

Explaining South Korea's Nuclear Debate beyond the North Korean Threat: China's Rise, Demography, and Multipolarity

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Abstract

South Korea's nuclear debate has transformed from a marginal discourse into a mainstream question. This article argues that Seoul's renewed interest in nuclear weapons is best understood against the backdrop of a new security environment, not the North Korean threat alone. A convergence of three broader structural forces encourages the proponents of a national nuclear arsenal: the rise of China as a potential regional hegemon, South Korea's demographic collapse, and the transition from a U.S.-led unipolar system to a multipolar one. China's growing coercive capabilities and the erosion of South Korea's conventional military manpower are making the nuclear option increasingly attractive to Korean elites and the public alike. The article further contends that Washington's changing interests amid intensifying great-power competition and its declining leverage over South Korea create a permissive environment for nuclear ambitions. While a national nuclear deterrent remains improbable in the near term, Seoul's movement toward nuclear latency, and ultimately toward a military nuclear program, appears increasingly plausible.

Keywords: China's rise, Demographic crisis, Multipolarity, North Korea, South Korea's nuclear debate

Introduction

South Korea has seen, in recent years, the remarkable emergence of an intense debate over nuclear military strategy. In January 2023, President Yoon Suk-yeol broke a taboo by warning the country might need its own nuclear arsenal (Kim 2023). Soon after, the Mayor of Seoul, Oh Se-hoon, an influential personality in Korean politics, expressed a similar opinion (Shin 2023). So did Defense Minister Kim Yong-hyun in September 2024 (Gallo and Lee 2024). During the recent presidential campaign, Kim Moon-soo, the defeated candidate from the People Power Party, had vowed to pursue nuclear latency (J. H. Park 2025). The transition to a Democratic government has not ended the nuclear debate, as the new foreign minister, Cho Hyun, quickly called for a national nuclear-powered submarine and a revision of the ROK-U.S. Nuclear Cooperation Agreement (M. Park 2025). This became reality at the October 2025 Gyeongju summit: the United States officially approved South Korea's acquisition of nuclear-powered submarines and pledged support for Seoul's eventual engagement in uranium enrichment and spent-fuel reprocessing for peaceful purposes (S. Kim 2025a).

Public discussions about a military nuclear program were traditionally limited to fringe voices. The topic is now openly addressed in the media and academia, and three-quarters of the population appears to favor developing nuclear weapons (Shin 2024). Koreans' overwhelming sympathy for the nuclear option is transpartisan, with even the firmly pro-American segments of public opinion favoring an independent deterrent (Chung 2024). The nuclear option's popularity holds even when the public takes into account potential costs, such as international sanctions (Lee and Kang 2025). As Victor Cha put it, "if a pro-nuclear consensus took hold among elites, it could all move quickly, because public support is already there" (quoted in Andersen 2025).

Nevertheless, the issue remains poorly studied and ill-understood. International observers often assume it is a mere passing trend, and that a modicum of U.S. intervention would suffice to extinguish it. The

current debate "frames the issue exclusively as an alliance management problem that can be solved by the United States activating the correct combination of carrots and sticks. But this unilateral focus on Washington underestimates the degree to which the region is moving towards multipolarity" and "discounts a broader range of security and status concerns" beyond North Korea (Hynd 2025, 55). Indeed, as this paper argues, the debate over a national nuclear arsenal does not exist in a vacuum, but amid a confluence of the North Korean threat, the demographic crisis, the rise of China, and decreasing American staying power that pushes towards the nuclear option (D. Lee 2025; ROK Forum for Nuclear Strategy 2025).

An independent nuclear arsenal is not the only option competing in the marketplace of ideas. Some would prefer nuclear latency, which would stop short of fielding a working nuclear deterrent. Others are in favor of the redeployment of U.S. nuclear weapons on the Peninsula, an option both less costly and less controversial. However, this piece only addresses the nuclear deterrent option, as it is the one that is most intensely discussed in Seoul and would be the most consequential for the future of Korean and regional security (Phillips 2024; Lami Kim 2024). Also, it focuses only on the issue of developing nuclear weapons, not on the specifics of how many or how they would be deployed. At any rate, delivery platforms are a relative non-issue, since Seoul already possesses a variety of them: ground-, sea-, and air-launched cruise missiles, ballistic missiles (including submarine-launched ballistic missiles), and fighter aircraft that could quickly be repurposed for nuclear delivery.

In this paper, I contextualize the South Korean nuclear debate in light of the many challenges facing South Korea's strategists. Recent developments present the country with both new threats and new opportunities that encourage the nuclear option. The article first describes Seoul's long history of considering the nuclear option and examines the traditional incentives to develop a nuclear arsenal. Historically, North Korea was the key reason to envision a national deterrent. However,

two new challenges are now weighing on Seoul's threat perception. The rise of China's military capabilities and assertiveness has become a growing motive in the debate. South Korean experts and leaders are increasingly concerned about the risk of Chinese regional hegemony and the potential loss of autonomy that would ensue. They see a nuclear arsenal as a possible answer to prevent the country's subjugation to Chinese domination. The demographic crisis is also a growing concern. Many fear that the population decline will make it impossible to maintain Korea's current military force posture, thereby inviting foreign aggression. Therefore, demography has become a significant incentive to develop nuclear weapons, serving as a compensatory measure. In the third part, the article examines the widespread assumption that the United States has sufficient leverage to prevent South Korea from developing nuclear weapons. Indeed, some observers now expect Washington to accommodate Seoul's demands because it needs South Korea's participation to prevail in its intense security competition with China. Also, in a multipolar world, the United States has less relative power and bandwidth to pressure Seoul. Meanwhile, South Korea possesses more bargaining power than it did during the unipolar moment, thanks to America's focus on great power competition, and Korean strategists are also well aware of this.

I. The Nuclear Debate in the Past

Since its founding, North Korea has posed a continuous threat to South Korea's security and survival. This danger falls into two major categories: the long-standing possibility of a conventional invasion and the more recent and rising nuclear threat.

For decades, South Korea's foremost concern was the prospect of a surprise, large-scale invasion reminiscent of the outbreak of the Korean War in 1950. North Korea continues to maintain one of the world's largest standing armies, with perhaps up to 1.2 million personnel. Much of this force is stationed along the Demilitarized Zone, potentially enabling a massive offensive with little warning time (Motin 2020).

North Korea recently gained combat experience in the war in Ukraine and will likely benefit from significant Russian support in technologies and weapons to increase the threat level further (Yoon 2025). Beyond the threat of invasion, Pyongyang has a history of using smaller-scale or terrorist attacks to unsettle the South. Notable examples include the USS Pueblo incident and the assassination attempt on President Park Chung-hee in 1968, the axe murder incident in 1976, the 1983 Rangoon bombing, the sinking of the ROKS Cheonan in 2010, and the shelling of Yeonpyeong Island later that same year.

While these conventional dangers remain, North Korea's nuclear and missile programs have profoundly transformed the inter-Korean balance. Since 2006, Pyongyang has conducted six nuclear tests and has accumulated enough fissile material for a significant number of warheads. Parallel to this, North Korea has rapidly advanced its missile technology, fielding weapons ranging from short-range systems that threaten all of South Korea to intermediate-range missiles that place Japan and U.S. bases in the Pacific at risk and intercontinental ballistic missiles capable of striking the American homeland. To secure its nuclear strike capability, North Korea is now actively developing and building nuclear-powered strategic ballistic missile submarines. Therefore, while the specter of a conventional attack remains ever-present, it is now joined by the unprecedented menace of nuclear weapons. One could imagine scenarios of nuclear coercion or even a conventional invasion preceded by a nuclear strike to debilitate the South. Together, these threats from the North force South Korea to uphold constant military readiness and a strong deterrence posture.

South Korea's first president, Syngman Rhee, lamented his country's lack of nuclear weapons as early as 1954 (U.S. News & World Report 1954). South Korea's interest in developing nuclear weapons grew during the 1970s, when fears of abandonment by the United States loomed large. In the aftermath of the Nixon Doctrine of reduced military commitment on continental Asia (1969) and the withdrawal from Vietnam (1973), Seoul secretly launched a nuclear program in

1974. It sought to acquire a French reprocessing plant capable of producing weapons-grade plutonium. When Washington discovered the plan, President Gerald Ford's administration threatened to terminate the U.S.-Korea security alliance and forced the deal to collapse. Under this pressure, South Korea abandoned its nascent weapons program and ratified the Nuclear Non-Proliferation Treaty in 1975.

Still, the matter resurfaced only a few years later. In 1981, when North Korea broke ground on a plutonium reactor, South Korea again considered acquiring its own nuclear weapons. Although the program was less ambitious than the attempt in the 1970s, President Ronald Reagan insisted it be canceled. He reassured South Korean President Chun Doo-hwan that U.S. troops would remain on the Peninsula indefinitely, which persuaded Seoul to abandon the endeavor (Kim 2001; see also Min 2025). In 1991, President George H. W. Bush withdrew all American tactical nuclear weapons from South Korea, and both Koreas signed the Joint Declaration on the Denuclearization of the Korean Peninsula, pledging not to test, produce, or deploy nuclear arms. Seoul took the agreement seriously, but Pyongyang soon violated it, continuing clandestine nuclear weapons development.

By the 2010s, North Korea's accelerating nuclear program reignited debates in Seoul. After the sinking of the ROK Navy corvette Cheonan and the shelling of Yeonpyeong Island in 2010, public opinion polls began showing rising support for an independent deterrent (Kim, Kang, and Ham 2021). North Korea's third nuclear test in 2013 and the subsequent development of long-range missiles further deepened anxieties. As of today, South Korean authorities believe that North Korea could be producing up to 20 new nuclear warheads per year (AFP 2026).

To deter Pyongyang, successive South Korean governments have reaffirmed the strength of the U.S. alliance, pursued expanded missile defense, conventional strike capabilities, and closer strategic coordination with Washington. Specifically, South Korea came up with its "three-axis system" to compensate for its lack of a nuclear deterrent: (1) Kill Chain

(a pre-emptive strike capability), (2) Korea Air and Missile Defense, and (3) Massive Punishment and Retaliation (Park 2024). The hope is that the ability to strike North Korean command and control and weapons, intercept incoming attacks, and inflict harm on the North Korean state after a nuclear attack will suffice to deter Pyongyang. The issue sharpened again after the 2016–2018 sequence, when Pyongyang tested more advanced nuclear devices and intercontinental ballistic missiles, and war with the United States appeared on the table. Calls grew within South Korea's political establishment for either the return of U.S. tactical nuclear weapons or the development of an indigenous program (Cheong 2023).

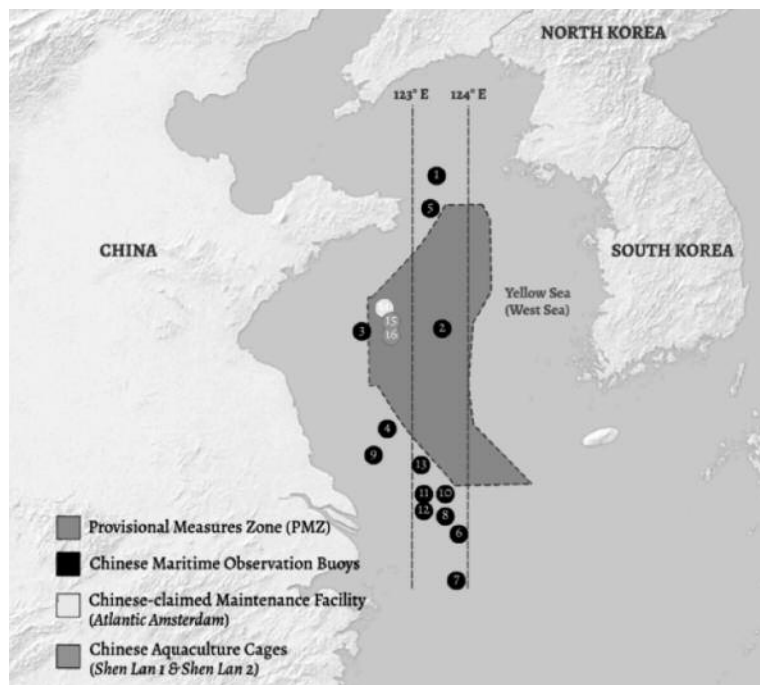
II. China's Rising Threat

Throughout the last three decades, China has modernized its military at a breakneck speed. Its armed forces are now overwhelmingly more potent than those of any of its Asian neighbors, its navy rivals the U.S. Navy, and its nuclear arsenal is growing in both numbers and quality. Not only that, but Beijing has made it abundantly clear that it is dissatisfied with its current borders and the regional status quo.

China's growing power provides South Korea with new incentives to pursue nuclear weapons for three key reasons. First, Beijing's long-term ambition of asserting regional hegemony threatens Seoul's foreign policy independence. A hegemonic China would impose its interests and preferences on Korea, which would likely mean the end of the country's alliance with the United States (Lind 2018). Second, the rise of China poses a threat to South Korea's territorial integrity. Disputes persist over the delimitation of the Yellow Sea's continental shelf and over maritime features such as Gageo Reef and Jeodo Islet. In 2013, China expanded its air defense identification zone to cover Jeodo and wants South Korean naval and coast guard forces to cease operating west of the 124th meridian (Map 1) (Jung 2021; Mastro 2023). Moreover, the Chinese navy and air force have already achieved a clear-cut superiority over the Yellow Sea, where South Korea is

outmatched and outgunned, and on the defensive (Seok 2025). The background noise within China about potential claims to Korean territory further worries Koreans (Committee on Foreign Relations 2012; Lee 2017).

Map 1. China-South Korea Provisional Measures Zone



Source: Jennifer Jun and Victor Cha, "Chinese Buoys Near the South Korea-China PMZ" [CSIS Beyond Parallel], December 15, 2025, <https://beyondparallel.csis.org/chinese-buoys-near-the-south-korea-china-pmz/>.

In Seoul, concerns about China's rise and assertiveness grew in the mid-2010s, but the Park Geun-hye administration (2013–2017) was still committed to improving relations. The deployment of THAAD (Terminal High Altitude Area Defense), an American anti-ballistic missile defense system, in 2016–2017 led to a sharp deterioration in Sino-Korean relations, probably the most serious bilateral crisis since diplomatic normalization in 1992. Beijing rejected South Korean and U.S. claims

that the system was directed solely at North Korea, arguing instead that its radar undermined China's strategic deterrent. It retaliated with a series of unofficial economic sanctions, an early instance in which China came to be perceived as a threat, at least economically, in recent Korean political discourse.

Under President Moon Jae-in (2017–2022), a consensus emerged that China posed a security threat and that Korea should both reinforce its deterrence capabilities and enhance the U.S. alliance. From 2021, Korean officials and documents began expressing concerns about the situation in the Taiwan Strait, which irritated Beijing (Pacheco Pardo et al. 2025). In recent years, China has installed several floating structures in violation of existing agreements in the Provisional Measures Zone in the Yellow Sea, raising concern in South Korea, as they could potentially serve military purposes (Choe 2025; Kwak 2025). In February 2025, South Korea's navy inaugurated a task fleet command at the Jeju Naval Base, a move intended to protect the country's approaches and southern sea lines of communication against growing Chinese pressure (J. N. Park 2025). To justify South Korea's willingness to secure nuclear-powered submarines, President Lee Jae Myung mentioned the threat of Chinese submarines (Kang 2025). On the popular level, too, a large majority of South Koreans have a negative view of Beijing, and over 85% favor siding with the United States over China (Asan Institute for Policy Studies 2025). The perceived Chinese security threat has led many to support joining the US-led Quadrilateral Security Dialogue (Quad) (Fang, Lee, and Li 2024). Symptomatically, growing anti-China sentiment among young South Koreans is leading to a decline in their interest in their western neighbor; fewer students are now taking courses on China, and the number of students studying in China is also declining (Song 2024).

Traditionally, the intense economic relations between Beijing and Seoul encouraged Korea to accommodate China's rise and avoid angering it. Yet, even the alleviating factor of the trade relationship is waning. In December 2023, the Ministry of Trade, Industry, and Energy

announced its '3050 Strategy Initiative,' which aims to secure South Korea's supply chains and reduce raw materials dependence on China to less than 50 percent by 2030. Declining trade complementarity will likely further reduce the moderating effect that trade could have on both Seoul and Beijing (Chung 2025; Easley 2025; Jin 2023).

The war in Ukraine has further underscored the vulnerability of smaller states situated near revisionist great powers dissatisfied with existing borders, a point duly noted in Seoul. Should the United States ever become unable to offset Chinese influence, South Korea could find itself exposed to Beijing's hegemonic ambitions without effective protection. China's growing power brings another danger. For proponents of an independent nuclear deterrent, North Korea could possibly take advantage of a crisis over Taiwan to coerce or even attack the South, as the United States might be too absorbed by the Chinese threat to support Seoul (J. Y. Kim 2025; Richey 2026). Indeed, many in the Korean public associate the rise of China with the risk that the United States will become less able and willing to use military force to defend Seoul (Kim and Jeong 2025).

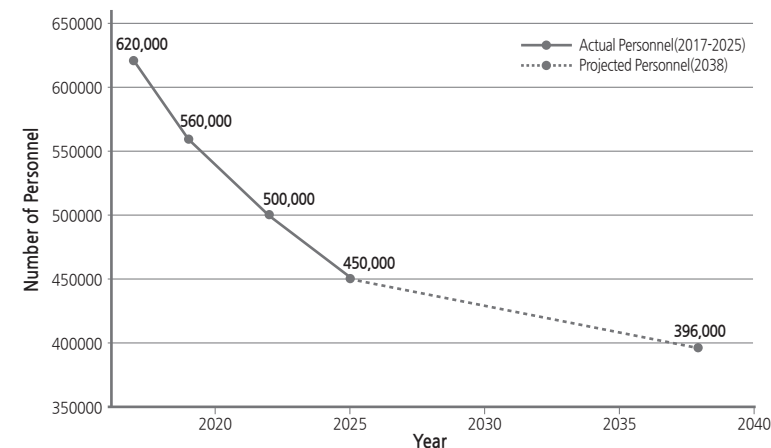
III. The Demographic Disaster

Another key concern among proponents of a nuclear deterrent is that the ongoing demographic collapse renders conventional deterrence and defense increasingly precarious (D. Lee 2025). In 2024, South Korea's total fertility rate stood at a mere 0.75, the lowest among OECD member states (for comparison, France and the United States stood at around 1.6). While the current population of South Korea is 51.2 million, it may fall to 36.22 million by 2072. Worse, the demographic crisis has decreased and will continue to decrease the number of troops able to defend the country.

The military estimates it should have at least 500,000 troops to maintain a strong deterrence posture. The number of conscripts (around half of the total force) could fall from 330,000 soldiers in 2020 to 240,000 by 2036 and 186,000 by 2039. Indeed, in 20 years, only

around 125,000 men will be available for conscription. In 2017, South Korea had 620,000 military personnel, and in 2019, 560,000. This number had decreased to 500,000 in 2022 and to 450,000 in 2025. Some estimates project the ROK military will have only 396,000 personnel by 2038. The army has been especially affected, as its soldiers decreased from 300,000 to 200,000 between 2019 and 2025. Therefore, unsurprisingly, the number of division-level units has decreased from 59 in 2006 to 42 in 2025, with 17 units being disbanded or consolidated. Most worrisome, combat units in the Gangwon and northern Gyeonggi Provinces were particularly targeted for disbandment. In response, in May 2024, President Yoon made the demographic crisis a national emergency. Still, there is no easy or quick fix, and the lack of personnel will be felt for the next few decades, regardless of government efforts and potential future improvements in the fertility rate (Lee 2021; J.

Figure 1. Decline in South Korean Military Personnel



Sources: Chung Min Lee, "South Korea's Military Needs Bold Reforms to Overcome a Shrinking Population," Carnegie, June 29, 2021, <https://web.archive.org/web/20221019023429/https://carnegieendowment.org/2021/06/29/south-korea-s-military-needs-bold-reforms-to-overcome-shrinking-population-pub-84822>; Jeong-hyeon Lee, "Gukgun byeongryeok 45man-myeong-euro jureo... sadangeup isang sip-chil-gae budae sarajyeo [Military Personnel Down to 450,000... 17 Units at or above Division Level Disappear]," Yonhap, August 10, 2025, <https://www.yna.co.kr/view/AKR20250801020500504>. Graph generated by Gemini (2026).

H. Lee 2025; Sharma and Roy 2024). As an expert on the problem notes, “by the 2040s, even maintaining 350,000 troops will be difficult, and that is why we need to establish an optimized manpower structure system ... as soon as possible” (quoted in Yeung and Bae 2025).

The danger posed by the demographic crisis to the inter-Korean balance is obvious. Many doubt official North Korean figures on demographics, as several sources point towards a lower fertility rate than claimed. Moreover, the poor state of public health in the country likely diminishes the number of people effectively able to fight (Jung 2025; J. Lee 2025; Ward 2023). Still, since North Korea’s fertility rate is higher than South Korea’s, over time, the North could slowly close the population gap, thereby altering the balance of power on the Peninsula in its favor. While Pyongyang already has a significant superiority in troop numbers, this gap could grow wider if it maintains its current rate of mobilization (North Korea also conscripts women, which the South does not).

Some would counterargue that South Korea’s shrinking population is not an insurmountable threat, and that a smaller but technologically dominant military can still maintain a robust conventional defense. That is the hope behind the ‘Defense Innovation 4.0’ strategy: to shift from a labor-intensive military to a capital-intensive one, with fewer soldiers and significantly more advanced, expensive technology. Therefore, each soldier becomes capable of performing the work that previously required an entire fireteam. Going forward, autonomous weaponry, robotics, and AI integration could rejuvenate South Korea’s conventional deterrent despite North Korea’s larger headcount (Yoo and Yun 2023). But, as seen in the war in Ukraine, the growth in unmanned systems has not replaced the need for humans; rather, it has shifted the need from combatants to technicians, since these systems require substantial resources for repair, maintenance, and constant software updates (Fried 2025). Until AI progress enables machines to maintain themselves autonomously, massive human effort will remain necessary to defend

Korea’s borders. Moreover, all of this rests on the assumption that North Korea will remain a technological backwater for the foreseeable future. But it is clear that Pyongyang, too, is working hard to keep pace with technological developments and will do its best to either bridge the gap or find alternative strategies. Betting on South Korea’s permanent technological dominance is risky.

Given all that, South Korea is likely to feel increasingly unable to sustain conventional deterrence, and, absent a nuclear arsenal, it will have to rely more and more heavily on U.S. security guarantees. The demographic and military personnel decline is all the more worrying when considering neighboring China’s overwhelming population superiority and its rising regional ambitions.

IV. Multipolarity and America’s Decreasing Leverage

South Korea does not possess a nuclear arsenal today because on both occasions when it attempted to develop one, the United States convinced Seoul to abandon the project. In the early 1970s, Washington withdrew 20,000 U.S. troops from South Korea and called on its Asian allies to shoulder greater responsibility for their own defense. This threatened to leave North Korea with a conventional military edge, prompting President Park Chung-hee to begin a covert nuclear program. Once Washington discovered it, it pressured South Korea to shut it down, leading South Korea to accede to the Nuclear Non-Proliferation Treaty in 1975. Following former President Yoon’s remarks in early 2023, the United States and South Korea issued a declaration reaffirming America’s commitment to extended nuclear deterrence. They also established a new Nuclear Consultative Group that gives Seoul a greater role in American nuclear planning. In 2024, a U.S. nuclear-armed submarine visited South Korea for the first time since 1981.

However, the United States is growing less interested in containing a potential South Korean nuclear program. Washington now sees the U.S.-ROK alliance primarily through the lens of its competition with China, a peer rival, and North Korea is no longer the foremost priority

(Work 2024). The 2025 U.S. National Security Strategy discusses many issues, but not North Korea. Although that does not imply any meaningful policy change in the short term, it is clear that Pyongyang and its nuclear weapons occupy little of the Trump administration's foreign policy bandwidth (White House 2025). But, in regard to China, South Korea matters in several ways. Korea would play a key role in keeping logistical routes to Taiwan, the Pentagon's pacing contingency, open. The large and modern ROK Navy and Air Force could even provide massive reinforcement if Seoul participated in the conflict. South Korea also helps threaten the Chinese navy in the Yellow Sea. Offensively, if Washington wanted to strike the Chinese mainland, the Korean Peninsula would be an invaluable base of operations. Defensively, it is an outpost to protect the Japanese archipelago. Without South Korea on its side, the U.S. presence in Asia would hang by a thread, and Washington would get closer to strategic defeat in the competition with Beijing (Anderson and Press 2025).

Publicly, South Korea has hinted that it would not allow the United States Forces Korea (USFK) to intervene in a Taiwan contingency (Kwon 2024). However, this position is primarily for public consumption and is intended to avoid provoking China. Indeed, contrary to a few years ago, Korean strategists increasingly believe they would be unable to remain idle in the event of a Taiwan contingency. Instead of staying aloof, Korean experts now widely expect the country to serve as a "retrograde and reconstitute" hub for U.S. forces engaged in defending Taiwan, and acknowledge the country would likely provide "rear area support" to the United States (Work 2025). Furthermore, the trend of South Korea joining and supporting U.S. political, economic, and military initiatives to counterbalance China is undeniable (Work 2024).

Looking at the broader picture, Washington must simultaneously contain two revisionist great powers in two regions of the world: Asia and Europe. Moreover, there is no shortage of crises all around the globe. The United States would have minimal bandwidth to focus on countering a South Korean nuclear program, which would be a secondary

concern. Therefore, according to a prominent Korean expert, "if our independent nuclear arsenal aligned with U.S. security interests and came to be perceived as a 'common asset' of the alliance, then the United States may accept it or even support it" (Choi 2024). Indeed, Undersecretary of Defense for Policy Elbridge Colby suggested a nuclear deterrent would be beneficial if it allowed the United States to shift its focus toward containing China (W. Kim 2024). President Trump himself has expressed sympathy for the idea in the past (Flores 2016), and insiders believe he still does (S. Kim 2025b).

Even if the United States were willing to block a future nuclear program, it is unclear whether it could still do so at a reasonable cost. The USFK is a formidable bargaining tool in Seoul's hands, as Korea could impede American strategy toward China. Seoul could also sell its support in a Taiwan contingency in exchange for U.S. acquiescence to a nuclear program. Korea's participation in a war against China matters immensely more to Washington than the potential ripple effects from a nuclear program. Moreover, South Korea is an economic and technological powerhouse, whose engagement on the U.S. side of the fence is crucial for America's vitality. Upholding nonproliferation, a norm of good international behavior, will not take precedence over great power competition. It is thus doubtful that a U.S. president would risk reining in South Korea and losing the entire Peninsula to great power competitors.

Korean experts are well aware that, historically, heavy American sanctions against proliferators have been more closely tied to political rivalry than to proliferation itself (Shim and Kim 2025). U.S. hostility toward the Iranian and North Korean nuclear programs stemmed largely from adversarial relations, not merely the pursuit of nuclear technology. By contrast, when allies such as Britain, France, Israel, and Pakistan developed nuclear weapons, Washington refrained from imposing crippling sanctions, since each was too strategically important to alienate during the Cold War. Indeed, through the AUKUS agreement, Washington is already pushing a key local ally, Australia, toward nuclear power to help contain China's influence. Although the

Non-Proliferation Treaty does not forbid technology transfer for nuclear propulsion, it marks a qualitative shift in the extent to which the United States is ready to support the military efforts of Indo-Pacific allies.

Containing nuclear proliferation is (relatively) easy under unipolarity, as the sole great power can pressure proliferators unimpeded. This is far harder under multipolarity, however, as multiple great powers have a harder time agreeing and coordinating, and proliferators can play one against the other to alleviate pressure (Gheorghe 2019). If South Korea launched a nuclear program and the United States chose to sanction and isolate it, Seoul would have the option to turn to China or even Russia for diplomatic support. Even if such a scenario is unlikely in practice, the mere possibility should deter the United States from sanctioning and abandoning Seoul.

In summary, the United States has never had so little leverage, and yet its interests have never been so aligned with Korea's. All of this is not mere theory. Proponents of a nuclear arsenal in Korea are well aware of this logic, which makes the United States both less likely and less able to block its nuclear ambitions. Pundits often emphasize that Seoul's supposed fear of diplomatic isolation and economic sanctions renders a program improbable; however, Korean security elites view these factors as manageable and are unlikely to be stopped by them, thanks to the new multipolar order and worsening great power competition. Hence, these points have become arguments in the national debate (see, for instance, Kelly and Lee 2024; Lee 2022).

V. Conclusion

The Korean nuclear debate is propelled not only by the traditional North Korean threat but also by the new combination of China's hegemonic ambitions, South Korea's demographic collapse, and the permissive environment of multipolarity. This nexus of factors ensures that the nuclear debate is here to stay and intensify for the foreseeable future. Hence, for policymakers, this suggests that the issue is highly timely; the South Korean nuclear debate is not background noise but a

pressing matter that will likely come to the forefront very soon (House 2025).

One could object that this article did not mention a common point made by opponents of a nuclear program that could scare Korean strategists: the risk of a regional 'nuclear cascade.' As the argument goes, if South Korea develops nuclear weapons, Japan may follow suit. Indeed, some in Japan's Prime Minister Sanae Takaichi's office are already toying with the idea (Kyodo News 2025). But Korean pro-nuclear experts are unfazed by such a prospect. Russia, China, and North Korea all developed nuclear weapons long ago, and Japan did not. South Korea is Japan's sole friendly neighbor. If all its rivals going nuclear did not sway Tokyo, an ROK arsenal is unlikely to be the straw that breaks the camel's back. Unlike Japan, South Korea faces a heightened threat environment where it could suffer a large-scale North Korean invasion. Meanwhile, Japan is relatively free from potential invasions, explaining why the Korean public is far more adamant about acquiring nuclear weapons than Japan's (Kim and Lee 2023). However, it remains a distinct possibility. The Soviet Union's nuclear program encouraged China, China encouraged North Korea, and North Korea is now encouraging South Korea. To that, Seong-Chang Cheong, a prominent advocate of a national nuclear deterrent, responds that a Japanese nuclear arsenal would be a net positive for Korean security. Both countries share fundamental interests, and a Japanese nuclear arsenal could play a key role in keeping Chinese aggression at bay (Lee 2024). Indeed, a growing number of Koreans are open to a Japanese nuclear deterrent, from 9% in 2022 to 35% in 2024 (Park and Jeong 2024). Therefore, this counterargument is unlikely to discourage many in Seoul. The most substantial obstacles to an independent nuclear deterrent are not political or economic but technical and military in nature (Motin 2024).

What will be Lee Jae Myung's nuclear policy? Despite the structural factors underlined here, a full-fledged nuclear weapon program appears unlikely for now, save for an unforeseen major crisis. Instead, in the coming months, Seoul will likely move toward nuclear latency, as some

in the new government have already suggested (Brunnstrom, Ali, and Park 2025). To be sure, Lee and his entourage are far less enthusiastic about a nuclear program than many on the Right. Still, he understands that steps toward a nuclear option would give negotiating leverage over Pyongyang, and make clear to North Korean leaders that excessive aggression could lead to the nuclearization of the South. Moreover, nuclear latency would increase South Korea's bargaining power vis-à-vis the United States and force China to take Seoul's interests more seriously. Lee has already moved South Korea to the edge of acquiring nuclear-propelled submarines and reprocessing capabilities. Moreover, during his recent presidential campaign, Lee consistently emphasized the value of a strong military deterrent, a stance that Democratic governments are often reluctant to take. Democratic presidents also have a history of increasing defense spending to field a military more autonomous from the United States (Kim 2021). Therefore, there is little doubt that Lee Jae Myung will continue to invest in South Korean military capabilities as a means of assurance and leverage against Pyongyang and Beijing. Whether South Korea eventually engages in developing an actual nuclear deterrent will depend on North Korean behavior, the trajectory of Chinese power, and South Korea's perceptions of American commitment and capabilities to defend the alliance.

References

- AFP. 2026. North Produces Enough Nuclear Material a Year for 10-20 Weapons: S. Korea President. *France 24*, January 21. Available <https://www.france24.com/en/live-news/20260121-north-produces-enough-nuclear-material-a-year-for-10-20-weapons-s-korea-president>.
- Andersen, Ross. 2025. The Nuclear Club Might Soon Double. *Atlantic*, July 8. Available <https://www.theatlantic.com/magazine/archive/2025/08/nuclear-proliferation-arms-race/683251/>.
- Anderson, Nicholas D., and Daryl G. Press. 2025. Access Denied? The Sino-American Contest for Military Primacy in Asia. *International Security*, 50(1), pp. 118-151.
- Asan Institute for Policy Studies. 2025. South Koreans and Their Neighbors 2025. April 28. Available https://asaninst.org/bbs/board.php?bo_table=s1_6_1&wr_id=14.
- Brunnstrom, David, Idrees Ali, and Ju-min Park. 2025. Troop Costs, China in Focus when South Korea's Lee Meets Trump. *Reuters*, August 22. Available <https://www.cnn.com/2025/08/23/troop-costs-china-in-focus-when-south-koreas-lee-meets-trump.html>.
- Cheong, Seong-Chang. 2023. *Wae ulineun haegboyugug-i doeoya ha-neunga* [Why We Should Become a Nuclear Power]. Seoul: Medici.
- Choe, Sang-Hun. 2025. China Calls Them Fish Farms. South Korea Fears They Have Another Use. *New York Times*, June 24. Available <https://www.nytimes.com/2025/06/24/world/asia/china-south-korea-sea-dispute.html>.
- Choi, Kang. 2024. Hanguk jache haekmujang gil yeol 'gongdong jasan'non [Opening the Path to South Korea's Own Nuclear Armament: The 'Common Asset' Theory]. Asan Institute for Policy Studies, September 6.

- Chung, Alec. 2025. A Shift in the Trade Structure and its Impact on China–South Korea Relations. *Korean Journal of International Studies*, 23(2), pp. 187-217.
- Chung, Kuyoun. 2024. South Korean Public's Threat Perception of North Korea and Support for the US Extended Deterrence. *Korea Observer*, 55(1), pp. 53-72.
- Committee on Foreign Relations. 2012. *China's Impact on Korean Peninsula Unification and Questions for the Senate*. Washington, D.C.: U.S. Government Publishing Office.
- Easley, Leif-Eric. 2025. 'Getting Asia Right' with a More Strategic US–South Korea Alliance. *Journal of East Asian Affairs*, 38(1), pp. 10-14.
- Fang, Songying, Soyoung Lee, and Xiaojun Li. 2024. A Security–Economics Trade-Off? Public Support for the Quad in South Korea. *Journal of East Asian Studies*, 24(3), pp. 343-363.
- Flores, Reena. 2016. What Donald Trump's 'America First' Vision of the World Looks Like. *CBS News*, March 26. Available <https://www.cbsnews.com/news/donald-trump-america-first-vision-world-election-2016/>.
- Fried, Tsiporah. 2025. The Impact of Drones on the Battlefield: Lessons of the Russia-Ukraine War from a French Perspective. *Hudson Institute*, November 13. Available <https://www.hudson.org/missile-defense/impact-drones-battlefield-lessons-russian-ukraine-war-french-perspective-tsiporah-fried>.
- Gallo, William, and Juhyun Lee. 2024. Under Yoon, Calls for South Korean Nukes 'Normalized.' *Voice of America*, September 9. Available <https://www.voanews.com/a/under-yoon-calls-for-south-korean-nukes-normalized/7777068.html>.
- Gheorghe, Eliza. 2019. Proliferation and the Logic of the Nuclear Market. *International Security*, 43(4), pp. 88-127.
- House, Karen Elliott. 2025. Will South Korea Want a Nuclear Weapon of Its Own? *Wall Street Journal*, September 9. Available <https://www.wsj.com/opinion/will-south-korea-want-a-nuclear-weapon-of-its-own-50949981>.
- Hynd, Alexander M. 2025. Dirty, Dangerous... and Difficult? Regional Perspectives on a Nuclear South Korea. *Journal of Asian Security and International Affairs*, 12(1).
- Jin, Eun-Soo. 2023. Korea to Ease Export Reliance of Key Materials from China. *Korea JoongAng Daily*, December 13. Available <https://koreajoongangdaily.joins.com/news/2023-12-13/business/industry/Korea-to-reduce-import-reliance-of-key-materials-on-China/1934912>.
- Jun, Jennifer, and Victor Cha. 2025. Chinese Buoys Near the South Korea–China PMZ. *CSIS Beyond Parallel*, December 15. Available <https://beyondparallel.csis.org/chinese-buoys-near-the-south-korea-china-pmz/>.
- Jung, Chungjin. 2021. China's Gray Zone Operations in the Yellow Sea. *Security Nexus*, September 30. Available https://dkiapcss.edu/nexus_articles/chinas-gray-zone-operations-in-the-yellow-sea/.
- Jung, Min-ho. 2025. N. Korea Faces Rare Crisis: Low Birthrate, Deep Poverty. *Korea Times*, December 17. Available <https://www.koreatimes.co.kr/foreignaffairs/northkorea/20251217/n-korea-faces-rare-crisis-low-birthrate-deep-poverty>.
- Kang, Hyun-kyung. 2025. Untangling South Korea's Quest for Nuclear-Powered Submarines. *Korea Times*, November 20. Available <https://www.koreatimes.co.kr/foreignaffairs/northkorea/20251120/untangling-south-koreas-quest-for-nuclear-powered-submarines>.
- Kelly, Robert, and Daehan Lee. 2024. Dongmaeng nae haekhwaksan-e daehan miguk-ui seoldeuk gwa gangap mit suyong: Haekmujang yebang-eul wihan miguk-ui dae-hanguk gangap ganeungseong geomto [Suasion, Coercion, and Accommodation by the United States against Allied Proliferation: Will the U.S. Coerce South Korea to Prevent Its Nuclearization?]. *Gukga Jeollyak*, 30(4), pp. 61-94.
- Kim, J. James, Chungku Kang, and Geon Hee Ham. 2021. Fundamentals of South Korean Public Opinion on Foreign Policy and National

- Security. Asan Institute for Policy Studies, September 13. Available https://asaninst.org/bbs/board.php?bo_table=s1_2_eng&wr_id=73&sfl=wr_subject%7C%7Cwr_content&stx=public+opinion&sop=and.
- Kim, Jee Yong. 2025. Daeman haehyeop jeonjaeng mit hanbando jeonjaeng-ui dongsi tto-neun yeonswae balbal si hanmiil gongjo-wa miguk-ui hwaksang-eokjeneun jaktonghal geosinga? [If War Breaks Out Simultaneously or Sequentially in the Taiwan Strait and on the Korean Peninsula, Will U.S. Extended Deterrence and Trilateral Cooperation among South Korea, the United States, and Japan Function Effectively?]. In *Hanguk-ui haekanbo peurojekteu 1: Tangwiseong-gwa chujin jeollyak* [Korea's Nuclear Security Project 1: Justification and Promotion Strategy], ed. ROK Forum for Nuclear Strategy, pp. 201-238. Seoul: Blue & Note.
- Kim, Jeongmin. 2023. Yoon Says Seoul Could Rapidly Acquire Nukes if North Korean Threats Increase. *NK News*, January 12. Available <https://www.nknews.org/2023/01/yoonsays-seoul-could-rapidly-acquire-nukes-if-north-korean-threats-increase/>.
- Kim, Lami. 2021. A Hawkish Dove? President Moon Jae-in and South Korea's Military Buildup. *War on the Rocks*, September 15. Available <https://warontherocks.com/2021/09/a-hawkish-dove-president-moon-jae-in-and-south-koreas-military-buildup/>.
- Kim, Lami. 2024. South Korea's Nuclear Latency Dilemma. *War on the Rocks*, September 19. Available <https://warontherocks.com/2024/09/south-koreas-nuclear-latency-dilemma/>.
- Kim, Seung-yeon. 2025a. S. Korea Gains Momentum on Nuclear-Powered Subs, Civil Uranium Enrichment, Fuel Reprocessing. *Yonhap*, December 17. Available <https://en.yna.co.kr/view/AEN20251215003000315>.
- Kim, Seung-yeon. 2025b. Trump Administration to Stick to Commitment to Offering Extended Deterrence to S. Korea: Ex-Trump Official. *Yonhap*, November 4. Available <https://en.yna.co.kr/view/AEN20251104006300315>.
- Kim, Seung-Young. 2001. Security, Nationalism and the Pursuit of Nuclear Weapons and Missiles: The South Korean Case, 1970-82. *Diplomacy & Statecraft*, 12(4), pp. 53-80.
- Kim, Tongfi, and Do Young Lee. 2023. Continuity and Changes: The Effects of Russia's War against Ukraine on Japanese and South Korean Nuclear-Weapons Discourse. *Nonproliferation Review*, 30(4-6), pp. 265-284.
- Kim, Won-chul. 2024. Elbridge Colby, Advocate of South Korea Going Nuclear, Named Top Pentagon Official for Policy. *Hankyoreh*, December 24. Available https://english.hani.co.kr/arti/english_edition/e_international/1174713.html.
- Kim, Yang Gyu, and Sangmi Jeong. 2025. Preventive Nuclearization: Power Shifts, Anticipated Insecurity, and Public Support for Nuclear Armament in South Korea. *Journal of East Asian Studies*, 25(3), pp. 302-325.
- Kwak, Yeon-soo. 2025. South Korea Condemns China for Installing Unauthorized Structures in West Sea. *Korea Times*, March 25. Available https://www.koreatimes.co.kr/www/nation/2025/03/113_394919.html.
- Kwon, Hyuk-chul. 2024. 'We Must Say No': Seoul Defense Chief on Korean, USFK Involvement in Hypothetical Taiwan Crisis. *Hankyoreh*, April 25. Available https://english.hani.co.kr/arti/english_edition/e_international/1138075.
- Kyodo News. 2025. Japan Needs to Possess Nuclear Weapons, Prime Minister's Office Source Says. December 18. Available <https://english.kyodonews.net/articles/-/67089>.
- Lee, Chung Min. 2021. South Korea's Military Needs Bold Reforms to Overcome a Shrinking Population. *Carnegie*, June 29. Available <https://web.archive.org/web/20221019023429/https://carnegieendowment.org/2021/06/29/south-korea-s-military-needs-bold-reforms-to-overcome-shrinking-population-pub-84822>.
- Lee, Daehan. 2022. The Case for a South Korean Nuclear Bomb. *National Interest*, September 24. Available <https://nationalinterest.org/blog/>

- korea-watch/case-south-korean-nuclear-bomb-204995.
- Lee, Daehan. 2025. Ingujeolbyeok-gwa gun byeongnyeok bujok mit jache haekmujang [The Demographic Cliff, Shortage of Military Manpower, and Independent Nuclear Armament]. In *Hanguk-ui haekanbo peurojekteu 1: Tangwiseong-gwa chujin jeollyak* [Korea's Nuclear Security Project 1: Justification and Promotion Strategy], ed. ROK Forum for Nuclear Strategy, pp. 239-278. Seoul: Blue & Note.
- Lee, Dong-hyeon. 2025. Mi-jung galdeung · han jeochulsan ... 'jache haekmujang goryeohaya' [U.S.–China Conflict, South Korea's Low Birthrate... 'We Should Consider Independent Nuclear Armament']. *The Fact*, April 11. Available <https://news.tf.co.kr/read/ptoday/2196589.htm>.
- Lee, Ha-won. 2024. 'Teureompeu 2-gi ttae hanil dongsi haekmujang haja' [During Trump's Second Term, Let South Korea and Japan Arm Themselves with Nuclear Weapons Simultaneously]. *Chosun*, November 22. Available <https://www.chosun.com/politics/diplomacy-defense/2024/11/22/OLX2L7PB6JHTNAMEPPI62POO4M/>.
- Lee, Jeong-hyeon. 2025. Gukgun byeongryeok 45man-myeong-euro jureo... sadangeup isang sip-chil-gae budae sarajyeo [Military Personnel Down to 450,000... 17 Units at or above Division Level Disappear]. *Yonhap*, August 10. Available <https://www.yna.co.kr/view/AKR20250801020500504>.
- Lee, Jooyung. 2025. The Shadow of Low Birth Rate in North Korea and Its Implications for the Economy. *38 North*, March 7. Available <https://www.38north.org/2025/03/the-shadow-of-low-birth-rate-in-north-korea-and-its-implications-for-the-economy/>.
- Lee, Michelle Ye Hee. 2017. Trump's Claim that Korea 'Actually Used to Be a Part of China.' *Washington Post*, April 19. Available <https://www.washingtonpost.com/news/fact-checker/wp/2017/04/19/trumps-claim-that-korea-actually-used-to-be-a-part-of-china/>.
- Lee, Peter K., and Chungku Kang. 2025. Worth the Squeeze: A Conditions-Based Analysis of South Korean Public Support for Nuclear Deterrence. Asan Institute for Policy Studies, issue brief, May 28. Available https://www.asaninst.org/bbs/board.php?bo_table=s1_1_eng&wr_id=236&sfl=wr_subject%7C%7Cwr_content&stx=nuclear+security&sop=and.
- Lind, Jennifer. 2018. Life in China's Asia: What Regional Hegemony Would Look Like. *Foreign Affairs*, 97(2), pp. 71-82.
- Mastro, Oriana Skylar. 2023. The Next Flashpoint? China, the Republic of Korea, and the Yellow Sea. *Asia Policy*, 18(1), pp. 67-93.
- Min, In Young. 2025. Explaining South Korea's Contrasting Nuclear Choices. *Journal of Asian Security and International Affairs*, 12(3), pp. 389-409.
- Motin, Dylan. 2020. Conventional Balance and Deterrence on the Korean Peninsula. *Jeunes IHEDN*. Available <https://www.jeunes-ihedn.org/2020/conventional-balance-and-deterrence-on-the-korean-peninsula/>.
- Motin, Dylan. 2024. Le débat nucléaire sud-coréen : quelles implications pour la France ? *Cahiers du Comité Asie-Pacifique*, no. 22, pp. 194-196. Available <https://www.jeunes-ihedn.org/2024/cahiers-du-comite-asie-pacifique-n22/>.
- Pacheco Pardo, Ramon, Rei Koga, Bo-jiun Jing, and Eun A Jo. 2025. Beyond Hedging? Japanese and South Korean Responses to US–China Competition. *Asian Survey*, 65(6), pp. 795-799.
- Park, Hwee-Rhak. 2024. A Non-Nuclear US Ally's Nuclear Preparedness Dilemma: South Korea's 'Three-Axis System.' *Defence Studies*, 24(2), pp. 257-276.
- Park, Hyeon-ju, and Yeong-gyo Jeong. 2024. Hanguk jache haekmujang-eul 59→71%... 'Il haekmujang do chanseong' 17→35% [Support for South Korea's Own Nuclear Armament Rises from 59% to 71%... 'Support for Japan's Nuclear Armament' Rises from 17% to 35%]. *JoongAng Ilbo*, October 8. Available <https://www.joongang.co.kr/article/25282741>.
- Park, Joon Ha. 2025. ROK Ruling Party Candidate Kim Moon-soo Embraces Nukes to Counter North Korea. *NK News*, May 9.

- Available <https://www.nknews.org/2025/05/rok-ruling-party-candidate-kim-moon-soo-embraces-nukes-to-counter-north-korea/>.
- Park, Joshua Namtae. 2025. South Korea's New Naval Base Throws a Jab, but Should Train for a Haymaker. *War on the Rocks*, July 17. Available <https://warontherocks.com/2025/07/south-koreas-new-naval-base-throws-a-jab-but-should-train-for-a-haymaker/>.
- Park, Min-hui. 2025. Jo Hyeon: 'Migukgwa hyeobuihae haekchujin jam-suham boyu-wonjaryeok hyeopjeong gaejeong geomto' [Cho Hyun: 'Discussing with the U.S. the Acquisition of Nuclear-Powered Submarines and a Review of Revising the Nuclear Agreement']. *Hankyoreh*, July 17. Available https://www.hani.co.kr/arti/politics/politics_general/1208626.html.
- Phillips, David P. 2024. Nuclear Redeployment: A Roadmap for Returning Nonstrategic Nuclear Weapons to the Korean Peninsula. In *On the Horizon: A Collection of Papers from the Next Generation*, ed. Doreen Horschig, pp. 12-38. Washington, D.C.: Center for Strategic and International Studies.
- Richey, Mason. 2026. Critical Mission Preparedness: The US and North-east Asian Allies in a Dual Taiwan-Korea Contingency. *Issues & Insights*, 26(2), pp. 13-21.
- ROK Forum for Nuclear Strategy, ed. 2025. *Hanguk-ui haekanbo peuro-jekteu 1: Tangwiseong-gwa chujin jeollyak* [Korea's Nuclear Security Project 1: Justification and Promotion Strategy]. Seoul: Blue & Note.
- Seok, Sang Hun. 2025. The Yellow Sea: An Overlooked Geopolitical Hotspot. *RUSI*, January 29. Available <https://www.rusi.org/explore-our-research/publications/commentary/yellow-sea-overlooked-geopolitical-hotspot>.
- Sharma, Abhishek, and Torunika Roy. 2024. South Korea's Declining Demographics: A National Security Issue. *ORF*, November 11. Available <https://www.orfonline.org/expert-speak/south-korea-s-declining-demographics-a-national-security-issue>.
- Shim, Gyu Sang, and Jee Yong Kim. 2025. The Costs of U.S.-Led Counterproliferation Sanctions: Exaggerated Ex Ante Fears vs. Sanction-Imposition Dilemmas. *Gukga Jeollyak*, 31(4), pp. 7-45.
- Shin, Hyonhee. 2023. Exclusive: Seoul Mayor Calls for South Korean Nuclear Weapons to Counter Threat from North. *Reuters*, March 13. Available <https://www.reuters.com/world/asia-pacific/seoul-mayor-calls-south-korean-nuclear-weapons-counter-threat-north-2023-03-13/>.
- Shin, Kyu-Jin. 2024. 72.8% of Koreans Support S. Korea's Nuclear Weapon Development. *Dong-A Ilbo*, February 6. Available <https://www.donga.com/en/article/all/20240206/4731163/1>.
- Song, Esther. 2024. Why Aren't South Koreans Studying in China Any more. *East Asia Forum*, May 24. Available <https://eastasiaforum.org/2024/05/24/why-arent-south-koreans-studying-in-china-any-more/>.
- U.S. News & World Report. 1954. Don't Surrender to the Communists. August 13, pp. 49-50.
- Ward, Peter. 2023. The Other Korean Demographic Crisis: Unmasking North Korea's Population Data. *NK Pro*, June 23. Available <https://www.nknews.org/pro/the-other-korean-demographic-crisis-unmasking-north-koreas-population-data/>.
- White House. 2025. *National Security Strategy of the United States of America*. November. Available <https://www.whitehouse.gov/wp-content/uploads/2025/12/2025-National-Security-Strategy.pdf>.
- Work, Clint. 2024. Under Trump the US-ROK Alliance Will Increasingly Be about China. *Korea Economic Institute*, November 25. Available <https://keia.org/the-peninsula/under-trump-the-us-rok-alliance-will-increasingly-be-about-china/>.
- Work, Clint. 2025. Siloed No More: The U.S.-ROK Alliance and a Taiwan Conflict. Korea Economic Institute of America, special report, March 31. Available <https://keia.org/publication/siloed-no-more-the-u-s-rok-alliance-and-a-taiwan-conflict/>.
- Yeung, Jessie, and Gawon Bae. 2025. As South Korea's Population Falls,

Its Military Is Shrinking Rapidly. Is That a Problem as North Korea Ramps Up Its Forces? *CNN*, August 18. Available <https://edition.cnn.com/2025/08/14/asia/south-north-korea-military-population-decline-intl-hnk>.

Yoo, Kihyun, and Donghwan Yun. 2023. The Conceptual Framework of Korean Defense Innovation 4.0: Transition to High-Tech Army in the Era of 4IR. *Korean Journal of Defense Analysis*, 35(2), pp. 165-188.

Yoon, Dasl. 2025. Kim Jong Un Wants a Military That's More Than Just Nukes — and Russia Can Help. *Wall Street Journal*, September 23. Available <https://www.wsj.com/world/asia/kim-jong-un-wants-a-military-thats-more-than-just-nukesand-russia-can-help-9aa41cd8>.

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