

South Korea's Nuclear Hedging?

The credibility of the United States' nuclear umbrella has been questioned time and again by its allies in Europe and Asia since the dawn of the nuclear era. Skepticism toward U.S. extended deterrence to the Republic of Korea (ROK) is particularly high amid their strained relationship in light of political leadership changes in Washington and Seoul as well as North Korea's rapidly advancing nuclear capabilities. A growing sense of abandonment among South Koreans raises the concern that Seoul may go nuclear. However, pursuing nuclear weapons is not likely given the enormous security and economic costs. A more likely scenario is Seoul's nuclear hedging, *i.e.* "maintaining, or at least appearing to maintain, a viable option for the relatively rapid acquisition of nuclear weapons."¹ South Korean President Moon Jae-in's pursuit of nuclear-powered submarines may be part of Seoul's nuclear hedging strategy.

While one cannot be certain whether Moon has such intentions, the ability to build nuclear-powered submarines indigenously—more specifically the ability to enrich uranium to fuel its submarines—would allow Seoul to achieve "nuclear latency," *i.e.* the ability to acquire nuclear weapons within a short period of time.² A major obstacle to South Korea's pursuit of nuclear-powered submarines, however, is the U.S.-South Korea nuclear cooperation agreement—also known as the "123 Agreement," which bans South Korea from enriching uranium for military purposes. The United States will soon have to decide whether to lift this restriction. In its deliberation, the United States should consider the proliferation risks that will accompany South Korea's acquisition of nuclear-powered submarines. Furthermore, if South Korea's pursuit of such submarines is an embodiment

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of the strategy of nuclear hedging, the United States should contemplate how to address Seoul's sense of insecurity in order to prevent the emergence of a nuclear South Korea.

This paper will first briefly sketch the recent developments that have decreased the credibility of the U.S. extended deterrence in South Korea and thus have raised potential concerns about a nuclear South Korea. It then analyzes the likelihood that South Korea will pursue nuclear weapons, and presents nuclear hedging as a more plausible scenario. Lastly, it discusses the potential implications of a nuclear hedging strategy for U.S. policy.

Recent Developments

During the past decade, the United States and South Korea maintained a tight alliance, perhaps the strongest in history. This began to falter with changes in political leadership first in Washington and then in Seoul.

Political Leadership Changes

In the United States, Donald Trump called for the withdrawal of U.S. troops from South Korea and the termination of the U.S.-ROK (KORUS) free trade agreement during his campaign. Shortly after his November 2016 election, President Trump seemed to back away from his campaign rhetoric, calling then-President Park Geun-hye to give reassurance that the United States remains committed to protecting its Asian ally. However, since then, Trump has continued to sow doubts about his commitment to the U.S.-ROK alliance.

Meanwhile, in South Korea, the nine-year rule of the pro-U.S. and conservative Saenuri Party (now renamed the "Liberty Korea Party") ended with the May 2017 election of Moon Jae-in, a liberal from the Democratic Party. A chief-of-staff of former President Roh Moo-hyun (2003-04, 04-08), who had

Ominous signs for the alliance have emerged around these two new leaders.

"alliance-shuddering tensions"³ with President George W. Bush, Moon has pursued a more independent stance toward the United States and a more dovish approach toward North Korea. Accordingly, there have been concerns that the alliance would become strained under these two new leaders. Ominous signs have already emerged around the following issues:

First, the relationship between the United States and South Korea became tense over the controversial U.S. Terminal High Altitude Area Defense (THAAD) missile defense system. In July 2016, the United States and South Korea

announced their agreement to deploy THAAD on South Korean soil in order to protect alliance military forces from North Korea's nuclear and missile threats.⁴ The deployment of THAAD has been a highly polarizing issue in South Korea, with the majority of the country's progressivists, including then presidential-candidate Moon Jae-in, criticizing the missile system. They believe the costs of the deployment of THAAD far outweigh the benefits. While THAAD will enhance U.S. surveillance capabilities against Chinese missiles, it provides minimal protection for South Korea (it cannot protect its capital, Seoul). At the same time, THAAD is wreaking havoc on Sino-Korean relations, causing China's economic retaliations toward South Korea's automobile, smartphone, tourism, and cosmetics industries. According to the Bank of Korea, China's punitive measures reduced South Korea's gross domestic product growth by 0.4% in 2017.⁵ A recent study conducted by the Korea Development Bank suggests that economic loss caused by China's sanctions over the deployment of THAAD could amount to US\$20 billion (22.4 trillion Korean Won).⁶ In addition, some worry about potential environmental hazards, which they believe have not been sufficiently studied. The Park Geun-hye administration's rushed decision to deploy THAAD in July 2016, while ignoring democratic procedures, intensified anti-THAAD sentiment.⁷ Further fueling the controversy was President Trump's April 2017 demand that Seoul pay for THAAD, reversing the existing agreement that the United States would pay for the missile defense system and its maintenance, while Seoul would pay for the land and supporting infrastructure. Such a demand enraged opponents of THAAD. This issue has since been largely resolved: Moon eventually deployed the missile defense system under pressure from the United States, while Trump's national security adviser H. R. McMaster reaffirmed the U.S. commitment to pay for the system.⁸ Nonetheless, such altercations over THAAD have created a chasm between the two allies.

Another rift arose between the two countries over trade, as Washington is increasingly pressing Seoul to amend KORUS. For many in South Korea, the five-year-old agreement symbolizes strong ties between the two countries. Trump views it as a "horrible deal"⁹ that generates a large trade deficit with South Korea.¹⁰ He has threatened to terminate KORUS altogether if Seoul refuses to revise it,¹¹ a scenario that Seoul could not disregard in light of the abrupt U.S. withdrawal from the Trans-Pacific Partnership (TPP) shortly after Trump took office. Facing the threat of an immediate annulment of KORUS—which would inflict enormous damage on South Korea's automobile, smartphone, and home appliance industries—in early October 2017, Seoul agreed to renegotiate KORUS. The timing is particularly unfortunate for South Koreans, as they are already suffering from China's economic retaliations over the deployment of THAAD. Trump's attempt to revise the trade deal under such conditions makes

South Koreans question the reliability of the United States as a friend who would come to their aid in need.

North Korea's Advancing Nuclear and Missile Capabilities

These leadership changes have come precisely at the same time that North Korea's nuclear threats have been growing. Despite U.S. efforts to denuclearize North Korea for the past quarter century, North Korea had already become a *de facto* nuclear-armed state. Since its first nuclear test in October 2006, North Korea has conducted five more, displaying the growing strength of its nuclear weapons: from less than 1 kiloton in 2006 to 4 kt in May 2009, 10 kt in February 2013, 6 kt in January 2016, and 10-20 kt in September 2016.¹² The sixth and most recent test conducted on September 3, 2017 demonstrated a big leap from the previous test about a year prior (with the estimation of the yield varying from 50 kt to 250 kt).¹³ Even the lowest estimate indicates that North Korea's nuclear warheads are far more destructive than the atomic bombs dropped in Japan during the Second World War (the yields of "Little Boy," which struck Hiroshima, and "Fat Man," which hit Nagasaki, were approximately 13 and 23 kt respectively).¹⁴ North Korea claimed that the nuclear device tested in 2017 was a miniaturized hydrogen bomb, small enough to be put on the tip of ballistic missiles. Although it is hard to verify this claim, experts said that "there was enough strong evidence to suggest the reclusive state has either developed a hydrogen bomb or was getting very close."¹⁵

North Korea's missile capabilities are also growing. In December 2012, North Korea successfully launched the Unha-3 rocket and put a satellite in orbit. In August 2016, North Korea conducted its first successful submarine-launched ballistic missile (SLBM) test near the eastern port of Sinpo, which flew about 300 miles toward Japan.¹⁶ Since then, Pyongyang has conducted a number of missile tests—20 times in 2017.¹⁷ Some of these tests demonstrated a large surge in its missile capability. Most remarkably, North Korea's first intercontinental ballistic missile (ICBM) test—conducted on July 4, 2017, as Kim Jong-un's so-called Independence Day "gift" to Trump—travelled 578 miles. David Wright of the Union of Concerned Scientists said that the missile could reach Alaska.¹⁸ The latest ICBM test that North Korea conducted in November 2017 soared higher than any previous missiles (2,800 miles) and spent 53 minutes in the air. U.S. Defense Secretary James Mattis said that the missile test demonstrated that North Korea can now hit "everywhere in the world basically."¹⁹ North Korea does not seem to have crossed a key threshold on the path to becoming a full-fledged nuclear power: nuclear reentry technology, which protects nuclear warheads from the intense heat and vibrations that result when ICBMs reenter the earth's atmosphere. However, it is becoming increasingly likely that North

Korea will soon acquire, if it has not yet already, the capability to attack the United States with nuclear weapons.

Such a scenario forces South Koreans to ask a similar question as the French did during the Cold War: Would the United States be willing to trade Anchorage, Honolulu, or soon, Los Angeles, for Seoul?

Diminished Credibility of U.S. Extended Deterrence in ROK

During the Cold War, the United States' European allies questioned the credibility of the U.S. nuclear umbrella in light of the doctrine of mutual assured destruction (MAD). The logic of MAD is simple: when two opponents have the ability to annihilate each other, they are deterred from attacking each other. It is widely believed that the doctrine of MAD between the United States and the Soviet Union was what prevented a major military conflict between the two superpowers during the Cold War. After the Soviets acquired the capability to destroy American cities, the United States' NATO allies questioned whether Washington would come to their aid if they were attacked by the Soviet Union.²⁰ Against this backdrop, the French developed their own nuclear weapons.²¹ Similarly, West Germany contemplated going nuclear in the 1950s, although Bonn eventually decided against it.²²

The same logic applies to U.S. extended deterrence in South Korea. Admittedly, North Korea will not have the capability to annihilate the United States. Its overall nuclear capability is dwarfed by that of the United States in all aspects: the size and strength of both nuclear and missile arsenals. However, given North Korea's successful SLBM test, it is likely that North Korea will soon acquire a survivable nuclear arsenal, if it has not already, which could destroy at least a few American cities. In other words, it is likely that North Korea has already or will soon secure a second-strike capability—the ability to respond to a nuclear attack with nuclear retaliation—or what Vipin Narang, a political scientist at MIT, calls “assured retaliation.”²³

The question then becomes, if the United States is vulnerable to North Korea's nuclear attacks, will the American nuclear umbrella work? In a hypothetical scenario where North Korea attacked Seoul and/or Tokyo, retaliating against North Korea would put American cities in jeopardy. Despite the United States' highly sophisticated missile defense systems, one cannot rule out the possibility that at least one nuclear bomb would detonate on American soil. Would the United States risk

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such a possibility in order to honor its defense commitments to South Korea or Japan? When push comes to shove, will American leaders decide to sacrifice American lives to protect South Koreans and Japanese? The logic of mutual nuclear deterrence would suggest that the United States would be deterred from retaliating against North Korea, should the latter attack Seoul or Tokyo.

Not surprisingly, some Americans have expressed concerns about “liabilities” that come with the U.S. commitment to protect South Korea. Pointing to North Korea’s July 2017 ICBM test and South Korea’s suspension of the THAAD deployment, American policy analyst Michael Auslin recently asked why “America [should] put not only its servicemen and women at risk, but [also] its cities, for an ally that hedges on America’s security assistance?” He also said, “North Korea, to be clear, poses no existential threat to the United States ... Putting America’s cities in the bull’s eye of nuclear nations for anything less than a truly existential threat would be foolish ... Where the Korean peninsula is concerned, America’s national security policy stands at a crossroads. Its commitment to Seoul cannot simply be asserted as an ordinary foreign policy, or upheld solely on the account of tradition. Policymakers will have to convince the American public why they should be put at risk, if their involvement in the intra-Korean dispute is what puts them in that position.”²⁴ Although understandable from a U.S. national security perspective and not necessarily representative of U.S. national security policy, the many statements like this cast further doubt over the credibility of U.S. extended deterrence in South Korea.

Moreover, Trump’s continued threats to carry out preemptive strikes against North Korea make South Koreans not only worry that the United States may not trade Los Angeles for Seoul, but also worry the United States may *sacrifice* Seoul for Los Angeles.²⁵ Soon after Kim Jong-un declared in January 2017 that North Korea was close to testing an ICBM that could reach the United States, Trump tweeted three words: “It won’t happen,” which was interpreted as his red line on North Korea.²⁶ Since then, Trump and Kim exchanged threats with Trump saying in August 2017 that if North Korea continues to make threats against the United States, “they will be met with fire and fury like the world has never seen,” and Kim responding by threatening to strike Guam with missiles.²⁷ Such tension culminated in Trump’s address at the UN General Assembly where he declared, “if [the U.S.] is forced to defend itself or its allies, we will have no choice but to totally destroy North Korea,” adding that “Rocket Man is on a suicide mission for himself and for his regime.”²⁸

Kim, on his part, released an unprecedented personal statement, stating that he “will consider with seriousness exercising a corresponding, highest level of hardline countermeasure in history.”²⁹ While it is uncertain what countermeasure Kim had in mind, his foreign minister Ri Yong-ho hinted of the possibility of a

hydrogen-bomb test in the Pacific Ocean. Such a test, which would demonstrate its capability to miniaturize a nuclear device enough to be loaded on top of a long-range ballistic missile, would also cause enormous environmental damage.³⁰ The latest in a series of threat exchanges between Trump and Kim is Kim's New Year's address warning that the "[n]uclear Button is on his desk at all times," and Trump's tweet in response: "Will someone from his depleted and food starved regime please inform him that I too have a Nuclear Button, but it is a much bigger & more powerful one than his, and my Button works!"³¹

The possibility of the United States' military strikes against North Korea has heightened this year. In late January, the White House dropped Victor Cha as the next U.S. ambassador to South Korea possibly due to his disagreement with the Trump administration's plans to carry out limited strikes against North Korea's nuclear facilities and missile launchers, known as the "bloody nose" option.³² Additionally, Trump's 2018 State of the Union address that shed light on North Korea's troubling human rights records, reminiscent of George Bush's Axis of Evil speech, raised the concern that Trump might be building the "moral case of a U.S. preventive war to 'liberate' North Koreans."³³

From Seoul's perspective, this is worrisome, particularly because the Trump administration has not made it clear that military operations against North Korea will happen with Seoul's consent. Any military operations against North Korea would be highly risky for Seoul, South Korea's capital city, which is home to more than 12 million people. Moon, then as a presidential candidate, said "[t]he safety of South Korea is as important as that of the United States There should never be a pre-emptive strike without South Korean consent."³⁴ Trump does not seem to agree. In August last year, Senator Lindsay Graham revealed that Trump had once told him, "If there's going to be a war to stop [Kim Jong Un], it will be over there. If thousands die, they're going to die over there. They're not going to die here." In agreement with Trump's statement, Graham added: "That may be provocative, but not really. When you're president of the United States, where does your allegiance lie? To the people of the United States."³⁵ Against this backdrop, the reliability of the United States as a security guarantor of South Korea is eroding. Instead, there is a growing view that, if necessary to protect American interests, Washington may sacrifice South Koreans, and thus Seoul should not just stand still naively, believing that Washington will always protect them.³⁶

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What if the U.S. Nuclear Umbrella Doesn't Work?

If South Koreans believe that they cannot rely on U.S. extended deterrence, what options do they have? When the Nixon administration's "Guam doctrine," which demanded that Asian allies be more self-reliant in defense matters, raised the fear of U.S. disengagement from Asia, South Korean President Park Chung-hee decided to pursue nuclear weapons. Nixon's surprise visit to China and his signing of the Shanghai Communiqué in 1972 signaled the abandonment of Taiwan. This made Park Chung-hee worry, "if Taiwan now found itself abruptly and expectedly compromised by its long-term benefactor, could South Korea be far behind?"³⁷ Seoul's ambition, however, was discovered by Washington in 1974, which stayed vigilant to clandestine nuclear efforts since India's "peaceful nuclear explosion" shortly beforehand. The United States put pressure on South Korea to forsake its nuclear ambition, threatening to end the alliance with South Korea. Seoul terminated its nuclear weapons program with a strengthened U.S. security commitment in return.³⁸ As the uncertainties over the future of the U.S.-ROK alliance and North Korea's advancing nuclear capabilities have intensified the sense of insecurity among South Koreans, will Seoul turn to nuclear weapons once again?

Some South Koreans are calling for the redeployment of American tactical nuclear weapons. The United States withdrew its forward-deployed nuclear weapons from South Korea in 1991 as part of its efforts to persuade North Korea to allow International Atomic Energy Agency (IAEA) inspectors into its nuclear facilities. Prominent leaders, including the Chairman of the Liberty Korea Party, Hong Jun Pyo, are galvanizing support for bringing them back. During his visit to Washington in October 2017, he said: "Only by deploying tactical (nuclear) weapons on South Korean territory can we negotiate with North

Korea on an equal footing."³⁹ Perhaps, the calls for the redeployment of tactical nuclear weapons may be partially intended to press China to exert more influence on Pyongyang to push it to denuclearization.⁴⁰

Others are calling for developing South Korea's own nuclear weapons. Such an idea has been proposed for some time, but usually by fringe movements. This is changing. According to a recent Gallup Korea poll conducted after North Korea's latest nuclear test in September 2017, 60 percent of South

Koreans support developing nuclear weapons.⁴¹ There is a growing voice for nuclear armament among scholars, as well. In a September 2017 conference,

Usually proposed by fringe movements, support for the ROK's own nuclear weapons is changing.

Jun Bong-geun, a professor at the Korea National Diplomatic Academy, argued that “if the US-ROK alliance and the US’ nuclear umbrella fail to operate when national security, well-being of the Korean people, and national economy [sic] are threatened by North Korea’s blatant nuclear threats, the call for nuclear armament will gain more ground.” He called on scholars to conduct in-depth studies on whether South Korea should go nuclear, when and how, the expected costs and impacts, and so on.⁴²

Will South Korea Really Go Nuclear?

In my analysis, it is unlikely that Seoul will try to acquire nuclear weapons, as the costs far outweigh the benefits. The deadliest cost of such a decision would be the security vacuum that would result. Should South Korea decide to develop its own nuclear weapons, the United States would likely withdraw its security guarantee. Although as a presidential candidate, Trump mentioned that the United States would be better off if South Korea accepted sole responsibility for their self defense, even if that meant South Korea acquired nuclear weapons,⁴³ it is doubtful that Washington would support South Korea’s development of nuclear weapons. Meanwhile, South Korea would require several years to acquire nuclear weapons, at least 3-5 according to prominent Harvard Kennedy School nuclear expert Matthew Bunn.⁴⁴ During this period—from a decision to undertake a nuclear weapons program to the actual acquisition of a workable nuclear arsenal—South Korea would be critically vulnerable to North Korea’s nuclear threats. Hence, going nuclear would in fact significantly decrease South Korea’s security in the medium term rather than strengthen it.

In addition, South Korea would incur serious economic costs should it decide to pursue nuclear weapons. The UN Security Council would impose economic sanctions on South Korea, which would damage the country’s highly trade-dependent economy. Moreover, the country’s electricity production would be disrupted. South Korea imports a large portion of low-enriched uranium from the United States to fuel its twenty-four nuclear reactors, accounting for more than 30 percent of the country’s electricity production.⁴⁵ The U.S.-ROK civil nuclear agreement bans the use of U.S.-origin materials for military purposes, a breach of which requires a suspension of any transfer of nuclear materials from the United States to South Korea.

Although the United States is not the only nuclear fuel supplier, it would be difficult for South Korea to purchase nuclear fuels from other suppliers since the Nuclear Suppliers Group (NSG), a multilateral nuclear export control regime, prohibits transferring nuclear materials to states that develop nuclear weapons in violation of the Nonproliferation Treaty (NPT) or do not fully comply with IAEA safeguards. The suspension of the nuclear fuel supply would cause economic

and social chaos in this already energy-starved country. Although the Moon administration has promised to phase out nuclear energy,⁴⁶ South Korea will have to keep relying on nuclear energy until it secures viable alternative sources of energy. Until that point, U.S. leverage over South Korea as a nuclear fuel supplier will remain strong.

Lastly, diplomatic isolation and reputational damage would ensue should South Korea decide to go nuclear. Seoul would have to withdraw from the NPT, which would incur massive diplomatic damage for the country. South Korea's pursuit of nuclear weapons would damage its middle-power prestige, illustrated by its hosting of the 2010 G20 Seoul Summit, and the leadership role it has played in nonproliferation as the second host of the 2012 Nuclear Security Summit as well as the 2016-17 Chair of the NSG. A nuclear South Korea would instead be an international pariah.

Some might hypothesize that South Korea could develop nuclear weapons covertly, but it would be nearly impossible. South Korea is a member of the Additional Protocol to the safeguards agreement with the IAEA, under which all of South Korea's present and future nuclear facilities are placed under international monitoring and inspections. Therefore, Seoul's decision to go nuclear would inevitably bear the above-mentioned costs.⁴⁷

A more rational choice for Seoul seems to be nuclear hedging.

Given such huge security as well as economic costs and risks of nuclear armament, a more rational choice for Seoul seems to be "nuclear hedging." The Moon administration may be pursuing such a nuclear hedging strategy by pushing for the development of nuclear-powered submarines.

Moon's Ambition for Nuclear-Powered Submarines

Moon argued during the April 2017 presidential debate that South Korea should build nuclear-powered submarines to counter North Korea's ability to launch missiles from submarines,⁴⁸ which was demonstrated by its 2016 SLBM test.⁴⁹ The primary rationale for acquiring nuclear-powered submarines is that they can stay underwater longer than diesel-electric submarines and thus are less vulnerable to detection and more capable of stealthily finding and destroying North Korea's nuclear-armed submarines.⁵⁰ Since Moon's inauguration in May, his administration has shown determination to bring this plan to fruition. Moon's Minister of National Defense, Song Young-moo, stated that "[w]e are ready to consider it," referring to nuclear-powered submarines, three days after North Korea's July 2017 ICBM test.⁵¹ The South Korean Navy is believed to be preparing for

a feasibility review for building nuclear-powered submarines, and the Moon administration has notified the Trump administration of the ambition.⁵²

This is not the first South Korean flirtation with nuclear-powered submarines. In the wake of North Korea's January 2003 withdrawal from the NPT, President Roh Moo-hyun approved a nuclear submarine program, based on recommendations from the country's navy, with the goal of deploying them by 2020.⁵³ This plan was named the "362 project" after the date that the project was approved: June 2, 2003. However, the plan came to an abrupt halt after the IAEA learned in 2004 that a few South Korean scientists had conducted an enrichment experiment a few years earlier in violation of its safeguards agreement with the IAEA. With the suspicion over South Korea's ambition to go nuclear mounting, Roh was pressed to abandon the project.⁵⁴ A chief-of-staff and a long-time friend of Roh, Moon seems to have the desire to revive Roh's policies, including the development of nuclear-powered submarines. The fact that Moon appointed Song, a retired navy admiral who was deeply involved in the 362 project, as his defense minister is another signal for his determination to build nuclear-powered submarines.⁵⁵

South Korea has the technical capacity to develop nuclear-powered submarines. The country is the world's fifth largest nuclear electricity producer⁵⁶ and a major nuclear vendor. South Korea is currently building four nuclear power plants in the United Arab Emirates. South Korea also boasts a premier submarine building capacity, which is illustrated by its successful \$1.1 billion bid in 2011 to export three submarines to the Indonesian Navy, beating Russian, French and German companies. The first of the three submarines, a modified version of South Korea's Chang Bogo-class submarine, a diesel-electric attack submarine, was handed over to the Indonesian navy in August 2017.⁵⁷ Although these submarines have a diesel-electric propulsion system, this deal illustrates South Korea's advanced submarine technology. Most importantly, experts believe that the country's military has the capacity to construct naval reactors, small nuclear reactors capable of propelling submarines.⁵⁸ According to Kim Si-hwan, a South Korean atomic energy official who was involved in the 362 project, South Korea had already completed a design for a naval reactor by 2004. A South Korean submarine expert, Moon Keun-sik, suggested that the country has the technology to build a 4,000-ton nuclear-powered submarine. "All that is needed is the government's willingness to kick-start the nuclear submarine project," he said.⁵⁹

Is Moon Pursuing Nuclear Hedging?

From a nonproliferation perspective, Moon's pursuit of nuclear-powered submarines is concerning because it may be an illustration of a nuclear hedging policy.

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Building on the definition initially introduced, nuclear expert Ariel Levite defines nuclear hedging as “a national strategy of maintaining, or at least appearing to maintain, a viable option for the relatively rapid acquisition of nuclear weapons... ranging from several weeks to a few years. In its most advanced form, nuclear hedging involves nuclear fuel-cycle facilities capable of producing fissionable material (by way of uranium enrichment and/or plutonium separation), as well as the scientific and engineering expertise both to support them and to package their final product into a nuclear explosive charge.”⁶⁰

A concept similar to nuclear hedging is “nuclear latency,” which Scott Sagan, a renowned political scientist at Stanford, defines as “a measure of how quickly a state could develop a nuclear weapon if it chose to do so from its current state of technological development.”⁶¹ Nuclear latency is similar to but different from nuclear hedging in that the former merely refers to the *capability* to build nuclear weapons quickly, while the latter refers to such capability combined with the *intention* to do so.

While it is uncertain whether Moon has the intention to leave open the option of developing nuclear weapons by building nuclear-powered submarines (nuclear hedging), the ability to build such submarines indigenously would at least allow Seoul to develop nuclear weapons quickly (nuclear latency). To produce nuclear submarine fuel, South Korea would need to develop the capability to enrich uranium. This would not require weapons-grade uranium highly-enriched to 80 percent or above. (France uses less than 5 percent enriched uranium to fuel its submarines, for example.) However, the same technology used to produce low-enriched uranium can also be used to produce highly-enriched uranium.

Adding to the worry, nuclear materials used in nuclear submarines do not need to be put under international safeguards. The NPT addresses “nuclear weapons or other nuclear explosive devices” and says nothing of nonexplosive uses of nuclear technologies, whether for military purposes or not. The treaty requires IAEA safeguards “with a view to preventing diversion of nuclear energy from peaceful uses to nuclear weapons or other nuclear explosive devices.”⁶² This is interpreted as the NPT allowing for withdrawal of nuclear material from safeguards for nonexplosive military purposes, including for naval nuclear propulsion.⁶³ What this means is that South Korea could divert fissile materials used to propel submarines to produce nuclear weapons covertly. The combination of enrichment capability,

lack of international inspections, a nuclear enemy, and a leaky nuclear umbrella is a recipe for nuclear proliferation. What does this all mean for U.S. policy?

Implications for U.S. Policy

The United States could make it hard for the Moon administration to pursue nuclear-powered submarines. Under the U.S.-ROK nuclear cooperation agreement, most recently revised in 2015, South Korea is not allowed to enrich U.S.-origin uranium without U.S. consent. Although the deal leaves the door open to further negotiation for South Korea to enrich uranium up to 20 percent for civilian purposes, this does not apply to uranium enrichment for military purposes. Moon has stated that he would seek to revise the deal to make it possible for South Korea to develop nuclear submarines.⁶⁴

Technically speaking, Washington's objection would not necessarily proscribe Seoul's development of nuclear-powered submarines. The nuclear deal with the United States bans South Korea from enriching *U.S.-origin* uranium, and does not have authority to prevent South Korea from importing and enriching uranium from other countries in order to fuel submarines. Though perfectly legal, this action would however cause a diplomatic rift with the United States, which would be costly for South Korea. Moreover, the United States could try to block other states from supplying natural uranium. Therefore, U.S. opposition could serve as a stumbling block to Moon's ambition for nuclear-powered submarines.

It is too early to tell where the Trump administration stands on this issue. If anything, the administration has so far reacted positively. After a phone conversation with President Moon in September 2017, President Trump announced that the two leaders reached a "conceptual approval" for Seoul to enhance the capacity of cutting-edge technology weaponry of the South Korean military, which has reportedly been interpreted by Seoul as a green light for the development of nuclear-powered submarines.⁶⁵ According to the South Korean media, during the summit meeting in November 2017, Trump agreed to cooperate with Moon in South Korea's acquisition and development of "state-of-the-art strategic assets," including nuclear-powered submarines. However, it is open to question whether this means the United States will export nuclear-powered submarines or allow South Korea to develop their own.⁶⁶ At this point, it is unclear whether the Trump administration has carefully made a decision. In addition, since a revision of the nuclear cooperation agreement to allow South Korea to enrich uranium for the purpose of building nuclear-powered submarines would require congressional approval, it is far from clear whether Moon's ambition to revise the agreement would materialize even if the Trump administration agrees to do so.⁶⁷

One Step at a Time?

Developing nuclear-powered submarines would at least allow Seoul to achieve nuclear latency.

North Korea's growing nuclear capabilities combined with the shaky U.S.-ROK alliance may spur South Korea to pursue nuclear hedging rather than nuclear armament given the latter's high costs. Moon's ambition to build nuclear-powered submarines may be partially driven by the pursuit of nuclear hedging. Although it is hard to know what his real intention is, developing nuclear-powered submarines would allow Seoul to achieve nuclear latency.

The Trump administration and Congress will have to decide whether to allow Seoul to build nuclear-powered submarines. Allowing Seoul to do so could arguably contribute to the alliance's military burden sharing, which Trump desires. While the United States is having difficulty

in meeting the increasing demand for nuclear-powered submarines due to rising threats from China and Russia, South Korea's development of nuclear-powered submarines could enhance the alliance's anti-submarine warfare capabilities to neutralize North Korea's SLBM threats.⁶⁸

However, such a decision is accompanied by proliferation risks. In its deliberations on an adequate policy toward South Korea's ambition for nuclear-powered submarines, Washington should examine what conditions might spur Seoul to pursue a nuclear option. If Washington desires to prevent Seoul's nuclear hedging or nuclear armament, it should also ponder how to address South Koreans' sense of insecurity. The Trump administration could start by toning down his threats of a preventative strike against North Korea, which would endanger millions of South Korean lives.

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