation to specific actors, however, it is important to consider all possible scenarios to achieve effective and unbiased predictions of all possible alternate futures.

Major Scenarios

For this particular analysis the possible actions of North Korea are considered differently from the possible actions of Japan, Taiwan and South Korea. North Korea is the catalyst for the behavior of the other three states. If North Korea does not proceed with acquiring a confirmed nuclear weapons capability, any interactions between the involved actors would be based on other issues not relevant to this study. Within the realm of LAMP analysis methodology, the possible courses of action for North Korea are considered “scenarios”, or situations from which the analyst is trying to determine the most likely future. For North Korea there are three major scenarios to be considered:

North Korea emerges as a confirmed nuclear weapons state; North Korea maintains nuclear capabilities for peaceful purposes only; and North Korea proceeds with disarmament of its current nuclear capabilities and honors the Nuclear Non-proliferation Treaty. Each scenario posed by North Korea could result in very different responses and futures for each interested actor.

Permutations of Behavior

According to the LAMP technique, the equation for determining the number of how many alternate futures are possible for each interested actor is $x^y=z$. In this equation "X" equals the number of actions available to each actor, "Y" equals the number of actors involved and "Z" equals the total number of alternate futures to be compared. In this analysis there are three possible courses of action for each of the three interested actors involved, Japan, Taiwan and South Korea. North Korea is not included, as its courses of action are considered the scenarios. Therefore, the equation for this analysis is $3^3=27$. This means there are 27 possible alternate futures to compare for Japan, Taiwan and South Korea, with each of three scenarios posed by North Korea.

The next step is to create a table of alternate future permutations. This will then be used to perform a pairwise comparison of the alternate future permutations for each scenario. The following abbreviations will be used to identify alternate future scenarios in the tables that follow:

Pursues independent nuclear capabilities – (IN)

Does not pursue additional nuclear capabilities – (NC)

Pursues additional peaceful nuclear capabilities only – (PC)

The three scenarios will also be identified by abbreviations as follows:

Scenario 1: North Korea emerges as a confirmed nuclear power – (CN)

Scenario 2: North Korea maintains nuclear capabilities for peaceful purposes only – (PN)

Scenario 3: North Korea proceeds with disarmament and honors the Nuclear non-proliferation Treaty – (NN)

Table 1 - Alternate Future Permutations

Possible Future #	Japan	Taiwan	S. Korea
1	IN	IN	IN
2	IN	IN	PC
3	IN	PC	IN
4	PC	IN	IN
5	IN	PC	PC
6	PC	IN	PC
7	PC	PC	IN
8	PC	PC	PC
9	IN	IN	NC
10	IN	NC	IN
11	NC	IN	IN
12	IN	NC	NC
13	NC	IN	NC
14	NC	NC	IN
15	NC	NC	NC
16	PC	PC	NC
17	PC	NC	PC
18	NC	PC	PC
19	NC	NC	PC
20	PC	NC	NC
21	NC	PC	NC
22	IN	NC	PC
23	IN	PC	NC
24	PC	NC	IN
25	PC	IN	NC
26	NC	PC	IN
27	NC	IN	PC

Pairwise Comparison for Each Scenario

It is now possible to use the Alternate Futures Table (Table 1) to conduct a pairwise comparison of each alternate future for each scenario. This is done to compare the likelihood of each alternate future against each other possible future. We start by comparing alternate future #1 to alternate future #2 in relation to the overall scenario, in order to determine which is more likely to occur. This comparison is made based on the analyst's understanding of the viewpoints of the involved actors. Next we compare alternate future #1 to alternate future #3, again determining which is more likely. This is continued until all possible futures have been compared to each other. The LAMP equation used to determine how many pairwise comparisons are necessary is: x=(n-1)+(n-2)…+(n-n). In this equation "n" is the total number of alternate futures to be analyzed and "x" is the total number of pairwise comparisons to be made. In this analysis "n" equals 27, therefore, "x" equals 351 pairwise comparisons to be made for each scenario. A new table is made by adding a fourth column to the alternate futures table for each scenario and labeling it "votes". The number of votes received are listed in the new column. The results of these votes will indicate which alternate futures seem more probable than the others. This allows for further analysis of the most likely possible futures related to each of the three scenarios.

Tables 2 through 4 contain the voting results of the pairwise comparison analysis of all alternate futures related to the three scenarios posed by North Korea.

Table 2
Alternate Futures Pairwise Comparison
Scenario 1: N. Korea – Confirmed a Nuclear Power - CN

Possible Futures #	Japan	Taiwan	S. Korea	#Votes
1	IN	IN	IN	16
2	IN	IN	PC	17
3	IN	PC	IN	21
4	PC	IN	IN	18
5	IN	PC	PC	20
6	PC	IN	PC	13
7	PC	PC	IN	25
8	PC	PC	PC	27
9	IN	IN	NC	7
10	IN	NC	IN	17
11	NC	IN	IN	6
12	IN	NC	NC	7
13	NC	IN	NC	0
14	NC	NC	IN	12
15	NC	NC	NC	16
16	PC	PC	NC	7
17	PC	NC	PC	22
18	NC	PC	PC	11
19	NC	NC	PC	14
20	PC	NC	NC	11
21	NC	PC	NC	3
22	IN	NC	PC	22
23	IN	PC	NC	4
24	PC	NC	IN	23
25	PC	IN	NC	1
26	NC	PC	IN	8
27	NC	IN	PC	3
				351

IN = Pursues Independent Nuclear Weapons Capabililty
NC = Does not Pursue Additional Nuclear Capabilities
PC = Pursues Additional Peaceful Nuclear Capabilities Only

Table 3
Alternate Futures Pairwise Comparison
Scenario 2: N. Korea – Maintains Peaceful Nuclear Power Only - PN

Possible Futures #	Japan	Taiwan	S. Korea	#Votes
1	IN	IN	IN	17
2	IN	IN	PC	13
3	IN	PC	IN	15
4	PC	IN	IN	11
5	IN	PC	PC	18
6	PC	IN	PC	11
7	PC	PC	IN	23
8	PC	PC	PC	26
9	IN	IN	NC	5
10	IN	NC	IN	16
11	NC	IN	IN	5
12	IN	NC	NC	8
13	NC	IN	NC	1
14	NC	NC	IN	17
15	NC	NC	NC	20
16	PC	PC	NC	8
17	PC	NC	PC	25
18	NC	PC	PC	15
19	NC	NC	PC	20
20	PC	NC	NC	12
21	NC	PC	NC	6
22	IN	NC	PC	20
23	IN	PC	NC	4
24	PC	NC	IN	23
25	PC	IN	NC	0
26	NC	PC	IN	10
27	NC	IN	PC	2
				351

IN = Pursues Independent Nuclear Weapons Capabililty
NC = Does not Pursue Any Additional Nuclear Capabilities
PC = Pursues Additional Peaceful Nuclear Capabilities Only

Table 4
Alternate Futures Pairwise Comparison
Scenario 3: N. Korea – Proceeds with Disarmament of Nuclear Capabilities - NN

Possible Futures #	Japan	Taiwan	S. Korea	#Votes
1	IN	IN	IN	13
2	IN	IN	PC	12
3	IN	PC	IN	17
4	PC	IN	IN	11
5	IN	PC	PC	17
6	PC	IN	PC	6
7	PC	PC	IN	22
8	PC	PC	PC	27
9	IN	IN	NC	2
10	IN	NC	IN	16
11	NC	IN	IN	5
12	IN	NC	NC	12
13	NC	IN	NC	1
14	NC	NC	IN	13
15	NC	NC	NC	14
16	PC	PC	NC	13
17	PC	NC	PC	25
18	NC	PC	PC	14
19	NC	NC	PC	18
20	PC	NC	NC	16
21	NC	PC	NC	5
22	IN	NC	PC	23
23	IN	PC	NC	7
24	PC	NC	IN	23
25	PC	IN	NC	1
26	NC	PC	IN	13
27	NC	IN	PC	5
				351

IN = Pursues Independent Nuclear Weapons Capabililty
NC = Does not Pursue Additional Nuclear Capabilities
PC = Pursues Additional Peaceful Nuclear Capabilities Only

The pairwise comparison results shown in Tables 2 through 4, can now be ranked from highest to lowest in order of probability. This will determine what is most likely to happen given each specific scenario.

Ranking the Alternate Futures

The alternate futures are ranked from highest to lowest relative probability, based on the number of votes received by each future, as shown in Tables 2 through 4. Tables 5 through 7 are the alternate futures tables for each scenario arranged in terms of votes from highest to lowest probability.

Table 5
Alternate Futures Pairwise Comparison – Ranked
Scenario 1: N. Korea – Confirmed a Nuclear Power - CN

Possible Future #	Japan	Taiwan	S. Korea	#Votes
8	**PC**	**PC**	**PC**	**27**
7	**PC**	**PC**	**IN**	**25**
24	**PC**	**NC**	**IN**	**23**
17	**PC**	**NC**	**PC**	**22**
22	**IN**	**NC**	**PC**	**22**
3	**IN**	**PC**	**IN**	**21**
5	**IN**	**PC**	**PC**	**20**
4	**PC**	**IN**	**IN**	**18**
2	**IN**	**IN**	**PC**	**17**
10	**IN**	**NC**	**IN**	**17**
1	**IN**	**IN**	**IN**	**16**
15	**NC**	**NC**	**NC**	**16**
19	**NC**	**NC**	**PC**	**14**
6	**PC**	**IN**	**PC**	**13**
14	**NC**	**NC**	**IN**	**12**
18	**NC**	**PC**	**PC**	**11**
20	**PC**	**NC**	**NC**	**11**
26	**NC**	**PC**	**IN**	**8**
9	**IN**	**IN**	**NC**	**7**
12	**IN**	**NC**	**NC**	**7**
16	**PC**	**PC**	**NC**	**7**
11	**NC**	**IN**	**IN**	**6**
23	**IN**	**PC**	**NC**	**4**
21	**NC**	**PC**	**NC**	**3**
27	**NC**	**IN**	**PC**	**3**
25	**PC**	**IN**	**NC**	**1**
13	**NC**	**IN**	**NC**	**0**
				351

IN = Pursues Independent Nuclear Weapons Capability
NC = Does not Pursue Additional Nuclear Capabilities
PC = Pursues Additional Peaceful Nuclear Capabilities Only

Table 6
Alternate Futures Pairwise Comparison – Ranked
Scenario 2: N. Korea - Maintains Peaceful Nuclear Power Only - PN

Possible Future #	Japan	Taiwan	S. Korea	#Votes
8	PC	PC	PC	26
17	PC	NC	PC	25
7	PC	PC	IN	23
24	PC	NC	IN	23
15	NC	NC	NC	20
19	NC	NC	PC	20
22	IN	NC	PC	20
5	IN	PC	PC	18
1	IN	IN	IN	17
14	NC	NC	IN	17
10	IN	NC	IN	16
3	IN	PC	IN	15
18	NC	PC	PC	15
2	IN	IN	PC	13
20	PC	NC	NC	12
4	PC	IN	IN	11
6	PC	IN	PC	11
26	NC	PC	IN	10
12	IN	NC	NC	8
16	PC	PC	NC	8
21	NC	PC	NC	6
9	IN	IN	NC	5
11	NC	IN	IN	5
23	IN	PC	NC	4
27	NC	IN	PC	2
13	NC	IN	NC	1
25	PC	IN	NC	0
				351

IN = Pursues Independent Nuclear Weapons Capability
NC = Does not Pursue Additional Nuclear Capabilities
PC = Pursues Additional Peaceful Nuclear Capabilities Only

Table 7
Alternate Futures Pairwise Comparison – Ranked
Scenario 3: N. Korea – Proceeds with Disarmament of Nuclear Abilities - NN

Possible Futures #	Japan	Taiwan	S. Korea	#Votes
8	PC	PC	PC	27
17	PC	NC	PC	25
22	IN	NC	PC	23
24	PC	NC	IN	23
7	PC	PC	IN	22
19	NC	NC	PC	18
3	IN	PC	IN	17
5	IN	PC	PC	17
10	IN	NC	IN	16
20	PC	NC	NC	16
15	NC	NC	NC	14
18	NC	PC	PC	14
1	IN	IN	IN	13
14	NC	NC	IN	13
16	PC	PC	NC	13
26	NC	PC	IN	13
2	IN	IN	PC	12
12	IN	NC	NC	12
4	PC	IN	IN	11
23	IN	PC	NC	7
6	PC	IN	PC	6
11	NC	IN	IN	5
21	NC	PC	NC	5
27	NC	IN	PC	5
9	IN	IN	NC	2
13	NC	IN	NC	1
25	PC	IN	NC	1
				351

IN = Pursues Independent Nuclear Weapons Capability
NC = Does not Pursue Additional Nuclear Capabilities
PC = Pursues Additional Peaceful Nuclear Capabilities Only

A cursory review of Tables 5 through 7, reveals the analyst's views of the most likey alternate futures for each scenario and may show a glimpse of patterns of behavior of the involved actors. The next section of this study will focus on the analysis of the five alternate futures receiving the most votes within each scenario. These futures relate

to the likely responses of Japan, Taiwan and South Korea to the scenarios posed by North Korea and the consequences that may result from such responses.

Analysis of Alternate Futures

Scenario 1 – North Korea emerges as a confirmed nuclear power – CN

Scenario 1, as posed by North Korea is that North Korea continues to develop and expand its nuclear weapons capabilities, disregarding the NPT and eventually becomes a confirmed nuclear power. This scenario most closely resembles the current situation relating to North Korea's nuclear weapons program.

When analyzing the potential responses to the "confirmed nuclear power" scenario the top five futures received 27, 25, 23, 22, and 22 votes respectively. These five alternate futures and the consequences related to each of them will be analyzed in an attempt to determine the most likely outcome for the interested states.

Alternate Future #8: *Japan, Taiwan and South Korea continue with the development of their currently existing peaceful nuclear programs*. None of the interested actors in this alternate future proceeds to acquire their own independent nuclear weapons program in response to North Korea's confirmation as a nuclear power. Alternate Future #8 received 27 votes, indicating from the pairwise comparison that this alternate future is more likely to occur than all of the other alternate futures. This alternate future indicates that Japan, Taiwan and South Korea may fear devastating results from the sanctions that would likely be levied against them, should they decide to acquire their own nuclear weapons program. This concern, therefore, would outweigh the benefits of choosing an independent nuclear weapons program. All three states rely heavily on nuclear energy as a power source and also obtain materials needed for this program from various nations

worldwide, including the U.S. All of these nations would likely stop the flow of necessary supplies to all three involved states and may also require them to return some materials. Without nuclear energy capabilities, all three states would suffer undue hardship economically and psychologically.

This scenario also indicates that these three states will also continue to rely on their protection agreements with the U.S., making it imperative for the U.S. to reassure its protection commitments. Although this alternate future is the most likely for the immediate future, this issue should be revisited and reevaluated on a regular basis, due to the fact that the way North Korea acts as confirmed nuclear power may eventually alter the other actors' way of thinking about the situation.

This alternate future would likely have minimal consequences with regards to the current relationships between both Japan and Taiwan with North Korea. Consequences may result, however, regarding the relationship between North Korea and South Korea, depending on the direction taken by North Korea. North Korea, emboldened by their nuclear capacity, knowing South Korea does not have the same capacity, may attempt to attack South Korea or threaten South Korea in order to reunite the two Koreas under North Korean rule.

Alternate Future #7: *Japan and Taiwan continue with further development of their currently existing peaceful nuclear programs, while South Korea proceeds to pursue independent nuclear weapons capabilities.* Alternate Future #7 received 25 votes, coming in only two votes behind Alternate Future #8 and is the second most likely future that may occur. As with Alternate Future #8, neither Japan, nor Taiwan attempt to acquire their own independent nuclear weapons capabilities. Again, the likely reasons for

this are the possibility of sanctions that would affect their peaceful nuclear energy programs causing undue hardship and also because of their reliance on U.S. Security Guarantees. South Korea, on the other hand, fearful of North Korea having this ability, decides that the risk of condemnation, sanctions and the possible loss of the U.S. Security Guarantee, does not outweigh the risk of not being able to defend itself against North Korea. It would be of particular concern to South Korea, that North Korea may decide to use their nuclear weapons program as a threat against the sovereignty of South Korea.

This alternate future could have several consequences. Hostilities between North Korea and South Korea may turn into war. On the other hand, if both have nuclear capabilities, they may deter each other from being the first to strike and avert war, therefore maintaining the status quo. Another consequence of South Korea, in addition to North Korea having nuclear weapons capabilities may be a domino effect in proliferation activities in the immediate region, as well as other areas of the world, especially the Middle East.

Alternate Future #24: *Japan continues with further development of its peaceful nuclear program, while Taiwan only maintains its current peaceful nuclear program without additional expansion and South Korea pursues an independent nuclear weapons program.* Alternate Future #24 received 23 votes, putting it at #3 of the top five alternate futures that may occur, however it is four points below the most likely future.

Since Japan relies heavily on its nuclear energy program and has been a strong advocate of the NPT, Japan will only expand its current peaceful capabilities, but not pursue weapons capabilities. Taiwan, whose main national security concern is China, not North Korea, will opt to remain as neutral as possible within the nuclear arena. Taiwan

will choose, therefore, not to expand its nuclear program in any way, especially since China has made it clear that it would not tolerate a nuclear armed Taiwan. South Korea, again, for the same reasons given in Alternate Future #7, will attempt to acquire its own nuclear weapons program.

This scenario would have relatively the same consequences as Alternate Future #7. It may either instigate the situation between North and South Korea or cause them to remain at the status quo. It may also still cause a domino effect in proliferation activities in other regions, but probably not in northeast Asia since Taiwan is committed to the status quo.

Alternate Future #17: *Japan and South Korea continue with further development of their current peaceful nuclear programs, while Taiwan only maintains its current peaceful nuclear program without additional expansion.* Alternate Future #17 received 22 votes, tying with Alternate Future #22, meaning there is an equal chance of either of these two alternate futures occurring. They are, for the purposes of this study, ranked #4 and #5, respectively, putting them both at the low end of the top five alternate futures.

As in Alternate Future #8, none of the states attempt to acquire their own nuclear weapons capabilities. In this case, however, Taiwan, as in Alternate Future #24, in order to avoid possible confrontation with China and to maintain the status quo, decides not to pursue any additional nuclear capabilities, peaceful or otherwise.

This scenario, again, as in Alternate Future #8, would likely have minimal consequences in regards to the current relationships between Japan and Taiwan with North Korea. As previously stated, however, consequence may result between the

relationship between North and South Korea, depending on the direction taken by North Korea.

Alternate Future #22: *Japan pursues independent nuclear weapons capabilities, while Taiwan only maintains its current peaceful nuclear program without additional expansion and South Korea continues with further development of its currently existing peaceful nuclear program.* Alternate Future #22 received 22 votes, tying with Alternate Future #17, meaning there is an equal chance of either of these two alternate futures occurring. Alternate Futures #17 and #22, for the purposes of this paper, are ranked #4 and #5 respectively.

This alternate future may indicate a major shift in the affects of the NPT, since Japan has historically been one of the strongest advocates of the NPT. If Japan should attempt to acquire its own nuclear weapons program it may indicate that Japan feels vulnerable in its national security strategy and that it does not hold much trust in the U.S. Security Guarantee. If Japan was to go as far as to risk losing U.S. support and worldwide materials for its nuclear energy program, there would be serious repercussions both in Japan/U.S. relations and in the climate of the NPT efforts worldwide. If Japan were to go nuclear, many experts believe many other states will follow suit. Consequences with regard to the relationship between Japan and North Korea, would likely be open hostility without war. There would likely be minimal consequences between Taiwan and North Korea and as stated previously, consequences may occur regarding the relationship between North and South Korea, depending on the direction taken by North Korea.

Scenario 2 – North Korea maintains peaceful nuclear capabilities only – PN

Scenario 2 of this study is highly unlikely based on past and recent behaviors of North Korea. Even as this paper is being written, North Korea has again conducted another underground nuclear test and test fired three short-range ground-to-air missiles. Though this remains the most desirable scenario, most experts believe that North Korea is past the point of no return and will continue to be defiant and move ahead with its nuclear weapons program, regardless of any and all consequences. Should this unlikely scenario occur, however, it is still important to analyze the responses of the affected states. It should be noted that four of the most likely alternate futures from Scenario 1 are also likely to occur under Scenario 2, however, the probabilities and rankings are not the same.

Alternate Future #8: *Japan, Taiwan and South Korea continue with the further development of their currently existing peaceful nuclear programs.* Alternate Future #8 received 26 votes, indicating from the pairwise comparison that Alternate Future #8 is more likely to occur than any other alternate future.

This alternate future indicates that neither Japan or Taiwan, nor South Korea will feel substantially threatened by North Korea under this scenario. This outcome could be ideal for all involved states, inasmuch as they all rely on nuclear energy capabilities and under this scenario, as long as their programs remain peaceful they will not have to face sanctions which would affect their nuclear energy capabilities. The consequences for this alternate future, in its simplest form, would be regional stability. Negative consequences, however, could occur should North Korea claim peaceful nuclear purposes only, while at

the same time secretly developing nuclear weapons. If this were to be discovered there would likely be a shift in the reactions of the affected states.

Alternate Future #17: *Japan and South Korea continue with further development of their currently existing peaceful nuclear program, while Taiwan only maintains its current nuclear program with no additional expansion.* Alternate Future #17 received 25 votes, coming in only one vote behind Alternate Future #8, making this alternate future the second most likely to occur under this scenario.

As with the same alternate future under scenario one, in this alternate future none of the states attempt to acquire their own nuclear weapons capabilities. Again, however, in this case Taiwan, in an attempt to avoid confrontation with China, maintains the status quo and does not attempt to expand it nuclear capabilities in any way.

This scenario would also have minimal consequences with regard to the relationship between North Korea and all three other states. Again, however, the situation would be ideal for Japan, Taiwan and South Korea, in not forcing them to decide to pursue their own nuclear weapons capabilities as a defense against North Korea. Just as with Alternate Future #8, however, negative consequences could occur if North Korea is discovered secretly developing nuclear weapons.

Alternate Future #7: *Japan and Taiwan continue with further development of their currently existing peaceful nuclear programs, while South Korea pursue independent nuclear weapons capabilities.* Alternate Future #7 received 23 votes, tying with Alternate Future #24, discussed below, meaning there is an equal chance of either of these alternate futures occurring. For purposes of this paper they are ranked #3 and #4 respectively.

This scenario indicates that Japan and Taiwan are comfortable maintaining the status quo. South Korea, however, feel differently. This may indicate that South Korea does not trust its security agreement with the U.S. and is fearful of the hostility of North Korea, regardless of their nuclear weapons capabilities. Consequences in relation to Japan and Taiwan's relationship with North Korea would be minimal. On the other hand, consequences between the relationship between North and South Korea could become dangerous. North Korea may look at these actions by South Korea as hostile actions and possibly initiate a war with South Korea. Another possibility is that since South Korea is establishing its own nuclear weapons program, North Korea may proceed to again attempt to acquire its own nuclear weapons program.

Alternate Future #24: *Japan continues with further development of its currently existing peaceful nuclear program, while Taiwan only maintains its current peaceful nuclear program without additional expansion and South Korea pursues independent nuclear weapons capabilities.* Alternate Future #24 received 23 votes, tying with Alternate Future #7, meaning there is an equal chance that either future may occur. The only difference between these two alternate futures is that Taiwan does not enhance its current capabilities, likely for reasons involving their relationship with China, not North Korea. Therefore, the consequences of this alternate future are also the same as for Alternate Future #7.

Alternate Future #15: *Japan, Taiwan and South Korea maintain their currently existing peaceful nuclear programs only, with no additional expansion.* This scenario would indicate that all three states are comfortable with the fact that North Korea only has a peaceful nuclear program. It may also indicate that for the near future all three

countries are content with their current nuclear energy capabilities and would rather maintain the status quo as far as nuclear programs are concerned and put more emphasis on other areas of need in their respective countries. This situation would also be ideal in the realm of nuclear non-proliferation efforts. This alternate future, however, is the least likely of the top five. This alternate future would also have minimal consequences regarding the relationship between Japan, Taiwan and South Korea with North Korea. Again, however, as in all the previous alternate futures for this scenario, if a secret North Korea nuclear weapons program were discovered, all the concerned actors would reconsider their alternatives.

Scenario 3 – North Korea proceeds with disarmament of its present nuclear capabilities.

Scenario 3 of this study is the least likely scenario. North Korea's past and present actions, as well as the statements of its leaders and spokespeople have indicated that they will pursue nuclear weapons capabilities regardless of the consequences. This is, however, the most desirable future that could occur, therefore it is still important to analyze the possible responses of the affected states.

It should be noted that all of the top five alternate futures from Scenario 1 are also the top five for this scenario, but not with the same probabilities or in the same order.

Alternate Future #8: *Japan, Taiwan and South Korea continue with further development of their currently existing peaceful nuclear programs.* Alternate Future #8 received 27 votes, indicating from the pairwise comparison that Alternate Future #8 is more likely to occur than all the other alternate futures for this scenario.

In this alternate future, again, none of the states proceed to acquire their own nuclear programs. This alternate future indicates that neither Japan or Taiwan, nor South Korea feel substantially threatened by North Korea, nor do they choose to be preemptively aggressive toward North Korea. This would be an ideal outcome for all involved states, including North Korea, inasmuch as it will mean a lessening of hostilities in the region and a more peaceful coexistence.

The consequences of this scenario between Japan, Taiwan and South Korea, regarding their relationships with North Korea would be positive with improved relationships and greater mutual trust.

Alternate Future #17: *Japan and South Korea continue with further development of their currently existing peaceful nuclear programs, while Taiwan only maintains its currently existing peaceful nuclear program, without any expansion.* Alternate Future #17 received 25 votes and ranked 2nd in the top five alternate futures for this scenario.

Alternate Future #17, just as Alternate Future #8, indicates that none of three affected states feels substantially threatened by North Korea and that none choose to be preemptively aggressive toward North Korea. The only difference between these two alternate futures is that in Alternate Future #17, Taiwan, once again for reasons not pertaining to North Korea, chooses not to pursue any additional nuclear capabilities but to simply maintain the status quo. Taiwan, however, could rest easier with this decision under this particular scenario, where North Korea is eliminating its nuclear programs. The consequences for this alternate future are the same as for Alternate Future #8.

Alternate Future #22: *Japan pursues independent nuclear weapons capabilities, while Taiwan only maintains its currently existing peaceful nuclear program, without any*

expansion and South Korea continues with further development of its currently existing peaceful nuclear program. This alternate future tied in votes with Alternate Future #24, discussed below. For purposes of this paper, these alternate futures are ranked #3 and #4 respectively, out of the top five alternate futures for this scenario.

This alternate future, as mentioned under Scenario 1, may indicate a major shift in efforts toward nuclear non-proliferation worldwide, especially due to the fact that Japan has historically been the strongest advocate of the NPT. This alternate future may indicate that Japan feels greatly vulnerable in its national security status, regardless of the situation in North Korea. It also indicates that Japan does not trust in the security guarantee with the U.S. If Japan were to go nuclear, many experts believe many other countries will follow suit.

The consequences in relation to Japan and North Korea's relationship, may be increased hostility between the two states and a nuclear arms race. If Japan were to decide to pursue independent nuclear weapons capabilities, after North Korea decided to do away with their nuclear program, it is likely that North Korea would rethink the situation and again decide to pursue independent nuclear weapons capabilities. In this alternate future the consequence in regards to the relationships between North Korea and Taiwan and South Korea would be minimal.

Alternate Future #24: *Japan continues with further development of its currently existing peaceful nuclear program, while Taiwan only maintains its currently existing peaceful nuclear program, without any expansion and South Korea pursues independent nuclear weapons capabilities.* Alternate Future #24 received 23 and tied with Alternate

Future #22. For purposes of this paper, Alternate Future #24 is ranked #4 of the top five alternate futures for this scenario.

This alternate future would indicate that neither Japan, nor Taiwan feel substantially threatened by North Korea and trust in North Korea's disarmament process. This alternate future again suggests Taiwan, for reasons not related to North Korea, chooses to maintain the status quo by not advancing any of its nuclear capabilities. This alternate future also indicates that South Korea still feels threatened by North Korea and wants to get the upper hand and put themselves in a more superior position by acquiring their own nuclear weapons arsenal. It also indicates that South Korea may not trust in North Korea's disarmament process.

Consequences regarding the relationships between Japan and Taiwan with North Korea under this alternate future would be minimal. Consequences may however result between North and South Korea. North Korea may feel threatened by South Korea's actions and hostilities between the two Koreas may again increase. These actions by South Korea may also cause North Korea to discontinue disarmament and again attempt to acquire independent nuclear weapons capabilities and/or escalate into war.

Alternate Future #7: *Japan and Taiwan continue with further development of their currently existing peaceful nuclear programs, while South Korea pursues independent nuclear weapons capabilities.* This alternate future received 22 votes and was ranked #5 of the top five alternate futures for this scenario. This alternate future is almost the same as Alternate Future #24, however, in this case Taiwan continues to advance its currently existing peaceful nuclear program. The consequences for this alternate future are the same as for Alternate Future #24.

Now that the top five most likely alternate futures have been discussed for each scenario, it becomes evident that no matter which scenario occurs in regards to North Korea, the alternate future with the greatest likelihood of occurring for each affected actor, Japan, Taiwan and South Korea, is that they will continue with the further development of their currently existing nuclear programs only. This means they will not pursue their own independent nuclear weapons capabilities in the immediate and short term future in reaction to North Korea's actions.

The next step in this analysis is to determine the focal events and indicators to watch for in order to determine if a likely future may be occurring.

Focal Events and Indicators

This section of this analysis focuses on focal events and indicators that may be used to determine the most likely future given the analysis that preceded this section and also to provide a checklist that can be used by analysts in the future.

For this study, determining the behaviors of Japan, Taiwan and South Korea in relation to various scenarios posed by North Korea relies on understanding what is occurring, what may occur and what responses could result. In considering focal points it is important to keep in mind what the current status quo of the situation is, since there is no change needed to address that specific alternate future. In this particular study, the current situation most closely resembles Alternate Future #8, Japan, Taiwan and South Korea are all continuing to develop their peaceful nuclear programs while North Korea is attempting to acquire independent nuclear weapons capabilities, as reflected in Scenario 1. Therefore, the focal events that need to be considered are those that change or transpose the immediate future into one of the other alternate futures. Not all of the focal

events need to occur together, but at least one must occur for transposition of alternate futures to occur.

Alternate Future #7 – Focal Events and Indicators – *Japan and Taiwan continue with further development of their peaceful nuclear programs, while South Korea pursues independent nuclear weapons capabilities.* The important difference between Alternate Future #7 and the status quo future (#8) is that South Korea decides to pursue its own independent nuclear weapons program.

Focal Events

- North Korea becomes a confirmed nuclear power..
- A nuclear armed North Korea makes verbal threats toward South Korea.
- North Korean troop movements along the border with South Korea.
- U.S. troop withdrawal from South Korea.

Indicators

- Observable shifts in technical status of current nuclear program in South Korea.
- South Korea withdraws from the NPT.
- Unusual construction activity in South Korea.
- Increased or new movements of nuclear scientists, engineers and bureaucrats, via travel or promotion to or within South Korea.
- Public statements, policy debates, movements and meetings concerning nuclear energy or nuclear weapons within South Korea.
- Explosives tests conducted in South Korea.
- Delivery vehicles tests conducted in South Korea.

Alternate Future #24 – Focal Events and Indicators – *Japan continues with development of its currently existing peaceful nuclear program, while Taiwan continues to maintain its currently existing peaceful nuclear program only, without expansion and South Korea pursues independent nuclear weapons capabilities.* This alternate future is similar to Alternate Future #7, the only difference is that Taiwan does not attempt to further advance its nuclear technology in any way. Focal Events and Indicators for this Alternate Future are basically the same as for Alternate Future #7, with the addition of the following focal events and indicators regarding Taiwan.

Focal Events

- Increased tensions between China and Taiwan

Indicators

- Taiwan does not pursue additional nuclear energy capabilities or request any additional nuclear supplies from contributory nations to further advance its technology.
- Taiwan maintains the status quo of its current capabilities.

Alternate Future #17 – *Japan and South Korea continue with further development of their currently existing peaceful nuclear programs, while Taiwan only maintains its currently existing nuclear program, without additional expansions.* This alternate future closely resemble the status quo future (#8), the only difference is that instead of continuing with further development of its peaceful nuclear program, Taiwan maintains the status quo of its current capabilities by not pursuing any additional nuclear capabilities, even for peaceful purposes.

Focal Events

- Increased tensions between China and Taiwan.

Indicators

- Taiwan does not pursue additional nuclear energy capabilities or request any additional nuclear supplies from contributory nations to further advance its technology.
- Taiwan maintains the status quo of its current capabilities.

Alternate Future #22 – *Japan pursues independent nuclear weapons capabilities, while Taiwan only maintains its currently existing peaceful nuclear program, without expansions and South Korea continues with further development of its peaceful nuclear program.* Alternate Future #22 is similar to Alternate Future #24, however the state pursuing independent nuclear weapons capabilities is Japan, instead of South Korea.

Focal Events

- North Korea becomes a confirmed nuclear power..
- Increased hostilities between Japan and North Korea.
- Deterioration of Japan/US relationship.
- Increased tensions between China and Taiwan.

Indicators

- Observable shifts in technical status of current nuclear program in Japan.
- Japan withdraws from the NPT.
- Unusual construction activity in Japan.
- Increased or new movements of nuclear scientists, engineers and bureaucrats, via travel or promotion to or within Japan.

- Public statements, policy debates, movements and meetings concerning nuclear energy or nuclear weapons within Japan.
- Explosives tests conducted in Japan.
- Delivery vehicles tests conducted in Japan.
- Taiwan does not pursue additional nuclear energy capabilities or request any additional nuclear supplies from contributory nations to further advance its technology.
- Taiwan only maintains the status quo of its current capabilities.

Alternate Future #15 – *Japan, Taiwan and South Korea maintain their current peaceful nuclear programs only, without any expansion.* This alternate future is similar to the status quo future (#8) except that instead of expanding on their current peaceful nuclear programs, all three affected states maintain the status quo of their current facilities without any type of expansions or advancements.

Focal Events

- North Korea maintains peaceful nuclear capabilities only.
- North Korea shows less aggression toward South Korea.
- North Korea and Japan develop a better relationship.
- Japan, Taiwan and South Korea are content with the current state of their own nuclear programs.

Indicators

- Neither Japan or Taiwan, nor South Korea continues to pursue additional nuclear energy capabilities or request any additional nuclear supplies from contributory nations to further advance its technology.

- Japan, Taiwan and South Korea only maintain the status quo of their current capabilities.

Transposition of Alternate Futures

Alternate futures may transpose into one another if actions of one actor change the perceptions of one or more of the other involved actors. If this transposition occurs, it may change the relative probability of all possible futures as time and action progresses. A brief discussion of the possibility of transposition of the top five alternate futures within each scenario will be discussed below.

Scenario 1 – North Korea becomes a confirmed nuclear power – CN

Under Scenario 1, there is really no correlation for one alternate future to transpose into another alternate future within the top five alternate futures. There is, however, the possibility of transposition between some of the first five alternate futures into some of the other alternate futures from among the 27 total possible alternate futures. Alternate Future #7 could possibly transpose into Alternate Future #3 or Alternate Future #1. If South Korea was to develop its own independent nuclear capabilities, Japan may feel even more vulnerable, knowing both North and South Korea are nuclear weapons capable and may decide to pursue their own independent nuclear weapons capabilities, as is the case in Alternate Future #3. Also, if South Korea and Japan both decide to pursue independent nuclear weapons capabilities Taiwan may also decide to do the same, transposing the situation into Alternate Future #1. Alternate Future #24 could also transpose into Alternate Futures #1 and #3 for the same reasons.

Alternate Future #22 could also possibly transpose into Alternate Future #10 or Alternate Future #1. If Japan was to develop its own independent nuclear weapons

capabilities, South Korea may decide since it is vulnerable to North Korea and Japan is already violating the NPT that it may be in their best interest to also acquire independent nuclear weapons capabilities. This is the case in Alternate Future #10. Again, if both Japan and South Korea acquire their own independent nuclear weapons capabilities, Taiwan may then also do the same, as in Alternate Future #1.

Scenario 2 – North Korea maintains peaceful nuclear capabilities only – PN

Scenario 2, again does not appear to have transposition possibilities between the top five alternate futures. Some of the top five alternate futures, however, could transpose into some of the other alternate futures from the 27 total possible alternate futures.

Again, Alternate Future #7 could transpose into Alternate Futures #1 and #3 and Alternate Future #24 could transpose into Alternate Futures #1 and #10, for the same reasons listed under Scenario 1.

Scenario 3 – North Korea proceeds with disarmament of its current nuclear capabilities.

Scenario 3 also does not appear to have transposition possibilities between the top five alternate futures, but does have transposition possibilities between some of the top five alternate futures with other alternate futures from the 27 total possible alternate futures.

In this scenario Alternate Futures #24 and #7 could transpose into Alternate Futures #1 and #3 for the same reasons stated under Scenario 1. Alternate Future #22 could also transpose into Alternate Futures #1 and #10 for the same reasons listed under Scenario 1.

Conclusion

Nuclear weapons proliferation is and will continue to be a major national security concern worldwide. Although many nations have signed the NPT and work cooperatively with the IAEA, some nations, even as member nations of the NPT, still seek to establish their own nuclear weapons programs. Each time this situation occurs, other states without nuclear weapons capabilities rethink their situations in regards to acquiring their own independent nuclear weapons capabilities. This is exactly the situation that is occurring in Northeast Asia.

As evidenced in this research, North Korea, a former member nation of the NPT, is currently in the process of establishing an independent nuclear weapons program. North Korea has previously withdrawn from the NPT, tested a nuclear weapon in 2006 and as recently as May 25, 2009, conducted an underground nuclear test, followed by the test firing of three short-range ground-to-air missiles. Even today, June 18, 2009, as this paper was being finalized, North Korea again made the headlines. A report out of Tokyo suggests that the Japanese believe that North Korea my fire a long-range missile toward Hawaii in early July. Satellite imagery, however, does not currently show that any weapon has been stacked or staged yet. Apparently, regardless of any international negotiations, punitive sanctions, worldwide condemnation or other consequences, North Korea is determined, at all costs, to become a confirmed nuclear power.

There are several consequences that may result from this action by North Korea. First, this type of activity weakens the overall status and effectiveness of the NPT. This may lead to an increase in proliferation activities worldwide. Other nations desiring nuclear weapons may feel that if North Korea could get away with this, perhaps they

could too. Most importantly, however, is the affect of North Korea's nuclear status on the other nations of Northeast Asia. As previously stated, two nations in Northeast Asia are already confirmed nuclear powers and many already have civilian nuclear infrastructures and have made previous attempts at their own nuclear weapons programs. These states are considered "threshold" states. These "threshold" states are Japan, Taiwan and South Korea, the actors of this research study. The major concern of this study, therefore, was to determine how these three actors would react to North Korea's nuclear program under three different scenarios. Scenario 1 was that North Korea became a confirmed nuclear weapons state. Scenario 2 was that North Korea maintained peaceful nuclear capabilities only. Scenario 3 was that North Korea proceeded with disarmament of its current nuclear capabilities. Each affected actor in this study, Japan, Taiwan and South Korea, had three potential courses of action they could take in reference to these scenarios. The first course of action was to pursue their own independent nuclear weapons capabilities. The second was to continue with the further development of their currently existing peaceful nuclear programs. The third course of action was to maintain their currently existing peaceful nuclear programs only, without any expansion.

After using the LAMP technique to conduct analysis of this situation, the overall results concluded that regardless of what direction is taken by North Korea, for the immediate to short term future, all three of the involved actors are most likely to, for the time being, only continue with the further development of their currently existing peaceful nuclear programs. Based on this analysis, none of the affected actors would

likely immediately seek their own independent nuclear weapons programs, even if North Korea does become a confirmed nuclear weapons state.

Although the resulting analysis of this situation in regards to nuclear proliferation activities by the concerned actors is positive for the near future, this is not to say that this restraint in proliferation activities will always remain. The actions of North Korea, as a confirmed nuclear power, can cause a shift in opinion of the affected states if their national security, economic or political situations are adversely affected by North Korea's future behaviors. Therefore, it is imperative to revisit analysis of this situation on a regular basis.

Appendix A – Probability Tree Analysis of Japan, Taiwan and South Korea responses to North Korea

Predicting the possible responses of Japan, Taiwan and South Korea to North Korea becoming a confirmed nuclear state poses many questions and concerns in the area of research. Since questions always arise during predictive analysis research such as this, one way to overcome these issues is to apply another method of research to the same question. This is done in an attempt to alleviate some of the problems, issues and biases that are inherent in using only one method of analysis. Though LAMP analysis was used for the main body of this paper and it is particularly suited for this type of study, incorporating a second methodology will enhance the results of the LAMP analysis.

Probability tree analysis will be the second methodology used for this research. Probability tree analysis is useful for determining the likelihood of events through a graphical presentation. It involves creating a simplification of reality, or simplifying the choices in order to design an effective decision tree diagram. Once the tree is created, probability values are assigned to each branch. The sum of the probabilities for each branch must equal one. Once these figures are assigned, the relative probability for the different branches is determined by multiplying all of the individual probabilities within the branch of a specific path.

For this analysis, the question being addressed is what are the most likely or probable behaviors of Japan, Taiwan and South Korea in regard to North Korea's becoming a confirmed nuclear weapons state. For the probability tree analysis, each actor, Japan, Taiwan and South Korea, will be matched with North Korea with its own probability tree. This is due to the fact that this type of analysis does not lend itself well to handling more than two actors at a time. The beginning of each probability tree is the

current situation regarding North Korea. This situation is that North is well on its way to and will most likely become a confirmed nuclear weapons state. The situation also assumes that Japan, Taiwan and South Korea would be affected the most and the most immediately by this change of status involving North Korea. The probability results will then be compared with the LAMP analysis results.

The probability tree method of analysis has some drawbacks. First, it only allows for a small number of possible actions by each actor. Also, it cannot account for any cooperative behaviors or shifts in behavior patterns based on outside influences. Therefore, each tree should be considered as a separate issue and combining the results could result in invalid values.

As is the case with any predictive research study there is always the possibility of bias and error in the final product, since probability studies are subjective to the researcher's own biases and knowledge. Therefore, it is important for the consumer of this study to appropriately analyze its usefulness and applicability.

Determining Options for the Decision Tree

The purpose of this analysis is to analyze the behaviors of Japan, Taiwan and South Korea in regard to North Korea. Since probability tree analysis requires simplified actions that must be mutually exclusive, the same actions used in the LAMP analysis will be used again in the probability tree analysis. The only difference is the option to have no response to North Korea's behavior is included in the probability analysis for each actor. In this analysis, Japan, Taiwan and South Korea's option to continue with further development of their currently existing peaceful nuclear programs, will be considered the

"no response", since this is the status quo situation and would indicate no real change in behavior of the actors.

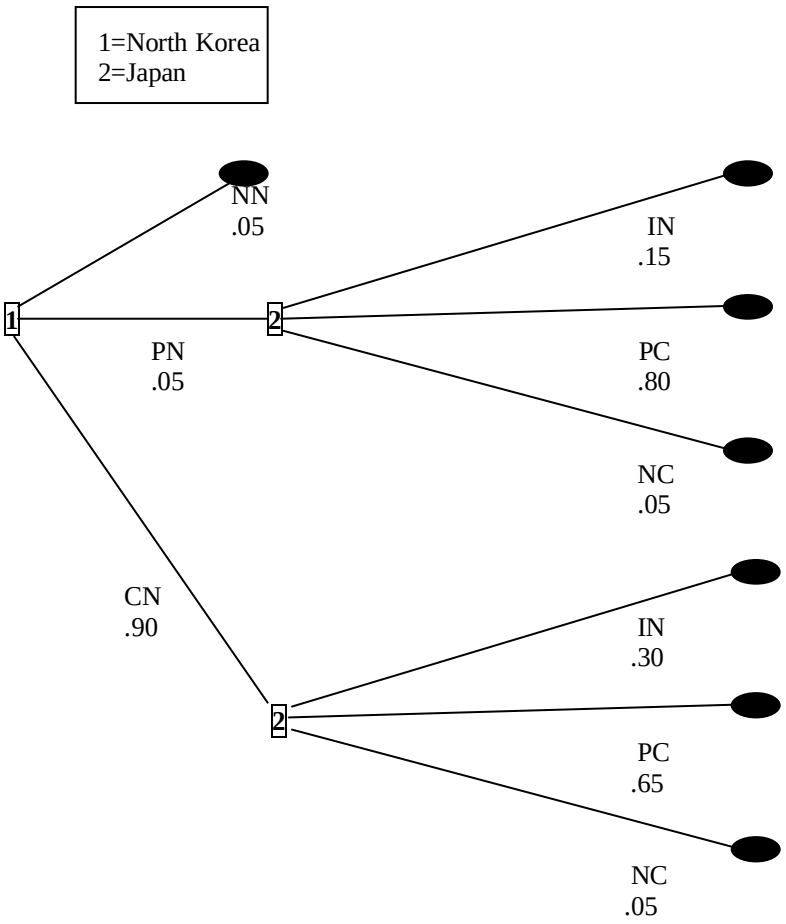
Regarding North Korea's behavior, there is one action specific to North Korea that brings about the end of a decision tree: North Korea proceeds with disarmament of its nuclear capabilities. With respect to this scenario, should North Korea do away with its nuclear capabilities, Japan, Taiwan and South Korea's interaction with North Korea regarding this matter would end.

There are three courses of action for Japan, Taiwan and South Korea: continue with the further development of their peaceful nuclear program; maintain their currently existing peaceful nuclear programs without any advancement; or pursue independent nuclear weapons capabilities. For North Korea there are also three possible behaviors: become a confirmed nuclear weapons state; maintain a peaceful nuclear program only; or proceed with disarmament of it currently existing nuclear capabilities.

In the following diagrams, the behaviors of Japan, Taiwan and South Korea are plotted against the behaviors of North Korea, probability values are assigned and the relative probability of each possible branch outcome is compared. The diagrams are based on the current status quo of the North Korean nuclear program, meaning North Korea is continuing to pursue an independent nuclear weapons program. The diagrams all begin with North Korea as the first actor, followed by the actions of the affected states. Each decision tree diagram is identical, except for the probability numbers.

Diagram 1: North Korea/Japan Probability Tree

IN – Pursues Independent Nuclear Capabilities
NC – Does not Pursue Additional Nuclear Capabilities
PC – Maintains Peaceful Nuclear Capabilities Only
CN – Confirmed Nuclear Power (North Korea)
PN – Maintains Peaceful Nuclear Program (North Korea)
NN – Proceeds with Disarmament (North Korea)



Japan and North Korea

Diagram 1 is a representation of the probability tree between Japan and North Korea, starting with the present relationship between Japan and North Korea. By using

the probability tree values in the diagram we can determine which scenarios are most likely and least likely to occur. For the sake of brevity, we will only focus discussion on these most and least likely scenarios.

Based on the initial assumption of the probability tree, that North Korea is continuing to build its nuclear weapons arsenal and becomes a confirmed nuclear weapons state, the most likely probability path for Japan leads to Japan continuing with the further development of its currently existing peaceful nuclear program only. As shown in the diagram this path shows North Korea becoming a confirmed nuclear state (CN=.9) and Japan responding by only continuing with further development of its currently existing peaceful nuclear program (PC=.65). This probability path ends with a relative probability of .585 or 58.5% probability of occurring.

The most unlikely probability in regards to North Korea and Japan, if North Korea becomes a confirmed nuclear state, is that Japan only maintains its currently existing peaceful nuclear program, without any additional expansion. In the diagram, this path shows North Korea becoming a confirmed nuclear state (CN=.9) and Japan responding by only maintaining its currently existing peaceful nuclear program, without expansion (NC=.05). This probability path ends with a relative probability of .045 or 4.5% of occurring.

Based on the assumption that North Korea stops its current nuclear weapons proliferation activities and only pursues peaceful nuclear capabilities, the most likely possibility of response for Japan is again that Japan continues with further development of their peaceful nuclear weapons program. As shown in the diagram, this path shows North Korea maintaining a peaceful nuclear program only (PN=.05) and Japan

responding by continuing with further development of its currently existing peaceful nuclear program (PC=.80). This probability path ends with a relative probability of .04 or 4%.

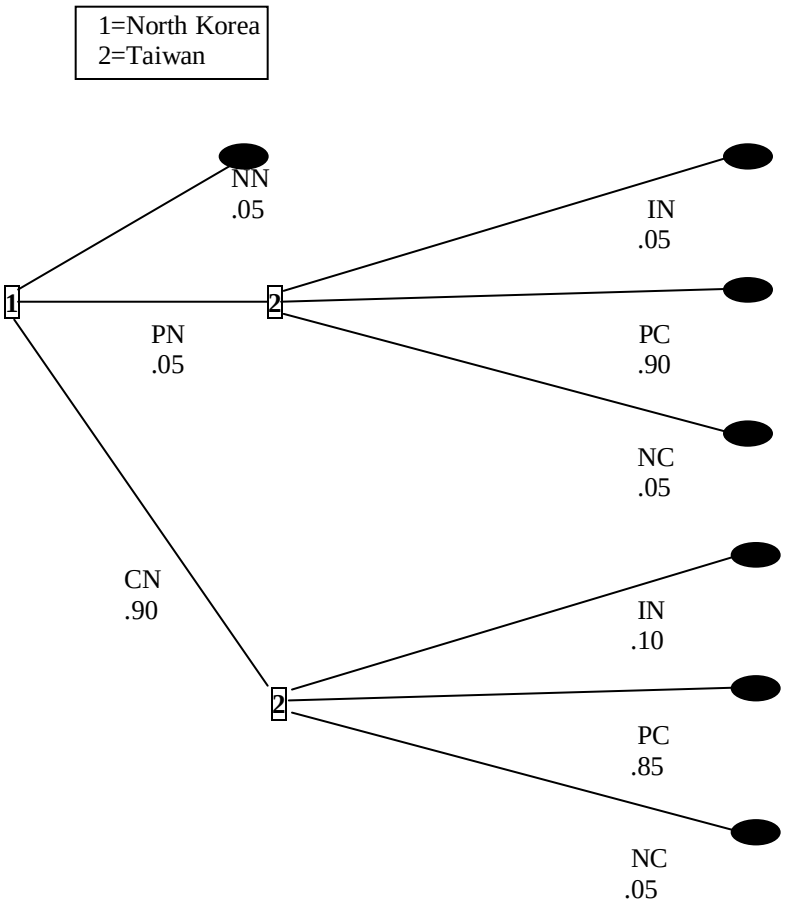
The most unlikely path, should North Korea maintain a peaceful nuclear program only, is that Japan would only maintain its currently existing peaceful nuclear program without any expansion. In the diagram, this path shows North Korea maintaining a peaceful nuclear program only (PN=.05) and Japan responding by only maintaining their currently existing peaceful nuclear program without any expansion (NC=.05). This probability path ends with a relative probability of .0025 or .25%.

As mentioned earlier, should North Korea decide to totally abandon its nuclear program, shown in the diagram as (NN=.05) the branch would end since the issue would no longer affected the involved actors. Therefore this branch of the probability tree requires no further discussion.

Overall, there is a 58.5% chance that Japan will maintain the status quo of its nuclear capabilities, only furthering development of its peaceful nuclear program if North Korea were to become a confirmed nuclear state. For the immediate future, no matter what direction North Korea takes, Japan will probably not be likely to pursue their own independent nuclear weapons program. The closeness of the 58.5% decision to a 50% chance of going in either direction, leads one to speculate, however, that the situation would be precarious and the issue may be readdressed relatively quickly should the actions of North Korea, as a nuclear state, cause increased concerns in regards to their relationship with Japan.

Diagram 2: North Korea/Taiwan Probability Tree

IN – Pursues Independent Nuclear Capabilities
NC – Does not Pursue Additional Nuclear Capabilities
PC – Maintains Peaceful Nuclear Capabilities Only
CN – Confirmed Nuclear Power (North Korea)
PN – Maintains Peaceful Nuclear Program (North Korea)
NN – Proceeds with Disarmament (North Korea)



Taiwan and North Korea

Diagram 2 is a representation of the probability tree between Taiwan and North Korea, starting with the present relationship between Taiwan and North Korea. By using the probability tree values in the diagram we can determine which scenarios are most

likely and least likely to occur. Again, for the sake of brevity, we will only focus discussion on these most and least likely scenarios.

Based on the initial assumption of the probability tree, that North Korea is continuing to build its nuclear weapons arsenal and becomes a confirmed nuclear weapons state, the most likely probability path for Taiwan leads to Taiwan continuing with the further development of its currently existing peaceful nuclear program only. As shown in the diagram this path shows North Korea becoming a confirmed nuclear state (CN=.9) and Taiwan responding by only continuing with further development of its currently existing peaceful nuclear program (PC=.85). This probability path ends with a relative probability of .765 or 76.5% probability of occurring.

The most unlikely probability in regards to North Korea and Taiwan, if North Korea becomes a confirmed nuclear state, is that Taiwan only maintains its currently existing peaceful nuclear program, without any additional expansion. In the diagram, this path shows North Korea becoming a confirmed nuclear state (CN=.9) and Taiwan responding by only maintaining its currently existing peaceful nuclear program, without expansion (NC=.05). This probability path ends with a relative probability of .045 or 4.5% of occurring.

Based on the assumption that North Korea stops its current nuclear weapons proliferation activities and only pursues peaceful nuclear capabilities, the most likely possibility of response for Taiwan is again that Taiwan continues with further development of their peaceful nuclear weapons program. As shown in the diagram, this path shows North Korea maintaining a peaceful nuclear program only (PN=.05) and Taiwan responding by continuing with further development of its currently existing

peaceful nuclear program (PC=.90). This probability path ends with a relative probability of .045 or 4.5%.

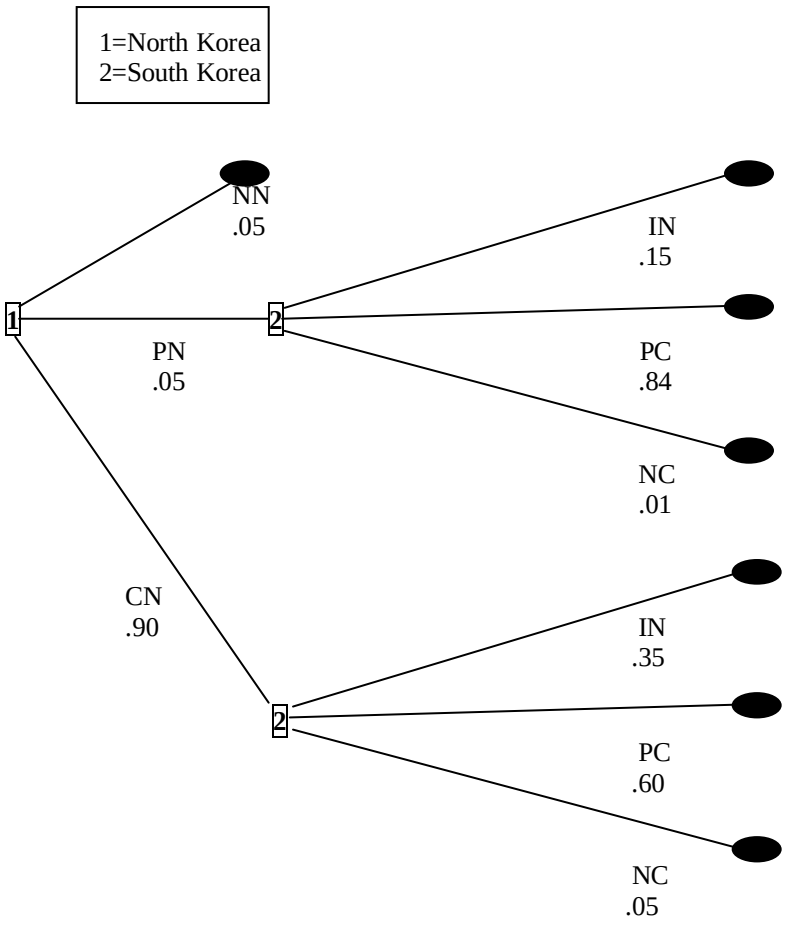
The most unlikely path, should North Korea maintain a peaceful nuclear program only, is that Taiwan would only maintain its currently existing peaceful nuclear program without any expansion. In the diagram, this path shows North Korea maintaining a peaceful nuclear program only (PN=.05) and Taiwan responding by only maintaining their currently existing peaceful nuclear program without any expansion (NC=.05). This probability path ends with a relative probability of .0025 or .2.5%

As mentioned earlier, should North Korea decide to totally abandon its nuclear program, shown in the diagram as (NN=.05) the branch would end since the issue would no longer affected the involved actors. Therefore this branch of the probability tree requires no further discussion.

Overall, as with Japan, Taiwan will likely also only continue with further development of its currently existing peaceful nuclear program, regardless of the actions of North Korea, at least for the immediate to short term future. Even if North Korea does become a confirmed nuclear state, there is still a 76.5% chance that Taiwan will only continue with further development of its current peaceful nuclear weapons capabilities and not pursue independent nuclear weapons capabilities. Though circumstance may change the perceptions and therefore the response by Taiwan, from the current perspective it is highly unlikely that Taiwan will proceed with proliferation efforts of their own.

Diagram 3: North Korea/South Korea Probability Tree

IN – Pursues Independent Nuclear Capabilities
NC – Does not Pursue Additional Nuclear Capabilities
PC – Maintains Peaceful Nuclear Capabilities Only
CN – Confirmed Nuclear Power (North Korea)
PN – Maintains Peaceful Nuclear Program (North Korea)
NN – Proceeds with Disarmament (North Korea)



South Korea and North Korea

Diagram 3 is a representation of the probability tree between South Korea and North Korea, starting with the present relationship between South Korea and North Korea. By using the probability tree values in the diagram we can determine which

scenarios are most likely and least likely to occur. Again, for the sake of brevity, we will only focus discussion on these most and least likely scenarios.

Based on the initial assumption of the probability tree, that North Korea is continuing to build its nuclear weapons arsenal and becomes a confirmed nuclear weapons state, the most likely probability path for South Korea leads to South Korea continuing with the further development of its currently existing peaceful nuclear program only. As shown in the diagram this path shows North Korea becoming a confirmed nuclear state (CN=.9) and South Korea responding by only continuing with further development of its currently existing peaceful nuclear program (PC=.60). This probability path ends with a relative probability of .54 or 54% probability of occurring.

The most unlikely probability in regards to North Korea and South Korea, if North Korea becomes a confirmed nuclear state, is that South Korea only maintains its currently existing peaceful nuclear program, without any additional expansion. In the diagram, this path shows North Korea becoming a confirmed nuclear state (CN=.9) and South Korea responding by only maintaining its currently existing peaceful nuclear program, without expansion (NC=.05). This probability path ends with a relative probability of .045 or 4.5% of occurring.

Based on the assumption that North Korea stops its current nuclear weapons proliferation activities and only pursues peaceful nuclear capabilities, the most likely possibility of response for South Korea is again that South Korea continues with further development of their peaceful nuclear weapons program. As shown in the diagram, this path shows North Korea maintaining a peaceful nuclear program only (PN=.05) and South Korea responding by continuing with further development of its currently existing

peaceful nuclear program (PC=.84). This probability path ends with a relative probability of .042 or 4.2%.

The most unlikely path, should North Korea maintain a peaceful nuclear program only, is that South Korea would only maintain its currently existing peaceful nuclear program without any expansion. In the diagram, this path shows North Korea maintaining a peaceful nuclear program only (PN=.05) and South Korea responding by only maintaining their currently existing peaceful nuclear program without any expansion (NC=.01). This probability path ends with a relative probability of .0005 or .05%.

As mentioned earlier, should North Korea decide to totally abandon its nuclear program, shown in the diagram as (NN=.05) the branch would end since the issue would no longer affected the involved actors. Therefore this branch of the probability tree requires no further discussion.

Overall, as with Japan and Taiwan, South Korea will also most likely only continue with further development of their currently existing peaceful nuclear program, regardless of the actions of North Korea. South Korea, however, appears to be the most likely out of all three affected actors to possibly change this decision and attempt to pursue their own independent nuclear weapons capabilities. According to this research, if North Korea is a confirmed nuclear state, though there is a 54% chance that South Korea will only continue to develop its peaceful nuclear program, there is also a 31.5% chance that they will pursue independent nuclear capabilities. This is the highest percentage toward pursuing independent nuclear weapons capabilities out of all three affected actors. This, however, as with Japan and Taiwan, will likely not happen in the near future and will also likely depend on the behaviors of North Korea as a nuclear weapons state.

Conclusion and Comparison with LAMP Analysis

In reviewing both the LAMP analysis and the Probability Tree analysis, it becomes clear that the most likely scenario is that North Korea will eventually become a confirmed nuclear weapons state. Even with this likelihood, it is also apparent that, at least for the immediate to short term future, Japan, Taiwan and South Korea will still only continue with the further development of their currently existing peaceful nuclear programs. Based on the analysis using LAMP and the Probability Tree, it is currently unlikely that Japan, Taiwan or South Korea will attempt to pursue independent nuclear capabilities in the near future, or halt any improvements or expansion with their peaceful programs, as a reaction to North Korea's behaviors. Of course the actions of North Korea as a confirmed nuclear state can relatively quickly change all of this and cause all the other affected states to reconsider their options. Therefore, it is imperative to revisit analysis of this situation on a regular basis.

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