Thinking About the Unthinkable
Examining North Korea’s Military Threat to China

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Abstract

Given the Democratic People’s Republic of Korea (DPRK) and the People’s Republic of China (PRC) partnership spanning for over seventy years, conventional wisdom holds that they are “blood allies.” However, the inherently fragile foundations of the DPRK-PRC alliance are reflected by the PRC stating that it will not allow war or chaos on the Peninsula and will not be coming to Pyongyang’s aid in the case where the DPRK initiates conflict with the ROK.

In a future DPRK contingency where the regime amasses one to two hundred nuclear warheads and carries out a major diversionary attack on the ROK in a time of serious instability, Beijing would almost certainly intervene to secure its national interests. Beijing’s role as a third-party intervener would probably be adversarial against the DPRK. Kim would thus likely worry that any PRC intervention would pose an existential threat and will be prepared to take strong military action against the PRC. With inferior conventional military forces, Kim would almost certainly be forced to confront the PRC with nuclear weapons to deter or defeat PRC intervention.

Analysis of the existing literature and expert interviews revealed that the DPRK’s future nuclear threat towards the PRC is under examined and frequently dismissed. However, given that the DPRK’s missiles are omnidirectional, and with Kim’s heavily xenophobic tendencies, including his fear that Beijing would prefer a pro-Chinese leader of the DPRK, Beijing might not be excluded from the list of Kim’s future nuclear targets.

The dissertation concludes that Kim could decide to threaten nuclear weapon use against the PRC and actually use them if the PRC is not deterred, seeking to avoid a substantial PRC intervention in the DPRK. Furthermore, as the DPRK develops survivable capabilities to manage escalation against nuclear-power adversaries, Kim may become more confident that he could threaten nuclear weapon use and execute it in a limited but very deliberate manner.
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<th>Description</th>
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<tr>
<td>AAA</td>
<td>Anti-Aircraft Gun</td>
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<td>AD</td>
<td>Active Duty</td>
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<td>AOR</td>
<td>Area of Responsibility</td>
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<td>ASCM</td>
<td>Anti-ship Cruise Missile</td>
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<td>ATK</td>
<td>Attack Aircraft</td>
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<td>ATP</td>
<td>Army Tactics Publication</td>
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<tr>
<td>BDE</td>
<td>Brigade</td>
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<td>BRICS</td>
<td>Brazil, Russia, India, China, and South Africa</td>
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<td>BTWC</td>
<td>Biological and Toxin Weapons Convention</td>
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<tr>
<td>CAB</td>
<td>Combined Arms Brigade</td>
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<tr>
<td>CA-BDE</td>
<td>Combined Arms Brigade</td>
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<tr>
<td>CA-BN</td>
<td>Combined Arms Battalion</td>
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<tr>
<td>CBW</td>
<td>Chemical and Biological Weapons</td>
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<tr>
<td>CCP</td>
<td>Chinese Communist Party</td>
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<tr>
<td>CFC</td>
<td>Combined Forces Command</td>
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<td>CMC</td>
<td>Central Military Commission</td>
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<td>CTC</td>
<td>Central Theater Command</td>
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<td>C2</td>
<td>Command and Control</td>
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<td>DDoS</td>
<td>Distributed Denial-of-Service</td>
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<td>DMZ</td>
<td>Demilitarized Zone</td>
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<tr>
<td>DOD</td>
<td>Department of Defense</td>
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<tr>
<td>DPRK</td>
<td>Democratic People’s Republic of Korea (North Korea)</td>
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<tr>
<td>EMP</td>
<td>Electromagnetic Pulse</td>
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<td>ETC</td>
<td>Eastern Theater Command</td>
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<td>FGA</td>
<td>Fighter/Ground Aircraft</td>
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<td>FTR</td>
<td>Fighter Aircraft</td>
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<tr>
<td>KOSPI</td>
<td>Korea Composite Stock Price Index</td>
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<tr>
<td>GDP</td>
<td>Gross Domestic Product</td>
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<tr>
<td>HOB</td>
<td>Height of Burst</td>
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<td>HQ</td>
<td>Headquarters</td>
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<tr>
<td>ICBM</td>
<td>Intercontinental Ballistic Missile</td>
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<tr>
<td>IISS</td>
<td>The International Institute for Strategic Studies</td>
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<tr>
<td>ISR</td>
<td>Intelligence, Surveillance, Reconnaissance</td>
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<tr>
<td>JICM</td>
<td>Joint Integrated Contingency Model</td>
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<tr>
<td>KAMD</td>
<td>Korean Anti-Missile Defense</td>
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<td>KPA</td>
<td>Korean People’s Army</td>
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<tr>
<td>Abbreviation</td>
<td>Full Form</td>
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<tr>
<td>US</td>
<td>United States</td>
</tr>
<tr>
<td>USINDOPACOM</td>
<td>United States Indo-Pacific Command</td>
</tr>
<tr>
<td>USFK</td>
<td>US Forces Korea</td>
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<tr>
<td>WEI/WUV</td>
<td>Weapon Effectiveness Index / Weighted Unit Value</td>
</tr>
<tr>
<td>WMD</td>
<td>Weapons of Mass Destruction</td>
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To my parents, Robert and Eun Kyong who served in US Forces Korea for nearly two decades… and my mother who never let me forget Korean—thank you for inspiring me to pursue this path.

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Summary

Issue

The Democratic People’s Republic of Korea (DPRK) continues to pose a nuclear threat to the United States and its allies in the region. The DPRK’s continued testing and development of increasingly sophisticated ballistic missile systems and nuclear warheads creates geopolitically destabilizing effects in the region. Moreover, the DPRK’s nuclear ambitions have transpired in the backdrop of the US’s strategic competition with the People’s Republic of China (PRC), further complicating the US’s security interests in the region. Given that the PRC shares a seventy-year alliance with the DPRK, conventional wisdom holds that the DPRK and the PRC are “blood-allies,” and this partnership will pose a threat to the Republic of Korea (ROK) and the US. However, the DPRK-PRC alliance is inherently fragile. For example, the PRC has said that it will not come to the DPRK’s aid in the case where the DPRK initiates conflict with the ROK.

In a future contingency, Beijing would likely intervene in any contingency of war or chaos on the peninsula to secure its interests. However, its willingness and ability to do so could be limited if the DPRK has procured one hundred or more nuclear weapons. Further, it is unclear if China has taken Pyongyang’s nuclear weapons threat seriously: **most believe that the regime’s nuclear weapons do not pose a direct threat to the PRC.**

But instability in the DPRK could blossom to the point where leader Kim Jong Un decides to carry out a diversionary major attack on the ROK. North Korea could well use nuclear weapons in such an attack in order to prevent defeat because of its conventional force inferiority. Chinese leader Xi Jinping has promised to intervene in such a case to sustain Chinese security. **Given the DPRK’s xenophobic tendencies, and the fact that the regime may fear that Beijing could try to replace it, Beijing needs to recognize that it could also be subject to a DPRK nuclear strike to counter that intervention.**

Approach

The research for this dissertation is organized into three different sections that examine the logic behind the DPRK’s evolving military threat to the PRC. The underlying scenario is one in which the DPRK launches an invasion into the ROK. Research question one asks if the DPRK could counter a PRC intervention using only
conventional forces, examining the conventional balances of forces between the PRC’s Northern Theater Command and the DPRK’s rear echelon forces using a RAND-developed weapons index methodology. Research question two examines whether DPRK limited strikes on the PRC and/or its forces could counter a PRC intervention, assessing the potential effects of the DPRK’s strike capabilities on bordering PRC military and civilian targets. Research question three analyzes whether North Korean strategic nuclear threats could counter PRC intervention without the PRC executing DPRK regime-ending escalation. It utilizes abstract escalation models, cost-benefit frameworks, nuclear damage assessment models, and nuclear deterrence literature to examine whether the DPRK would be able to influence PRC decision-making and manage nuclear escalation by the PRC. Additionally, these findings are supplemented by interviews with academics, warfighters, and planners in the ROK and in Washington D.C.

Figure S.1. Research Questions

RQ 1: **Conventional:** Can DPRK stop PRC intervention with conventional capabilities?

RQ 2: **Conventional to Sub-Strategic:** Can DPRK stop or delay PRC intervention with conventional or limited nuclear strikes?

RQ 3: **Strategic:**

1. Could the proposed DPRK strategy stop or sufficiently delay PRC intervention?
2. Can the DPRK manage the PRC escalation that could be associated with its threats and execution?

Source: Author

Conclusions

Beijing’s decision of whether and to what degree to intervene in a future conflict involving the DPRK will depend on the type of contingency and the conditions of the
The geopolitical environment at the time. If Beijing fails to support the DPRK, or threatens the regime’s survival, the DPRK and PRC could end up in a military conflict.

The DPRK’s nuclear weapons could deter the PRC from becoming involved in such a conflict. **In particular, the DPRK’s possession of second-strike capabilities (which it may already have) could create an opportunity for Pyongyang to deter Chinese intervention and influence its policies.**

Interviews with warfighters, planners, and strategists in the ROK suggest that while the DPRK’s nuclear threat is passively acknowledged, it is not taken very seriously, especially in the context of Chinese intervention in a future conflict.

**Recommendations**

Focusing on recommendations for the United States and our ROK ally:

1. The Combined Forces Command (CFC) needs to enhance its *integrated conventional/nuclear warfighting capabilities and plans* as the threat evolves:
   a. Enhance active and passive defenses needed to limit risks of damage from nuclear attacks.
   b. *Simultaneously, the United States needs to strengthen ROK assurance of the US extended deterrence commitments, including the “nuclear umbrella.”*
   c. US/ROK military personnel need to receive professional military education (PME) on defending against nuclear weapon employment.
2. CFC needs to **plan to respond to PRC intervention in a future conflict.** These plans should:
   a. Include potential DPRK and PRC nuclear strikes against each other.
   b. Allow assured US/ROK-PRC communications. The ability to coordinate and deconflict could be critical in a future conflict.
3. Include potential nuclear weapon use as a **key topic of discussion in future PRC-ROK-US engagements** and examine ways to limit the likelihood, and consequences of nuclear weapon use.
1. Introduction, Background, and Literature Review

General Aims, Objectives, and Policy Relevance

Motivation

Since the signing of the Armistice Agreement in 1953 by the representatives of the United Nations Command (UNC), the Korean People’s Army (KPA), and the Chinese People’s Volunteer Army, the Korean Peninsula has been separated into two countries.\(^1\) The armistice is only a cease-fire agreement. The two Koreas are still technically at war today. In 1978, the Republic of Korea (ROK) and the US established the Combined Forces Command (CFC) as the binational warfighting headquarters.\(^2\) The combination of the UNC, the CFC, the United States Forces Korea (USFK), and the US’s “nuclear umbrella” for the ROK serve to deter Democratic People’s Republic of Korea’s (DPRK) aggression against the ROK.\(^3\) However, despite the Armistice Agreement and these deterrence mechanisms, the DPRK has conducted numerous provocations over the past seven decades and has apparently developed a fairly large nuclear weapons arsenal.\(^4\)

Although the US military’s conventional forces are far more capable than those of the DPRK, the DPRK’s chemical, biological, and nuclear weapons have given the DPRK means to inflict significant damage on US and ROK forces.\(^5\) The DPRK has declared


\(^2\) The Senior US Military Officer assigned to Korea (SUSMOAK) who is a flag/general officer at the O-10 level, commands the UNC, CFC, and USFK, see: “USFK Combined Forces Command,” accessed May 31, 2020, https://www.usfk.mil/About/Combined-Forces-Command/.


that the US is its “biggest enemy” and is developing intercontinental ballistic missiles (ICBM)s that could be used to attack the US.\textsuperscript{6} Despite decades of efforts to halt DPRK’s development and production of nuclear weapons through sanctions, diplomacy, and negotiations, the United States has failed to stop the DPRK from amassing a sizeable nuclear arsenal that is likely to grow in the coming years. The DPRK’s existing and projected capabilities pose significant security concerns for the US and the ROK.

However, the Korean security dilemma is not exclusively a UNC/CFC/US/ROK problem. The division of Korea, in part, reflects the residual struggle for influence between the US and the communist states during the Cold War. Though the Cold War terminated with the breakup of the Soviet Union, the People’s Republic of China (PRC) continues to support the DPRK, while the US maintains its support and presence in the ROK. Despite maintaining a PRC-DPRK alliance which Mao Zedong once referred to as “lips and teeth,” the partnership, at its core, rests on a foundation of distrust and divergent goals.\textsuperscript{7} The Chinese and Koreans share an uneasy history, riddled with millennia of geopolitical conflict. This dynamic has fed into the modern DPRK security dilemma, which likely contributed to the founding ideologies of the DPRK and the reason for its xenophobic policies.\textsuperscript{8} Moreover, the Kim regime’s goals of survival and regional eminence, coupled with its growing asymmetric capabilities and erratic behavior, pose direct and indirect security threats towards Beijing.\textsuperscript{9}

\textit{Dissertation Objective}

The objective of this dissertation is to empirically analyze the DPRK’s future military threat towards the PRC and assess the extent to which this threat should be of concern to US and Chinese decision makers.


\textsuperscript{7} Mao Zedong called the PRC-DPRK relationship to be as close as “lips and teeth” which refers to the Chinese proverb that if the lips are absent from a mouth, the teeth will get cold. See: Evans J R Revere, “Lips and Teeth: Repairing China-North Korea Relations,” Center for East Asia Policy Studies (The Brookings Institute, November 2019).


\textsuperscript{9} The Kim regime refers to Kim Jong Un, and his lineage of predecessors: Kim Jong Il, and Kim Il Song. Throughout the dissertation, “the regime”, “the Kim Regime”, “Pyongyang” will be used synonymously to refer to the DPRK’s government.
To do so, the dissertation will explore the damage that the DPRK could inflict on the PRC through the lens of various use-case vignettes that involve DPRK use of both conventional and strategic weapons. These use-case vignettes are intended to serve as abstract models to aid strategists in thinking about unconventional security problems on the Korean peninsula. The damages that the DPRK’s weapons could inflict on the PRC in a DPRK contingency and how the DPRK could manage conflict escalations in the future could change Beijing’s perceptions of the military threat posed by Pyongyang. Through a series of military assessments, damage estimates, and discussions of hypothetical escalation vignettes, this dissertation will attempt to demonstrate the implications of future DPRK strategies and related policies for U.S. and Chinese decision makers.

Background and Literature Review

*Failure to Prevent the DPRK from Building Nuclear Weapons*

The DPRK currently wields a varied inventory of ballistic missiles. One source posits that the DPRK has ten to twenty nuclear weapons, with enough fissile material to build 40 to 50 additional warheads. Despite US-led efforts to halt the DPRK’s nuclear program through sanctions, multilateral, and bilateral agreements, the DPRK has sustained its nuclear weapons program for decades. Further, the DPRK has built the industrial base needed to continue expanding its arsenal.

From the Agreed Framework in 1994 to the 2018 Singapore Summit, the US’s bilateral initiatives may have briefly slowed nuclear weapons development but ultimately failed to stop it. Multilateral agreements have not succeeded either. From the first round of Six-Party Talks comprising the US, PRC, DPRK, ROK, Russia, and Japan in 2003, to its

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10 For the purposes of this dissertation, “strategic weapons” is defined to include WMDs (nuclear, biological, chemical), as well as electromagnetic pulse attacks, and cyber.

11 Herman Kahn refers to utilizing abstract models to aid thinking on unconventional nation security, see: Herman Kahn, *Thinking About The Unthinkable*, First Ed. (Avon Library Book, 1962), 127.


final round in 2008, minimal progress has been made in denuclearizing the DPRK.\textsuperscript{14} The US’s binational and multinational economic sanctions have included seven executive orders signed by US presidents and seven statutes (laws) passed by the US Congress, in addition to nine sanctions resolutions passed within the United Nations Security Council.\textsuperscript{15} Despite these concerted efforts, however, the regime managed to continue its nuclear weapons program. Why were these efforts ineffective?

One hypothesis is that the DPRK effectively skirted sanctions through illicit economic activities due, in part, to lax sanctions enforcement, in which China has played a pivotal role.\textsuperscript{16} This has arguably allowed Kim’s regime to continue its nuclear weapons development program. The PRC continues to be the DPRK’s biggest trading partner. Data suggests the Chinese have skirted sanctions to stabilize fuel prices in the DPRK in efforts to maintain domestic stability in the DPRK.\textsuperscript{17} These efforts show just how important DPRK stability is to Beijing.

Despite Beijing’s “three no’s” on the Korean Peninsula (no nukes, no war, no collapse), the PRC’s past actions suggest that Beijing currently places “no-collapse” at the top of their priorities.\textsuperscript{18} Although the PRC voted in favor of placing sanctions against the DPRK during the period of “maximum pressure”, they were also notorious for violating them or otherwise allowing them to be violated.\textsuperscript{19} Case studies of past DPRK provocations and the PRC’s interventions show that Beijing usually enforced sanctions only if they did not


\textsuperscript{16} Stanton, Lee, and Klingner, “Getting Tough on North Korea,” 70.


\textsuperscript{19} “Maximum pressure” refers to US President Trump’s campaign against the DPRK between 2017 and 2019.
directly threaten the stability of the regime and if the DPRK actions were likely to elicit a US military response (see Figure 1.1).\textsuperscript{20}

**Figure 1.1. Dual Threats Model: What Causes PRC to Act on the DPRK?**

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<td>No Threat to Stability in North Korea</td>
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<tr>
<td>Threat to Stability in North Korea</td>
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Source: *Understanding China’s Response to North Korea’s Provocations*, Song 2011\textsuperscript{21}

These actions suggest the PRC ultimately values DPRK’s stability over preventing the DPRK from becoming a nuclear power, in part because Beijing does not believe Kim’s nuclear weapons will be a direct threat to the PRC.\textsuperscript{22}

Arguably, the PRC’s greatest apprehension regarding the DPRK comes from the potential outflow of refugees that could result from a regime collapse.\textsuperscript{23} The growing PRC concerns can be seen by observing Beijing’s actions along the Sino-Korean border.


\textsuperscript{21} Song, 1150.


in the last five years. The PLA has increased its exercises and presence in its Northern Theater Command (NTC) which encompasses the DPRK (and Russia) in its area of responsibility (AOR). Furthermore, the increase in Chinese border defense brigades

Figure 1.2. PLA’s Northern Theater Command and the DPRK

[Image of map showing PLA's Northern Theater Command and the DPRK]

Source: Author’s depiction
Note: The portion of the PRC highlighted in red encompasses the NTC’s AOR

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Adam Mount, “How China Sees North Korea,” The Atlantic, August 29, 2017, https://www.theatlantic.com/international/archive/2017/08/china-military-strength-north-korea-crisis/538344/; Furthermore, the CCP seems to be rethinking their posture on cross-border contingency plans beyond refugee spillover to include nuclear security. In 2016, Pyongyang’s continued nuclear weapons tests triggered Beijing to release an announcement reassuring its people in the Northeastern provinces that that the government did not detect any abnormal traces of radiation from its water tests, see: “Ministry of Environmental Protection Ends Emergency Response to North Korea’s Fifth Nuclear Test, No Indication of Abnormal Radiation Level,” Renmin, September 15, 2016.
along the Sino-Korean border illustrates Beijing’s evolving concerns. Some experts believe the PLA has an operational planning document called the “Chick Plan” which supposedly outlines the PRC’s response to a potential regime collapse.

While the DPRK and the PRC maintain an alliance that is over sixty years old,27 the events leading up to the partnership and its dynamics since have had its share of ups and downs. The alliance was forged as a necessity of the circumstances under which both countries found themselves in after the Korean War.28 The PRC views the DPRK as a geostrategic buffer between the PRC and the US-backed ROK. Moreover, concerns of refugee spillover in a regime collapse scenario have served as a linchpin for Beijing’s obsession on maintaining Kim’s regime stability. However, Pyongyang’s nuclear weapons program has also been an on-going concern for Beijing. Although Beijing has, at times, skirted sanctions placed on Pyongyang, its behavior shifted during the period of “maximum pressure” (in 2017). Relations between the two countries abruptly soured during this period.30


Note: This document is not available in the open source


28 Obe and Byrne.


Furthermore, this shift in behavior revealed many of the underlying cracks beneath the DPRK-PRC alliance. Andrew Scobell summarized the PRC’s concerns about the DPRK by describing Pyongyang as a troubled teenager with self-destructive tendencies living in a decrepit old house with an arsenal of lethal weapons, threatening to damage Beijing’s newly remodeled mansion in a possible confrontation against the US.\(^\text{31}\) As such, Beijing grapples with a dilemma: while it understands that its support for the regime is also inadvertently supporting Pyongyang’s nuclear ambitions, these nuclear weapons could spark a DPRK-US confrontation and start a war.

Further, the DPRK’s distrust of the PRC to protect them demonstrates the fragility of the alliance. Unlike the ROK, the DPRK’s foundational ideology of *Juche* does not allow for any foreign country to protect the country.\(^\text{32}\) The DPRK’s decision to create its own asymmetric capabilities (WMDs, cyber, etc.) further signals its unwillingness to rely on others for its defense.

Although the PRC and the DPRK have resumed their high-level diplomatic talks since 2019, relations between the two countries could sour again. Pyongyang’s efforts to thwart Beijing’s pressures and maintain its independence was made clear in 2017 and 2020. The number of missile tests conducted in 2017 seemed designed to provoke Beijing. In 2017, Kim deliberately timed his nuclear weapons testing to coincide with high-profile PRC events such as the Brazil, Russia, India, China, South Africa (BRICS) summit (held 3 September 2017 – 5 September 2017) and the Belt and Road Forum (held 14 May 2017 – 15 May 2017) in Beijing.\(^\text{33}\) The fragility of the partnership was further illustrated when Pyongyang abruptly shut down the Sino-Korean border during


Note: The BRICS Summit is an annual meeting of five emerging economies: Brazil, Russia, India, China, and South Africa. The Belt and Road Forum is a political and economic summit that hosts leaders of partner nations that are part of the PRC’s Belt and Road initiative to strengthen partnerships and discuss future for development.
the 2020 COVID-19 pandemic despite the action’s crippling effects to its own economy and diplomatic relationship.\textsuperscript{34}

Given the foundational ideological differences that challenge the fundamental notion of trust in the alliance and Pyongyang’s outward demonstration and willingness to defy its “big brother,” events like this are likely to recur.\textsuperscript{35} Moreover, the DPRK’s defiance of the PRC may become more pronounced if the regime reduces its dependence on Chinese aid and increases its arsenal of strategic weapons. This possibility serves as the primary motivation for this dissertation.

Juche and the Bomb

Despite having a treaty that requires the PRC to support the DPRK in the case of an outside attack “by all means at its disposal,” the DPRK still felt compelled to develop nuclear weapons. Article II of the \textit{Treaty of Friendship, Cooperation and Mutual Assistance} of 1961 stipulates that:

\begin{quote}
“The Contracting Parties undertake jointly to adopt all measures to prevent aggression against either of the Contracting Parties by any state. In the event of one of the Contracting Parties being subjected to the armed attack by any state or several states jointly and thus being involved in a state of war, the other Contracting Party shall immediately render military and other assistance by all means at its disposal.”\textsuperscript{36}
\end{quote}

Thus, the DPRK demonstrated that it does not trust the PRC to protect it.\textsuperscript{37} This is partly because the DPRK’s defense doctrine (and strategy writ large) is heavily reliant on the principles of Juche— an ideology that serves as an important foundation to understand the DPRK’s xenophobic policies. Moreover, the idea of self-reliance and its related hyper-nationalistic policies have become congruent with the ideas of regime survival and have driven Kim’s ambitions to develop nuclear weapons.


\textsuperscript{35} The PRC is often referred to as the “big brother” in its relationship with the DPRK.


\textsuperscript{37} Stokes, “North Korea Doesn’t Trust China to Protect It.”
Juche is the fundamental ruling principle of the DPRK, with Kim Il Sung credited as its author. According to the official DPRK state website, Juche is described as the following:

“The Juche idea is based on the philosophical principle that man is the master of everything and decides everything. It is the man-centered world outlook and also a political philosophy to materialize the independence of the popular masses, namely, a philosophy which elucidates the theoretical basis of politics that leads the development of society along the right path. Government of the DPRK steadfastly maintains Juche in all realms of the revolution and construction. Establishing Juche means adopting the attitude of a master towards the revolution and construction of one’s country. It means maintaining an independent and creative standpoint in finding solutions to the problems which arise in the revolution and construction. It implies solving those problems mainly by one’s own efforts and in conformity with the actual conditions of one’s own politics. The realization of independence in politics, self-sufficiency in the economy and self-reliance in national defense is a principle the Government maintains consistently. The Korean people value the independence of the country and nation and, under the pressure of imperialists and dominationists, have thoroughly implemented the principle of independence, self-reliance, and self-defense, defending the country’s sovereignty and dignity firmly. It is an invariable policy of the Government of the Republic, guided by the Juche idea, to treasure the Juche character and national character and maintain and realize them. The Government of the Republic always adheres to the principle of Juche, the principle of national independence, and thus is carrying out the socialist cause of Juche.” 38

Although Juche is widely understood to be a product of socialist propaganda inspired by teachings of Lenin and Marx, it is also uniquely a product of Korean historical context and its resulting norms. Korea’s long history of being a relatively weak country invaded by its powerful neighbors has created the need for self-reliance and resistance from all foreign influence.39 To understand the DPRK’s military thinking, it is important to


understand the foundational impetus that birthed the ideology of *Juche*, and how this principle of self-reliance permeates through DPRK’s policies.

The Historical Traumas that Led to Juche

To understand the complicated geopolitics of the modern-day Peninsula and why *Juche* has become such a central tenet to the regime’s ideology, one must also understand the complicated history that led to its development. Historically, Koreans have developed a “hate-love relationship with China” with their close geographical proximity and intertwined cultural similarities.\(^40\) Korea’s long and complex history is illustrated in the following figure:

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**Figure 1.3. Summarized Chronology of Chinese and Korean History**


\(^41\) Clemens, 27.
Since the “Three Kingdom-Era,” the kingdoms of Shilla, Baekjae, and Gogoryeo heavily interacted with China through trade, cultural exchanges, and battles. After hundreds of years of conflict and redrawing of geopolitical lines, the three kingdoms were eventually consolidated under Goryeo (also spelled Koryo). During this period, Chinese influence of Confucian bureaucracy became the model for Goryeo’s government. Goryeo was eventually replaced by the Yi Dynasty, marking the beginnings of the Choseon Dynasty which lasted until the Japanese imperialism of 1910. Seeing that the Choseon’s military was no match for the Ming Dynasty’s, Yi Song Gye decided to serve China as a tributary state while improving relations with its powerful neighbors. While Yi’s foreign policies improved relations with China and Japan to an extent, the Choseon Dynasty was not exempt from geopolitical conflict with its powerful neighbors. The Kingdom of Choseon maintained its sadae, or “respect for the senior state” for China and accepted its tributary practices. The Kingdom of Choseon also maintained favorable trading partnership with Japan and preserved relative peace on the peninsula.

In 1592, however, Japanese emperor Toyotomi Hideyoshi ordered Choseon to accede to Japanese powers and attempted to utilize Korea as a conduit to invade China. Despite Choseon’s attempt to stop the Japanese, its military was defeated by the Japanese, who fought their way up to the Yalu River. China responded with its own forces, leading Emperor Hideyoshi to discuss peace terms with the Chinese. Emperor Hideyoshi suggested splitting Choseon in two, with the Chinese controlling the North and the Japanese controlling the South. The Chinese declined this offer, causing additional years of proxy warfare on the peninsula. The Japanese retreated in 1597 but peace did not last for long. The Manchus eventually invaded Choseon in 1627 and 1636, requiring them to be its tributary state before going on to conquer Ming China, marking the beginnings of the Qing Dynasty. Once more, Korea had no other option but to yield to its powerful neighbor and become a tributary state.

42 Clemens, 28.


45 Clemens, 30.
Ravaged by the Japanese and Manchu invasions, Choseon became a heavily xenophobic “hermit” kingdom from the mid-seventeenth century to the nineteenth century, prohibiting foreign commerce (outside of China and Japan) and even travel outside of the peninsula. General distrust for foreigners, and concern for powerful foreign influence led to greater seclusion of Choseon from the outside world, though it maintained its tributary relationship with the Qing Dynasty. However, Choseon lost its protection when Qing Dynasty became internally devastated in the mid-nineteenth century by the Opium Wars and released Choseon from its sphere of control.

Despite gaining its independence, poverty, hunger, weak governance, and internal corruption grew rampant in Choseon. It never fully recovered from the constant instability and conflict inflicted by previous invasions. Weak governance within Choseon led to serious problems for the security of the kingdom. In 1894, a group of disgruntled Korean nationalist peasants formed the Tonghak Movement (Eastern Learning Movement) and orchestrated a rebellion against the corrupt Choseon government. Weak and desperate, the Choseon government requested Chinese troops to halt the rebellion. This led to a devastating defeat of the Tonghak Movement. However, the dispatch of Chinese troops to the Korean Peninsula led Japanese forces to intervene to protect their economic interests. This triggered the First Sino-Japanese War, which lasted from 1894 to 1895. Japan emerged as the victor when it seized the royal palace in Seoul on 23 July 1895. Ironically, a Korean-led nationalist insurrection movement to expel foreign entities invited more incursions into the country and further conflict.

After the defeat of China during the First Sino-Japanese War, China’s influence in the region waned as Japan’s grew. Due to Korea’s geographic location between China, Russia, and Japan, and its favorable location as a conduit for trade, the surrounding powers competed to gain influence over Korea. With China no longer being able to be an “older brother” to Korea, and Korea’s debilitated internal government, Korea was left

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46 Clemens, 30.


48 Oh and Hassig, 150.

49 Oh and Hassig, “The Foreign Relations of a Hermit Kingdom.”
even more vulnerable to invasions. Additionally, with foreign political rivalry competing for power, Japan grew increasingly weary of its competitors. At the time, Empress Min (the last empress of Choson) recognized that Russia was Korea’s best chance of fending off the Japanese. Recognizing her alliance with the Russian government, however, the Japanese assassinated Empress Min in October 1895, in an event now known as the Eulmi Incident. Too weak militarily to respond to the assassination of its own queen, the Royal Palace in Seoul could only silently condemn Japanese actions. Subsequently, Japan went on to solidify its dominance in the region after winning the Russo-Japanese War in 1905, in which Korea served once more as its proxy battleground state. Japan colonized Korea from 1910 until 1945.

However, Korea was never fully “liberated” from foreign powers after its release from Japanese colonialism. In February of 1945, US President Roosevelt proposed a four-power (US, Great Britain, Soviet Union, PRC) trusteeship of Korea to Soviet Premier Stalin at the Yalta Conference. Later that year, Korea was divided at the 38th Parallel during the Potsdam Conference separating it into the Soviet-controlled North and the US-controlled South. Kim Il Sung was chosen to lead the North and Rhee Syngman was installed by the US for the South. Despite its “independence” from Japan Korea fell victim to foreign interference again.

China and Korea’s relationship rekindled at the onset of the Korean War when Kim Il Sung asked for the blessings of Beijing and Moscow to invade the ROK. The PRC’s subsequent decision to intervene in the Korean War was a costly one. Approximately 920,000 Chinese soldiers were killed during the conflict. Despite fighting on the same


52 Oh and Hassig, “The Foreign Relations of a Hermit Kingdom.”


side, the PRC shared a rocky relationship with the DPRK during the war. Historical accounts claim that Peng Dehuai, the commanding general of the PRC’s People’s Volunteer Army, ridiculed Kim II Sung for his poor leadership and believed the DPRK was saved by the PRC intervention. Kim was known to be particularly resistant to taking General Peng’s suggestions while ignoring guidance from both Moscow and Beijing despite his dependence on them. Kim’s ill feelings from the relationship even transpired in his subsequent rewriting of the DPRK’s founding history, where he conveniently left out the PRC’s assistance during the war.

The abridged version of Korea’s history reveals the historical trauma that have become the impetus for the DPRK’s hyper-nationalistic ideals promoting self-reliance and thwarting foreign influences. The inherent distrust of foreign powers, and desire for Korea to forge its own way forward as a united country after the Peninsula was divided in half by great powers were important catalysts for the Korean War. At the war’s onset, Kim II Sung and his followers believed that the US’s influence in the ROK was the US’s way of bringing yet another wave of colonialism into the Peninsula. Although Kim II Sung and his party members had to receive the blessings and support of Mao and Stalin to launch his offensive, Kim ultimately viewed them as means to an end—he needed the military and political support to unify the Peninsula, freeing it from foreign powers. Moreover, beyond the promulgation of self-reliance and hyper-nationalistic ideologies, Juche was also a formal rejection of the Sino-centric tributary system that persisted for centuries as the main governing political order in East Asian regional politics.

https://doi.org/10.1080/1043643X.1993.11876905.; Mao Zedong’s son also died during the Korean War: https://nationalinterest.org/blog/buzz/no-dynasty-china-how-maos-son-was-killed-korea-war-147856


Doing Business with “A Thousand Year Enemy”

The DPRK’s history with the PRC and its effect on their perceptions today pose an interesting question about Pyongyang’s ultimate objectives with Beijing. The DPRK sees the PRC as a necessary partner, but also a partner that must be watched with caution. Afterall, China has historically viewed Korea as a client-state and maintained their position of dominance by placing Korea in its tributary system. Given Korea’s limited military capabilities in comparison to China, it had no choice but to embrace its powerful, condescending “big brother” to its north and west. In his list of “final instructions” to his son, Kim Jong Il told Kim Jong Un that their country must distance themselves from the Chinese meddling in their domestic affairs, given that it has "been the country that has made us the most miserable.”

In 2018, a senior Korean Worker’s Party (KWP) official stirred anti-Chinese sentiments (on behalf of the government) in public by stating that though Japan has been the DPRK’s enemy for a century, the Chinese have been their enemy for a thousand years. Despite these comments, however, the DPRK is still heavily reliant on the PRC for economic aid and support.

Experts predicted that the Kim regime would collapse after the failure of its central economy from 1994-1998. This lead to the Arduous March, a famine that caused hundreds of thousands to millions to die from starvation. Relatedly, the survival of the regime raised questions about the amount of official and unofficial aid Beijing gave Pyongyang to prevent collapse. A Congressional Research Service report found that the PRC continues to be the DPRK’s largest contributor in food aid, which is largely unmonitored.

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Note: The Arduous March, also known as the Great Famine, was one of the most tragic human rights catastrophes of the 1990s where the failed central food distribution system in the DPRK caused millions of North Koreans to die.


to be the DPRK’s largest trading partner.\textsuperscript{64} Moreover the PRC has violated many international sanctions placed on the DPRK through illicit trading.\textsuperscript{65} The PRC’s continuous economic engagement and aid are largely motivated by the PRC’s interests in preventing regime collapse.

Beijing’s practice of allowing regional governments and businesses to trade with the DPRK is the main reason why sanctions could be difficult to enforce. The goals of the local commercial enterprises and officials often diverge from the that of the PRC’s central government, and the autonomy given to these local actors have incentivized them to sometimes act in ways that deviate from the central government’s guidance.\textsuperscript{66} For instance, local Chinese merchants may engage in illicit trading activity in Sino-Korean border towns to generate business despite guidance to the contrary from Beijing.\textsuperscript{67} Additionally, the immensely opaque and pervasively corrupt business practices of the DPRK have created an environment that make it nearly impossible for either government to effectively monitor and control market activity across the border.\textsuperscript{68}

When it comes to doing business with Pyongyang, Beijing’s key objective with its economic engagements with the DPRK seems to be preserving the regime.\textsuperscript{69} Beijing has maintained its concerns over the potential influx of refugees and chaos that would

\begin{footnotes}
\item[65] David Brunnstrom, “U.S. Accuses China of ‘flagrant’ N.Korea Violations, Offers $5 Million Reward,” Reuters, December 2, 2020, https://www.reuters.com/article/usa-northkorea-china-idUSKBN28B540. Note: Some trade violations by the PRC are likely state sponsored while others are efforts of individual Chinese entrepreneurs. Given the opaqueness of these trade statistics, it is hard to tell how much trade is attributable to each party.
\item[68] Reilly, “China’s Economic Engagement in North Korea,” 916.
\end{footnotes}
ensue should the regime collapse. Further, the PRC does not want a US-backed, unified Korea on its border. The Kim regime has made the survival and stability of its power to be synonymous with the survival and stability of its country, cautioning PRC leaders that withdrawal of its support could result in a collapse. This Catch-22 alliance has left both countries trapped in a seemingly symbiotic, yet conflict-prone relationship.

Though Beijing’s economic policies may have prevented the regime from failing, some experts claim Beijing’s security policy towards Pyongyang has been a failure. Despite its efforts to preserve the regime, the strategy has not yielded the economic benefits promised to the PRC’s border provinces, did not kindle a major economic reform in the DPRK, and more importantly, it did not restrain the DPRK’s WMD program. Despite its “blood-alliance,” the PRC seems to have limited influence in the DPRK. Further, the partnership may not be as resilient as Beijing wants it to be.

Additionally, the DPRK’s heavy economic dependence on the PRC does not necessarily mean that Pyongyang accepts Beijing’s security relationship—on the contrary, it may motivate Pyongyang to become even more independent. For the DPRK, this could

70 Bruce W. Bennett, Preparing for the Possibility of a North Korean Collapse (RAND Corporation, 2013).

71 Dick K. Nanto and Mark E. Manyin, China-North Korea Relations (Congressional Research Service, 2010), 2.

72 Scobell, “CHINA AND NORTH KOREA.”


76 Stokes, “North Korea Doesn’t Trust China to Protect It.”
mean amassing a strategic arsenal (e.g., larger nuclear weapons) that can thwart the influence of all foreign powers, to include the PRC. Furthermore, Pyongyang has a track record of using its nuclear weapons as part of a two-track diplomacy strategy to gain both political and economic support. For Kim, his strategic weapons are critical to both regime survival and achieving his economic, political, and security objectives.

The Future Military Threat to the PRC

Following the analysis of DPRK-PRC relations, the premise of this dissertation revolves around “thinking about the unthinkable”. Over time, the DPRK’s conventional and strategic weapons could become a security threat towards the PRC. As the PRC works to enhance its position of global influence in the world, and as the DPRK continues to grow its strategic arsenal, Beijing’s security perceptions of Pyongyang could also evolve.

Beijing’s intent to establish itself as the dominant global power is supported by numerous activities it has undertaken at home and abroad to achieve that status. For the purpose of this dissertation, I will side with the “believers” on this debate—Beijing’s goal of attaining its “national rejuvenation” by 2049 will challenge the US’s current position as a global hegemon. Over the years, Taiwan has gathered great interest as a potential collision point between the US and the PRC. A Chinese invasion could lead to a major conflict.

The Korean Peninsula could be another imminent flashpoint for great power conflict. Pyongyang’s ambitions to procure more nuclear weapons and its penchant for taking

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78 “Thinking About The Unthinkable” is the title of a 1962 book written by Herman Kahn, a former RAND researcher and the founder of the Hudson Institute. The book stirred controversy as it suggested the rational prospects of having an “unthinkable” nuclear war and what such conflict could look like.


provocative actions could lead to conflict with the US and ROK. China, while seeking to maintain stability, may feel forced to intervene.

The PRC’s involvement as a third-party intervener (TPI) in a conflict does not seem to be a question of ‘if’, but a question of ‘how’.\(^8^1\) Various DPRK contingencies have been explored in the past, most have dealt with humanitarian/disaster relief, how Beijing may intervene to secure DPRK nuclear weapons, Beijing’s response to a US-nuclear strike against Pyongyang, how Beijing might respond to a DPRK nuclear plant meltdown/disaster, and other indirect nuclear threats towards Beijing.\(^8^2\)

The issue of Pyongyang’s nuclear weapons being a military threat against Beijing has been seldom explored. Moreover, Beijing generally overlooks Pyongyang as a conventional military threat, let alone as a nuclear one.\(^8^3\) However, this could be a result of the Chinese failing to address a situation where “the most obvious time [the] Chinese might become a target for the North” which is when Beijing moves forces into the DPRK in a contingency.\(^8^4\)

While a future where Pyongyang would utilize its nuclear weapons, or even threaten its usage against Beijing may seem improbable now, circumstances could change over time. With the PRC trying to rise to a position of global primacy, its position could be undermined if a kinetic conflict (let alone a nuclear one) were to break out on its border.\(^8^5\)

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\(^8^1\) CFC US Planners, in-person interview, May 2022.


\(^8^3\) A public opinion poll sponsored by the Genron NPO (a nonprofit, independent think tank based in Japan) found that only 10.3 percent of Chinese felt the DPRK to be a military threat. See: “The Japan-China Joint Opinion Survey 2019” (The Genron NPO, October 24, 2019), https://www.genron-npo.net/en/opinion_polls/archives/5505.html.


\(^8^5\) Perspective on PRC’s evolving DPRK policy as it relates to Beijing’s rising status as a great power, see: Kim Heung-kyu, “China’s Evolving North Korea Policy,” *Institute for Security & Development Policy*, Perspective & Analysis, April 2020, 8.
Pyongyang’s weapon tests during Beijing’s Brazil, Russia, India (BRI) and BRICS summits in 2017, in addition to Kim ordering the public execution of his uncle Jang Song Thaek and his brother, Kim Jong Nam, who were known Chinese-sympathizers, displayed the regime’s defiance against Beijing. Moreover, the use of a nerve agent to kill Kim Jong Nam showed the regime has little regard for conventional norms of behavior. Having a defiant Pyongyang embarrass its ‘older brother’ in such a public way, may become less acceptable over time if Beijing’s takes steps towards positioning itself as a global hegemon. Moreover, as the DPRK expands and develops its nuclear arsenal (among other strategic weapons), Pyongyang may become more assertive. Therefore, the implications of having an increasingly defiant Pyongyang may have important implications for regional security and a threat to Beijing’s power.

The fact that the DPRK has continued procuring nuclear weapons well beyond the levels needed to defend itself creates important security challenges. Pyongyang has made its willingness to use nuclear weapons as a last option they have very clear.


87 Jake Maxwell Watts, Yantoultra Ngui, and Jonathan Cheng, “Role of VX Nerve Agent in Kim Jong Nam’s Death Raises Global Alarm,” Wall Street Journal, February 25, 2017. Note: The use of VX nerve agent which is considered a chemical weapon, raised alarms about the DPRK’s willingness to deploy WMDs in future conflicts.

88 On Beijing’s political culture of ‘saving face’ see: “Saving Face from China’s New Nationalism: Pride, Politics, and Diplomacy on JSTOR,” accessed February 17, 2021, https://www.jstor.org/stable/10.1525/j.ctt1pq06f.5?Search=yes&resultItemClick=true&searchText=saving+face&searchUri=%2Faction%2FdoBasicSearch%3Fquery%3Dsaving%2Bface%26acc%3Don%26wc%3Don%26fc%3Don%26group%3Dnone%26refreqid%3Dsearch%253A4ec9cc880391ef75171318a11f05b181&ab_segments=0%2Fbasic_search_solr_cloud%2Fcontrol&refreqid=fastly-default%3A8e834e9343e756c55e1d27cba4f0b560&seq=1#metadata_info_tab_contents.

89 Bennett et al., “Countering the Risks of North Korean Nuclear Weapons,” 84.


Though the DPRK’s opaque nuclear strategy seems to be focused mainly on defense and demonstrating its capabilities, its stated ambitions to create tactical weapons (if they do not exist already) seem to indicate that the DPRK may include nuclear weapons in offensive as well as defensive operations. Moreover, if the DPRK can create second strike capabilities (assured retaliation), develop robust nuclear command, control, and communication (NC3) structures, while developing warheads of varying yields and missiles of different ranges, Pyongyang could have a better ability to coerce, or even compel its opponents to achieve their political and military objectives.

Although Beijing and Pyongyang may have the same security objectives for now, their reasons for having these objectives are fundamentally different—ultimately, each country has very different ambitions for the region. Pyongyang does not likely see Beijing as its “brother” or “blood-ally” but rather as a temporary means of support. The DPRK is not the PRC’s puppet state, and on the contrary, Pyongyang has gotten Beijing to provide the economic aid needed to ensure regime survival, while allowing the DPRK to build nuclear weapons. Pyongyang will likely continue to try to gain what it needs from Beijing to accomplish its long-term ambitions. Though Pyongyang has publicly stated that its nuclear weapons are to defend the country against the ROK, Japan, and the US, these seem to be intermediate goals to ensure regime survival and maintain Beijing’s backing. In the long-term, Pyongyang desires to establish itself as a formidable regional power that can thwart all foreign powers. A comparison of the DPRK and the PRC’s intermediate and long-term geopolitical goals are as follows:

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### Table 1.1 Comparison of DPRK and PRC’s Goals

<table>
<thead>
<tr>
<th></th>
<th>Intermediate</th>
<th>Long-term</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>DPRK</strong></td>
<td>- Economic stability needed for regime survivable and developing strategic weapons</td>
<td>- Reunifying the Korean Peninsula under Pyongyang’s leadership</td>
</tr>
<tr>
<td></td>
<td>- Decoupling the US-ROK alliance</td>
<td>- Having enough strategic weapons to thwart all foreign influence</td>
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<td></td>
<td></td>
<td>- Eminence as regional superpower</td>
</tr>
<tr>
<td><strong>PRC</strong></td>
<td>- Preserving DPRK regime</td>
<td>- Peaceful reunification of the Korean Peninsula</td>
</tr>
<tr>
<td></td>
<td>- Reducing US military presence on the Peninsula, eventually decoupling the US-ROK alliance</td>
<td>- Having a unified Korean government that is pro-Beijing</td>
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<td></td>
<td></td>
<td>- Having a unified Korea in its sphere of influence</td>
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<tr>
<td></td>
<td></td>
<td>- Denuclearization of the Peninsula</td>
</tr>
</tbody>
</table>

Source: Author’s analysis

Pyongyang’s hyper-nationalistic, xenophobic ideologies are likely to guide their foreign policy. The regime is likely to expand their nuclear weapons arsenal to further their goals. Moreover, Pyongyang will likely continue to try to maintain support from Beijing by noting the threat of instability if their needs for economic and political assistance are not met.

Henceforth, Beijing seems to be stuck in a dilemma: by prioritizing stability of the regime, its actions are inadvertently allowing the DPRK regime to continue building its nuclear weapons, which could ultimately pose a threat to the region and Beijing.\(^9^4\) Equally important, however, is that if the PRC fails to work towards DPRK denuclearization, the US could decide to bolster its military presence in the ROK (or worse, take military action).\(^9^5\) Conversely, Beijing’s increased cooperation with


\(^9^5\) In addition to bolstering US-ROK bilateral military exercises, the US could also add military capabilities in the Peninsula to respond to DPRK’s provocations—this would be concerning for the PRC. For
Washington could cause the regime to collapse, creating a unified Korea under the US’s sphere of influence.

As the PRC desires neither outcome, the PRC’s future strategy on the Peninsula will likely remain unchanged—it will continue to provide the DPRK with economic assistance while conducting periodic diplomatic engagements to reaffirm their bilateral partnership, and somehow *hoping* for a denuclearized DPRK in the future.96

On the other hand, Beijing’s approach may conflict with its objective of achieving global primacy. For instance, US acceptance of the DPRK as a de facto nuclear weapons state could bolster the DPRK’s status in the region, limiting Beijing’s leverage over Pyongyang. Additionally, the acceptance of the DPRK as a nuclear weapons state would encourage countries like Taiwan, the ROK, and Japan to develop their own, independent nuclear forces. Less dramatically, the US could also shift its policy focus from DPRK denuclearization to DPRK arms control, necessitating enduring US military cooperation with its regional partners, which is also an unfavorable outcome for the PRC.97 Therefore, Beijing’s traditional approach of doing little to promote DPRK denuclearization may not serve it well in the long run.

There is evidence, however, that there may be a slight shift in Chinese thinking on the issue. In 2017, Chinese historian Shen Zhihua criticized Beijing’s DPRK policy by stating that the objectives of the two countries are fundamentally at odds with one another—the PRC wants stability while the DPRK wants to challenge the regional status quo with its nuclear weapons.98 In the past, the Chinese state media censored anti-

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96 According to an interview with an officer with the USFK J5, the PRC appreciates a certain degree of USFK presence in the ROK as it provides a stability piece for maintaining status quo on the Peninsula and containing some of the DPRK’s provocations.


DPRK sentiments from the public Chinese forum. Therefore, the publication of Mr. Shen’s comments is particularly interesting as it signals the Chinese Communist Party’s (CCP) willingness to spotlight a challenging view. Moreover, the CCP seems to understand that their policy of the three ‘nos’ on the peninsula hinges on DPRK’s denuclearization at its core.\(^9\) In September 2015, PRC’s foreign minister Wang stated, “without...denuclearization, stability on the Peninsula and peace in Northeast Asia will be hardly attainable.”\(^10\) Ultimately, having an independent DPRK armed with nuclear weapons could challenge the regional balance of power in ways unfavorable for the PRC.\(^10\)

The remainder of this dissertation will empirically explore whether the DRPK may become a military threat to the PRC through the usage of abstract models aided by hypothetical contingency vignettes, comparative assessments on current and projected military capabilities, and analyses of both traditional and contemporary nuclear deterrence theory as it applies to the DPRK contingency. These abstract models will examine the ability for the DPRK to threaten the PRC with conventional military assets, assess how a limited/unlimited conflict may unfold using nuclear forces (among other WMDs), analyze those escalation dynamics, and explore their related policy implications. “Thinking about the unthinkable” vignettes in which the DPRK’s conventional and strategic weapons could threaten the PRC is an important exercise in challenging the conventional wisdom about how a future conflict would progress.

Moreover, while the notion of DPRK’s nuclear weapons posing a threat to the PRC is an unpopular view among many Chinese-North Korean scholars, the abstract models provided in this dissertation are designed to confront such normative thinking on the issue. Although the DPRK currently has far more limited nuclear and conventional strike capabilities than the PRC, it could acquire capabilities that could allow it to badly damage Chinese forces and assets. Further, the DPRK does not necessarily have to achieve nuclear parity to achieve its political and military objectives.

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As a disclaimer, this dissertation is not meant to predict the outcome of a conflict between the DPRK and the PRC. Rather, the intent is to analyze the implications of the use of conventional and nuclear weapons in a contingency involving the DPRK, ROK and PRC in which nuclear deterrence fails and the DPRK engages in a limited, or even an unlimited war against its adversaries.

Setting the Stage: A Hypothetical DPRK Contingency

Borrowing from Herman Kahn’s language in *Thinking About the Unthinkable*, “if we believe a war to be possible (not probable—possible) …” strategists should consider hypothetical conditions for how a war could start, escalate, and eventually terminate under various circumstances to construct strategies that will prevent them.102

In this scenario, we postulate that an ultra-progressive ROK president is elected in 2027. He immediately tries to improve relations with the DPRK, pursuing a peaceful coexistence dialogue that leads to the signing of a treaty between the two countries, ending the Korea War of the 1950s. Consequently, the legal justification for the CFC and broader USFK presence in the ROK have been placed under scrutiny. Meanwhile, the ROK and US have been at a diplomatic impasse for close to two years after numerous failed talks to renegotiate the Special Measures Agreement (SMA) which expired in 2025.103 As a result, more than half of the local South Korean employees employed at various US military installations have been furloughed or terminated, causing many of them to quit and find employment elsewhere. Without the local hires to provide critical manpower, ROK-USFK bilateral exercises have been cancelled. Furthermore, with continued birthrate decrease concerns, stagnant economic growth,

102 During the Cold War, Kahn proposed various plausible scenarios in which a war may have initiated between the US and the Soviet Union. Kahn characterized the groups of escalation rungs as the following (between the US and the former Soviet Union):
1. Very Tense Crisis — Inadvertent War
2. Very Tense Crisis — Soviet Union Calculated Strike
3. Very Tense Crisis — US Calculated Strike
4. Normal Situation — Inadvertent War
5. Normal Situation — Soviet Union Calculated Strike
6. Normal Situation — US Calculated Strike

103 Renegotiating the SMA was a topic of contention between the ROK and US during the Trump administration, see: Kyle Ferrier, “A Day Late, But Not a Dollar Short: The New U.S.- Korea Burden-Sharing Agreement,” *Korea Economic Institute of America* (blog), March 18, 2021, https://keia.org/the-peninsula/a-day-late-but-not-a-dollar-short-the-new-u-s-korea-burden-sharing-agreement/.
and relatively amenable ROK-DPRK relations, the ROK President faces political pressure to cut defense spending as part of a "peace dividend" to support domestic needs. At home, the US faces political pressure to scale back its troop presence in the ROK given tense bilateral relations and domestic pressure to refocus US assets to deter the PRC, while preparing to defend Taiwan in the wake of an invasion.

The PRC is pleased with its Korea policy as it long supported an end-of-war declaration and a reduction of the US military presence. Moreover, despite the DPRK’s alarming number of nuclear warheads, Pyongyang has made it clear that they are only for strategic deterrence of the US, ROK, and Japan.

The PRC continues to urge peaceful dialogue between the DPRK-ROK by doubling down on their no-war policy on the Korean Peninsula. Still, President Xi perceives the need for greater Chinese influence over Peninsular affairs. But disgruntled by continuous Chinese interference in the Korean bilateral dialogue, Kim has largely ignored communiques from President Xi regarding Korean matters.

The new ROK president knows that the DPRK has shown signs of instability and wishes to avoid regime collapse at all costs. He sends considerable "humanitarian" aid to North Korea, though the US and other countries object to some of these supplies, which contravene UN sanctions. Kim Jong Un recognizes the ROK President’s willingness to compromise, and therefore requested bilateral reunification talks, to which the ROK President agreed.

Although Korean bilateral reunification talks initially appeared promising, disagreements on governance structure, economic cooperation, and integration have resulted in a diplomatic impasse. Frustrated by unproductive talks and the unwillingness of the ROK government to agree to DPRK conditions, Kim begins slowly and covertly to prepare for military operations against the ROK. The DPRK is even moving around ballistic missiles which may have nuclear weapons, trying to coerce the ROK to concede to DPRK demands on the reunification front.

The DPRK knows that its conventional forces will be no match for the ROK’s, even with a weakened CFC force. Therefore, Kim understands that his offensive against the ROK

104 The ROK’s low birthrate is also a concern for the ROK Ministry of National Defense due to the conscription laws of eligible men necessary to fulfill its military readiness, see: Elizabeth Hervey Stephen, “Policy Concerns of Low Fertility for Military Planning in South Korea,” East-West Center 102 (November 2011): 8.

105 From President Xi’s three ‘nos’ one of them is no war/chaos on the Korean Peninsula.
needs to be both limited and will likely need to be nuclear. However, the detonation of any nuclear weapon on the Peninsula will almost certainly precipitate Chinese intervention, and this is something Kim must prevent at all costs because the Chinese will likely not be coming to Kim’s aid. Kim will therefore need to carefully manage escalation against Beijing by making credible threats to deter their intervention while avoiding escalation into the nuclear threshold against them.\(^{106}\) Fundamentally, this means that Kim seeks to destroy key ROK military strengths and force the ROK to accept a ceasefire in 2 days (by threatening nuclear attacks on ROK cities), hoping to end the conflict and thereby preempt any PRC intervention, even if it begins. He is hopeful because PRC doctrine says that the PRC should “...not overdo the degree of force in war, and not take as primary threatening of the adversary’s survival...”\(^ {107}\)

The PRC receives information that the DPRK may be planning a large-scale artillery attack on the ROK. The PRC immediately sends a communiqué to the DPRK to halt any further military preparations, but Kim does not respond. Fearing US military involvement and the possibility of war on the Peninsula, President Xi orders PLA troops in the NTC to prepare to secure DPRK nuclear warhead storage sites and seize missile transporters. Meanwhile, the PLA border defense brigades along the Sino-Korean border prepare for a DPRK contingency (e.g., refugees, nuclear contamination), and the Northern Theater “mobile” People’s Armed Police (PAP) divisions deploy for “exercises” near the Sino-Korean border. President Xi also orders the People’s Liberation Army Air Force (PLAAF) and People’s Liberation Army Rocket Force (PLARF) units to prepare to strike North Korean nuclear weapon and ballistic missile storage sites.

Kim believes that Beijing’s intends to destroy the DPRK’s nuclear weapons and missiles used to deliver them. Despite the PRC’s written doctrine that they will focus on destroying military assets versus the adversary’s government, a desperate and fearful Kim fears that Beijing may try to overthrow the regime. Kim wants to limit the conflict to the DPRK and ROK, deterring foreign intervention. Recognizing the PRC threat, Kim orders infantry units in the rear echelon and the mechanized infantry divisions in the mid-echelon to move toward the border to prevent the Chinese forces from entering the country.\(^{108}\)

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\(^{106}\) How the DPRK may manage escalation with the PRC will be explored in research question three (chapter four) of this report.


\(^{108}\) This hypothetical contingency scenario is a fictional product of the author’s making, and by no means serves as a prediction for future events. Some events in this fictional scenario were inspired by true events that have occurred on the Korean Peninsula in the past.
2. Research Question 1: Conventional Military Balance Assessment

Can the DPRK stop the PRC’s intervention with its conventional forces?

Intent of Research Question

The first research question is intended to serve as a strawman. Most experts would agree that the PRC’s conventional military forces are vastly more numerous and more capable than those of the DPRK. The intent of this question is to analyze the difference in magnitude of military effectiveness between the DPRK and PRC’s conventional forces, namely its ground forces and supporting air and sea support capabilities. If PRC conventional forces really are significantly superior to DPRK conventional forces, as expected, the DPRK would not be able to stop a PRC intervention in North Korea with its conventional forces. The DPRK would have to have alternative means.

Background

PLA’s Ground Forces (PLAA) in the Northern Theater Command (NTC)

The NTC headquartered in Shenyang is doctrinally tasked with various contingencies surrounding the PRC’s northeastern borders to include Mongolia, Russia, and the DPRK. As mentioned earlier, the NTC also has the option to draw additional support from the Central and Eastern Theater Commands (CTC, ETC) as well as its paramilitary and reserve troops in times of emergencies. Given the geographic proximity of the CTC and ETC, to the NTC and the DPRK, operational units from these theater commands would ostensibly be able to deploy even on short notices.
The PRC's NTC ground forces consist of the 78th Group Army, the 79th Group Army, and the 80th Group Army. Each Group Army consists of roughly six combined armed brigades (various compositions of light, medium, and heavy brigades), a special operations brigade, an army aviation brigade, an artillery brigade, an air defense brigade, as well as an engineering and logistics brigade that provide support functions. The combined arms brigade (CA-BDE) is the PLAA's basic operational unit and is comprised of different types of mechanized, motorized, and armored combined arms battalions (CA-BN) depending on whether the unit is designated as a light, medium, or heavy brigade.

Estimates for the calculations were based on available open-source reports and advice from subject matter experts (SMEs). Support functions such as engineering, reconnaissance, and logistics units were not counted in the overall effectiveness measures since they do not directly contribute to the firepower totals.

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109 The calculations considered the PLA's latest ground force modernization efforts in 2017. Personnel organization estimations were aggregated from various expert sources and were estimates as of August 2021.
KPA Ground Force (KPAGF) in the Rear Echelon

Despite having 1.2 million active-duty soldiers and 7.7 million in its reserves, the DPRK’s military is largely inferior qualitatively to that of its neighbors. The training and management of the DPRK’s conventional military has stagnated since the 1990s, and much of its equipment, which was manufactured between 1950 and 1970 is functionally obsolete.¹¹⁰

The KPA ground force (KPAGF) positions approximately 70 percent of those forces along the demilitarized zone (DMZ), leaving the northern region sparsely covered. Furthermore, the poor quality of its road network could limit the movement of forces.

Figure 2.2. KPAGF’s Northern Echelon Forces

Methodology

To quantitatively assess the effectiveness of the respective forces, the total military effectiveness indexes were scored individually for the PRC’s NTC ground forces and the DPRK’s rear echelon forces. These indexes are unitless values that provide rough approximations for the destructive capability of each country’s conventional ground forces when their equipment and weapons systems are measured in aggregate. In this methodology, the effectiveness scores of each weapon system was taken from a list of established indexes derived from the Joint Integrated Contingency Model (JICM). JICM is an outgrowth of the RAND Strategy Assessment System (RSAS). The JICM ground order of battle scores approximately 700 unique weapon types that fall into fourteen different classes.\(^{111,112}\)

For weapons systems not listed in JICM database, approximate values were assigned based on their age, technology, utilization, and how they compared to the existing weapons systems. Other factors, such as equipment maintenance and conditions, were also considered. Given these realities, their affiliated weapons system indexes were discounted as appropriate. Additionally, soldiers assigned to special operations forces (SOF) were scored higher than regular infantry soldiers as they were assumed to be more capable.

To score the effectiveness of each country’s ground forces, the number of weapons, types of weapons, and personnel were aggregated from various tables of organization and equipment (TO&E) from open-source literature, as shown in Figure 2.3.

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\(^{111}\) Index based assessments have been criticized for being too linear and failing to account for important factors such as the quality of the intelligence available to the force, command, control, and communications, and troop morale. As these factors would favor the PRC, the results presented may understate their advantage.

\(^{112}\) Charts available in Appendix A.
The 2021 and 2020 publications from the US Army’s ATP were utilized to gather TO&E data for the PRC and DPRK ground forces.\textsuperscript{113} Those values and weapons systems were then validated with equipment data published by the International Institute of Strategic Studies (IISS) in their 2021 Military Balance +. After aggregating the number and type of weapons from these sources, each system was given a score from the JICM indexes. Weapon quantities were multiplied by the JICM index to provide a total raw score for that system. Those system scores were then aggregated across the unit to yield a total effectiveness score for the unit. Finally, the unit-level effectiveness scores were grouped across its affiliated regional commands to generate an estimated national military effectiveness score for each country.

Analysis

The PLAA’s NTC aggregate JICM index is much higher than the KPAGF’s rear echelon forces at both the regional aggregate and at the operational-unit levels.

Given the DPRK and PRC’s differing ground force organizational structure, several operational-level details had to be extrapolated separately in addition to creating side-by-side comparisons of aggregate measures. Ground force units of each country had to be calculated at the aggregate regional levels, then reexamined at the appropriate operational levels (i.e., brigade) from those regional aggregates.

The KPAGF’s regular infantry corps are organized into infantry divisions, armored brigades, artillery brigades, light infantry brigades, and river crossing regiments. The KPAGF’s mechanized infantry divisions (formerly corps-structure) are very similar in terms of size and equipment, but the squads would ride in armored personal carriers or infantry fighting vehicles.\textsuperscript{114}

Conversely, the PLAA’s military is structured at the group and the brigade levels instead of corps or division-level. The PLA’s Group Army evolved from its traditional corps-structure and now serves as the PLAA’s operational-level organization. Although this new structure still allows the PLA to retain its traditional corps-level capabilities, the new group structure allows for the armies to operate with greater flexibility and provides the

\textsuperscript{113} Army Techniques Publications ATP 7-100.2 and ATP 7-100.3 were mainly utilized. Other open-source publications and subject matter experts were consulted in addition to the ATPs. Special thanks to Mr. Dennis J. Blasko and Dr. James M. Minnich for additional data and insights on the PRC and DPRK’s military.

\textsuperscript{114} Headquarters, Department of the Army, “ATP 7-100.2 North Korean Tactics,” Army Techniques Publication (Headquarters, Department of the Army, July 24, 2020), 68, https://fas.org/irp/doddir/army/atp7-100-2.pdf.
ability to task-organize. Additionally, the group army is not likely to be employed as an operational unit, but rather as a force pool from which different operational units such as the CA-BDEs can be taken. The combat power of each group army comes from its six CA-BDEs aided by an artillery brigade, air defense brigade, aviation brigade, SOF brigade, engineer brigade, chemical defense brigade, and various support brigades.

To demonstrate how the two countries’ operational units compare, comparable unit level analysis was conducted at the brigade-level for both countries. To do this, composition of equipment and personnel were assessed at the comparable unit-levels. As brigade-level units provide the main combat power for both armies, the composition of equipment and personnel were examined at that level for both countries. Three types of brigades were analyzed: motorized, mechanized, and armored infantry brigades. Additionally, equipment measurements for each type of brigade (classified as motorized, mechanized, and armor, respectively) were categorized into five different components: armor, anti-tank, artillery, air defense, and infantry as shown in Table 2.1. Separating the type of equipment into different categories made it easier to compare the type of equipment and capabilities of each unit.

PLA units are superior to the KPAGF in almost all brigade and equipment types. The only exception was the KPAGF’s infantry values in its mechanized brigade, which was higher than that of the PLAA. This is because the KPAGF unit has more soldiers than its PLAA equivalent.

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115 Headquarters, Department of the Army, “ATP 7-100.3 Chinese Tactics” (Headquarters, Department of the Army, August 2021), 36, https://armypubs.army.mil/epubs/DR_pubs/DR_a/ARN33195-ATP_7-100.3-000-WEB-1.pdf.


117 Types of weapons aggregated for each category can be found in Table A.1 of Appendix A of this dissertation.
Table 2.1 Brigade-Level Score Comparisons by Equipment Type

<table>
<thead>
<tr>
<th>Equipment Type</th>
<th>DPRK (Motorized)</th>
<th>DPRK (Mechanized)</th>
<th>DPRK (Armored)</th>
<th>PRC Combined Arms (Motorized)</th>
<th>PRC Combined Arms (Mechanized)</th>
<th>PRC Combined Arms (Armored)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Armor</td>
<td>20</td>
<td>130</td>
<td>190</td>
<td>270</td>
<td>880</td>
<td>1340</td>
</tr>
<tr>
<td>Anti-tank</td>
<td>10</td>
<td>70</td>
<td>6</td>
<td>120</td>
<td>120</td>
<td>70</td>
</tr>
<tr>
<td>Artillery</td>
<td>30</td>
<td>170</td>
<td>80</td>
<td>90</td>
<td>250</td>
<td>180</td>
</tr>
<tr>
<td>Air Defense</td>
<td>10</td>
<td>90</td>
<td>30</td>
<td>90</td>
<td>110</td>
<td>80</td>
</tr>
<tr>
<td>Infantry</td>
<td>110</td>
<td>290</td>
<td>70</td>
<td>230</td>
<td>210</td>
<td>160</td>
</tr>
<tr>
<td>Total</td>
<td>180</td>
<td>750</td>
<td>376</td>
<td>800</td>
<td>1570</td>
<td>1830</td>
</tr>
</tbody>
</table>

Source: Author's calculations
Note: The index values are unitless

The PLAA’s light, medium, and heavy CA-BDEs have more modern, sophisticated weapon systems. The aggregated JICM indexes describe the quality and quantity of the weapons systems.

Aggregate effectiveness scores are shown by brigade type in Figure 2.4. The PLAA’s JICM index was more than four times greater than the KPAGF in the armor brigade category, roughly twice the mechanized brigade, and almost five times greater for a motorized brigade. To further illustrate the quality disparity of the weapons technology sample comparisons of common ground force weapons systems are presented below:
A detailed comparison of the quantity and quality of PRC vs. DPRK tanks, and the relative effectiveness their tank battalions is shown in Figure 2.5. Note that PLA scored significantly higher than the KPAGF in all three categories.
The aggregate combat power of available PRC and DPRK forces is shown in Figure 2.6. The PLA forces in the NTC outperformed the KPAGF’s rear echelon forces by more than double in the aggregate JICM index. Two different estimates were calculated for the DPRK—the high estimate reflects the aggregate measure of the rear echelon without discounting the quality and quantity of their weapons systems. The low DPRK estimate discounts the value to account for posturing, obsolescent equipment, and other factors.
Although the PLA in the NTC outperformed the KPAGF’s rear echelon by a wide margin, the comparison may underestimate PLA strength while overestimating DPRK strength due to data limitations. PLA TO&E data is difficult to find, while DPRK forces suffer from training and support shortfalls that could render them less effective than indicated.

**Qualitative Comparison of PLA and North Korean Air and Naval Forces (Regional)**

In lieu of a quantitative comparison of the PLA and the KPA’s Air Force, this section of the research will focus on their qualitative comparison. This approach was chosen mainly because the KPA lacked even the basic equipment inventory in their Air Force and Navy needed for a meaningful comparison.

**The PLA Air Force (PLAAF) and PLA Navy (PLAN):**

The NTC has two air bases with subordinate brigades, an unnamed air base, a Theater Air Force HQ (standard for all PLA theaters), and an Air Force Special Mission Division.\(^{118}\) Although these PLAAF units are assigned to the NTC, the PLAAF assets located in the PRC’s CTC, and ETC could also easily be deployed during emergencies.

\(^{118}\) The NTC also has a search and rescue (SAR) brigade and a flying academy. However, for purposes of this research question, non-kinetic aviation units were not considered.
given their geographic proximity to the DPRK. The primary basing locations are shown in Figure 2.7.

**Figure 2.7. Primary PLA Navy and Air Force Locations**

![Map of Primary PLA Navy and Air Force Locations]

Source: Allen et.al, Journal of Strategic Studies (2021)

*The KPA Air Force (KPAAF) and Naval Forces (KPAN)*

The KPAAF and KPAN are significantly smaller than its ground forces. The KPAAF has a total of 120,000 active-duty personnel supporting approximately 1,600 aircraft. They have no reserve forces. The KPAN is even smaller with approximately 60,000 personnel and no reserve forces. Most of the KPAAF’s current aircraft inventory consist of Soviet and Chinese designs from the Cold War-era. Their most ‘modern’ fighter is the MiG-29, a 1970s design. As of 2001, an analyst estimated that there are roughly 360 ships operated in the KPAN’s West Fleet (Yellow Sea), but this vessel

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119 Headquarters, Department of the Army, “ATP 7-100.2 North Korean Tactics.”

Note: Personnel estimates provided by the Department of the Army and IISS are incongruent.


inventory may have attritted since due to lack of maintenance and funds.\textsuperscript{122} The KPAN also lacks any real major surface combat ships.

According to \textit{Military Balance+ 2021}, the KPAAF has approximately 401 fighters and 80 light bombers.\textsuperscript{123} Sanctions against the DPRK have limited their ability to import aircraft parts forcing them to cannibalize aircraft for parts. These shortfalls may have greatly reduced the number of aircraft that are operational. Further, the average DPRK pilot trains for 30 hours a year due to fuel constraints. In contrast, the average PLAAF pilot flies approximately 150 hours per year while an US Air Force pilot flies at least 200 hours per year.\textsuperscript{124} This lack of training could greatly reduce pilot effectiveness.

Further, the KPAAF does not employ unmanned air vehicles (UAVs) though it is developing them.\textsuperscript{125} However, early reports suggest these systems are not very advanced.\textsuperscript{126}

\begin{flushleft}

Note: A follow-up with Mr. Bermudez revealed that although inventory have likely attritted since 2001, the approximations are still roughly true for 2021.

\textsuperscript{123} Haena Jo, “Flying against the Odds.”

Note: 2020 white paper estimates from the ROK Ministry of Defense approximated KPAAF’s aircraft inventory at 1,580 versus its 1,640 estimates from 2018.

\textsuperscript{124} Haena Jo.

Note: 150 hours is a rough estimate for the average PLAAF pilot. Elite PLAAF pilots participating in “Golden Helmet” may train more than 200+ hours a year. While training hours for US Air Force pilots can vary widely by plane and program, an average fighter flies approximately 200 hours per year.


\end{flushleft}
According to the ROK’s 2020 Ministry of National Defense (ROK MND) White Paper, the KPAAF has five flight divisions, one tactical transport brigade, two air force sniper brigades, and various air defense units under the Air and Anti-Air Force Command. The KPA has subsequently positioned its forces into four different zones, with approximately 40 percent of its fighter jets in the forward-positioned south of the Pyongyang-Wonsan line. As shown in figure 2.8, the KPAAF’s assets are heavily centered around Pyongyang.

**Air Force Comparison:**

The KPAAF pales in comparison to the PLAAF in both equipment and personnel. The KPA prioritizes their military concentration on their ground forces and focuses mainly on the threat coming from the South. The inventory comparison shown below does not discount combat effectiveness of the KPA’s equipment. Limited satellite imagery and open-source intelligence has made it difficult to gauge the attrition rate of the KPA’s

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aircraft and naval vessels. However, the KPAAF and KPAN have refocused their efforts to procure more jamming capabilities, UAVs, and SAMs to offset their limited airpower capabilities—these capabilities are very limited.

Figure 2.9 provides a comparison of the KPAAF’s total inventory with the PLAAF’s NTC regional total. The PLAAF operates far more third, fourth, and fifth generation fighters.\textsuperscript{128} The KPAAF has more first and second-generation fighters, which have very little capability are unlikely to play a meaningful role in a conflict. This comparison may overstate KPAAF capabilities due to the parts and training shortfalls noted earlier.

The PLAAF has far more sophisticated aircraft in the NTC, to include the J-20, the PRC’s fifth-generation stealth aircraft.\textsuperscript{129} In comparison, the DPRK’s “newest” aircraft is the MiG-29 Fulcrum, a Soviet-designed fighter from the 1970s, of which the KPAAF has only eighteen. Given these quantitative and qualitative factors, it is safe to say that the PLAAF’s NTC likely has air dominance over the entirety of the KPAAF.

\textsuperscript{128} The PLAAF has and is in the process of transitioning out its second-generation aircraft.

\textsuperscript{129} The PLAAF classifies their fighter aircraft differently than the rest of the world. In the PLAAF, the J-20 is considered fourth generation.
The KPA Navy (KPAN):
The KPAN is the smallest branch of the KPA, with only 60,000 active-duty personnel. Most of the KPAN fleet consists of aging small patrol craft carrying various missiles, torpedoes, and guns. Due to their inferior surface warfare weapons, however, the KPAN has focused on increasing their submarine fleet. It mostly operates as a coastal defense force and due to constraints in their equipment and personnel, and their capabilities are limited to short-term offensive and defensive operations.

The KPAN consists of a headquarters, two fleet commands, sixteen squadrons, two naval sniper brigades, and coastal defense units scattered along the Western and Eastern coasts. The KPAN has the West Sea Fleet and the East Sea Fleet, with approximately twenty major and minor bases split between the two fleets (figure 2.10 highlights the major bases). Like the KPAAF, the KPAN also relies on outdated equipment. While most ships are Soviet and Chinese designs from the 1950s, its small patrol crafts were developed domestically.

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130 Headquarters, Department of the Army, “ATP 7-100.2 North Korean Tactics,” 60. See also: “Chapter Six: Asia,” 276.

Of the approximately 810 to 990 naval vessels the KPAN operates, roughly 360 of them are in the West Fleet. The West Fleet has five naval squadrons and a coastal missile regiment. All five naval squadrons (11th, 12th, 8th, 9th, and an unnumbered naval squadron) are purposed for surface combat. As the geography could force ships moving from one coast to another to traverse ROK-controlled waters, only KPAN assets in the West Sea Fleet were considered. Thus, 36 percent to 45 percent of the total KPAN inventory will be assumed to belong to its Western Fleet.

The PLAN dominates the KPAN. Like the KPAAF, the KPAN also suffers from aging weapons systems and equipment shortfalls. The KPAN operates mostly as a coastal


133 According to SME interviews, although assets could theoretically move between the two fleets, the cost of logistics and time will likely not allow for sharing of assets between the two fleets.

134 Estimate provided by SME interview.
patrol force, although it has conducted provocative actions such as the sinking of the ROK warship Cheonan.\textsuperscript{135}

While the KPAN is geographically constrained, the PLAN can move ships from both the North Sea Fleet and the East Sea Fleet thanks to their proximity to the Yellow Sea. Moreover, the PLAN has a sizable aircraft fleets that can augment their existing maritime capabilities—the KPAN, on the other hand, does not have any naval aircraft.\textsuperscript{136} Further, the PLAN has a sizeable surface to air missile (SAM) capability—again, the KPAN does not.\textsuperscript{137}

As shown in Figure 2.11, an aggregate country comparison shows that the PLAN’s total for key naval vessels far outnumbers the KPAN’s total in all cases but submarines.\textsuperscript{138}


\textsuperscript{136} PLAN’s North and East Sea Fleet naval aviation inventory available in Appendix A.

\textsuperscript{137} The PLAN was on high alert in 2017 during the height of Kim’s missile tests. This shows that the PLAN is likely integrated in the NTC’s broader plans for a DPRK contingency, see: Kristin Huang, “Chinese Navy Keeps Firm Focus on Northern Shores as North Korean Tensions Rise | South China Morning Post,” South China Morning Post, September 7, 2017, https://www.scmp.com/news/china/diplomacy-defence/article/2110233/chinese-navy-keeps-focus-northern-shores-north.

That same year, the PLA conducted exercises shooting down “incoming missiles” over the skies of Bohai Bay (body of water between the PRC and DPRK). These exercises seem to suggest that the PLA has thought about direct, missile threats from the DPRK, see: Lo, “China ‘Shoots down Missiles’ in Drill in Waters Close to North Korea,” South China Morning Post, September 5, 2017, https://www.scmp.com/news/china/diplomacy-defence/article/2109907/china-shoots-down-incoming-missiles-during-exercise.

\textsuperscript{138} PLAN’s country total is an aggregate of its Northern Sea Fleet, Eastern Sea Fleet, and Southern Sea Fleet.
Despite the KPAN’s fleet size, its capabilities and operational readiness are very limited. Most of KPAN’s fleet relies on 1960s systems. Further, approximately ten percent of the KPAN’s surface fleets are out of commission due to engine or hull repair, while another ten to twenty percent are stored on land. Furthermore, the stored fleet requires additional maintenance before it can be used—this is particularly true for some of the KPAN submarines in bunkers. In the event of conflict, the KPAN only has limited capability to conduct short-duration offensive and defensive operations.

Due to its operational limitations, the KPAN has focused on submarines. Although submarines can provide surprise salvo attacks, their weapons capacity limits them to relatively small attacks.

139 “Janes: Korea, North - Navy.”

140 “Janes: Korea, North - Navy.”

Most of KPAN’s common attack submarines, such as the Sang-o and Romeo class, are inferior to the PLAN’s attack submarines due to their outdated technology, age, and likely poor maintenance. The Sang-O and Romeo Class submarines are representative of a bygone era of submarine technology, with much of its capabilities predating the Cold War.

The primary fleets of interest are the PLAN’s Northern and Eastern Sea Fleet and the KPAN’s West Sea Fleet. Again, the PLAN has a geographic advantage of having two of its three major naval fleets near the Yellow Sea. The KPAN, on the other hand, must divide their naval forces into two fleets to operate on both coasts, limiting their capabilities in an already constrained force.

Furthermore, experts believe that approximately 47 percent of the KPAN’s total maritime assets are in the West Sea Fleet while the remaining 53 percent are in the East Sea Fleet. However, satellite imagery suggests that there may be proportionally fewer submarines in the West Sea Fleet. As submarines provide the KPAN’s main maritime combat capability, this distribution further limits the effectiveness of the force. The calculation resulted in the comparison shown in Figure 2.12:

According to the Nuclear Threat Initiative, the KPAN has approximately 20 Romeo class submarines and 40 Sang-Os.


Assuming a contingency scenario, the immediate forces of interest are the prepositioned forces that can be readily deployed to the Yellow Sea.

Estimates from Joseph Bermudez
Only key maritime vessels were considered. As TO&E data was not available for the KPAN’s West Fleet as it was for the PLAN’s North and East Sea Fleet, the author halved (approximately 47 percent) the capabilities of the KPAN’s principal surface combatant and mine warfare inventory totals to provide rough estimates for the West Fleet.146

Conclusions of Research Question One

The PLA’s NTC military is far more effective than the KPA’s northern echelon forces across all services.

Ground force calculations showed that the PLA’s conventional military is significantly more capable than the KPA’s rear echelon forces.147 Further, the PLAAF and PLAN equipment inventories are larger and more sophisticated than those of the KPAAF and the KPAN. The PLA would dominate on both quantity and quality of forces even when paramilitary and reserve forces are included. The PLAAF and PLAN are also far better...

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146 The KPAN’s West Sea Fleet submarines were counted separately because of available open-source data. The principal surface combatant hull classifications for this research question were the following: FFG, CV, CGHM, DDGHM, DDGM, FFGH. Also, the estimates above completely omit the PLA’s coast guard inventory.

147 The PLAA’s geographic proximity to the DPRK border is also an operational advantage for the PRC.
trained. Further, the PLA has the geographic advantage of being able to shift forces from nearby theaters. As a result, the DPRK rear echelon forces do not stand a chance when compared to a well-resourced and trained PLA military in the NTC.

DPRK limitations in other areas, such as intelligence, surveillance, reconnaissance (ISR), early warning capabilities, communications, maintenance, and base infrastructure are also important. These factors are critical to battlefield effectiveness but difficult to capture in simple indices. Doing so would further advantage the PRC.

Poor road infrastructure also limits the effectiveness of DPRK forces. “According to South Korea’s Statistics Korea, North Korean roads, as of 2019, were 26,180 kilometers in length, about 23 percent of South Korea’s. Except highways, less than 10 percent of roads are paved in the North, and most of the main roads have two lanes or less.”

Most of the paved roads are concentrated in the south and near Pyongyang. This limits the DPRK’s ability to rapidly move troops in the northern part of the country. The KPAGF’s 425th and 108th mechanized infantry divisions would have to move 150 km on mostly unpaved roads through mountainous terrain with limited fuel to get to the PRC-DPRK border. These units are equipped with hundreds of aging, poorly maintained vehicles. The poor condition of the vehicles and limited road network would severely limit their ability to move rapidly in a future conflict.

Further, the PRC supplies most of the DPRK’s crude oil imports. The PRC has provided electricity to the DPRK via its grid. In a conflict, the PRC will likely target DPRK fuel distribution and electricity generation systems supporting troop movement. Given the DPRK’s dependence on the PRC for energy, the KPA would likely not be able to carry out a protracted conventional conflict.

In summary, the DPRK would therefore not be able to stop PRC intervention in the DPRK using just DPRK conventional forces.

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3. Research Question 2: Limited Focused Conventional Strike Options and Limited Nuclear Strike Options:

Can the DPRK stop or delay PRC intervention with conventional or limited nuclear strikes?

Intent of Research Question

In this section, I examine the damage the DPRK can inflict with its conventional artillery systems and what Kim Jong Un calls “sub-strategic” nuclear weapons (tactical nuclear weapons). This is important in understanding the type of escalations Kim would be able to use to prevent or stop PLA intervention, and how these limited strike options could ultimately lead to the use of nuclear weapons. If Kim were to launch any kind of limited attack against the PRC or its forces, he would expect serious PRC retaliation. Whether Kim might be able to manage such escalation with the PRC will be examined in research question three.

Analysis: Conventional Strike Options

The DPRK might consider threatening and perhaps executing two kinds of limited conventional weapon attacks to prevent or stop PRC intervention in the DPRK: A cost imposing attack aimed at the Chinese population, and a denial attack aimed at stopping or seriously slowing PRC intervention. I provide one example of each.

An Artillery Attack on a Chinese City

Dandong is the closest Chinese city to the Sino-Korean border in the southeastern Liaoning province. Within Dandong, the target of interest for this study’s artillery calculation is the Zhenxing District, which shares an immediate border with the DPRK.\(^{151}\)

The artillery systems in the KPA’s rear echelon consist of both self-propelled and towed artillery systems. The rear echelon operates 122-mm and 152-mm self-propelled howitzers. These are considered medium range artillery with “fair” performance at best.

\(^{151}\) Only targets of close range along the Sino-Korean border had to be considered for the rear echelon’s conventional artillery calculations because these artillery systems have limited range since these systems would have to operate from the Korean-side of the border.
The KPA’s conventional weapons systems are technologically inferior to those of its neighbors. The KPA’s military strategy relies heavily on concentrated and coordinated artillery fires. The KPA’s rear echelon forces are the oldest and least capable out of its three echelons. Most of its advanced, well-maintained systems are positioned near the DMZ.

In this scenario, Pyongyang communicates to Beijing that it will conduct artillery strikes on Dandong if the PLA decides to cross the border and intervene in the DPRK. The KPA’s rear echelon artillery are likely limited to a few batteries of the 122-mm self propelled guns (SPGs) (M-1981) and 152-mm self-propelled howitzers (SPH) (M-1974). Furthermore, the impending attack on the ROK requires the KPA to leave forces along the DMZ in place to support the invasion. Thus, it will have to rely on the IX, XII, VIII Infantry Corps, and potentially the 425th mechanized infantry division to conduct the attack on Dandong.

In this vignette, a KPA artillery battalion made up of 122-mm SPG and 152-mm SPH is deployed to Sinuiju. It begins firing into the Zhenxing District of Dandong City. The lethal areas of the 122-mm SPG and 152-mm SPH were calculated and then applied to the population density of Zhenxing District to estimate casualty numbers. These calculations were based on the DPRK using a single battery of each system conducting a three-minute volley. Due to the large variance in potential lethal radii of these warheads, a sensitivity analysis was conducted to provide both low and high casualty estimates.

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152 Headquarters, Department of the Army, “ATP 7-100.2 North Korean Tactics,” 26.

153 Countervalue targets are assets that are of value to the opponent but are not necessarily a military threat. These targets most often refer to cities and civilian populations. The use of countervalue and counterforce targets are more common in the nuclear deterrence literature. The use of countervalue and counterforce targets will be discussed more in the second phase of this research question which deals with tactical nuclear weapons.

154 The KPA’s rear echelon’s reserve units will likely have to be activated for a scenario like this. Additionally, the mobilization of the 425th mechanized infantry division will likely take time given its geographic distance to the Sino-Korean border. Therefore, for the purposes of this calculation, only the artillery assets of the VIII Infantry Corps were considered.

155 The Zhenxing district shares a border with the DPRK and is also one of the densest areas within the city of Dandong.

156 Similar KPA artillery fatality and casualty calculations were conducted against ROK assets. Similar methodology was applied to this study, see: Barnett et.al. “North Korean Conventional Artillery: A Means to Retaliate, Coerce, Deter, or Terrorize Populations”, RAND 2020.
A KPA artillery battalion employing six 122-mm and six 152-mm artillery systems could kill approximately 1700 to 4600 civilian the Zhenxing District of Dandong City. These results are shown in Table 3.1. Although Dandong City was selected as the primary target in this vignette, the proximity of the PLA bases to Dandong (yellow triangles in figure 3.1 below) shows that these two PLA bases could also be within range of KPA’s artillery systems in Sinuiju.

Table 3.1. Dandong Population Fatalities by KPA’s Midrange Artillery System

<table>
<thead>
<tr>
<th>Artillery Type</th>
<th>Range</th>
<th>Fatalities (Low)</th>
<th>Fatalities (High)</th>
</tr>
</thead>
<tbody>
<tr>
<td>M-1981 (122-mm)</td>
<td>24 km</td>
<td>360</td>
<td>920</td>
</tr>
<tr>
<td>M-1974 (152-mm)</td>
<td>17.4 km</td>
<td>720</td>
<td>1600</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td><strong>1080</strong></td>
<td><strong>2520</strong></td>
</tr>
</tbody>
</table>

Source: Author’s calculations

Notes: See the calculations for lethal radius and casualties in appendix.

Artillery Attacks to Slow Down PLA Troop Movement

The PRC could enter the DPRK from multiple points along the Yalu River. A combined arms brigade and a border defense brigade in Dandong are adjacent to it. In Tonghua, there is a combined arms brigade, two rocket force bases, and a border defense brigade. Additionally, there is a PLAAF fighter brigade, a border defense brigade, and an artillery division/brigade near the Yanbian prefecture.

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157  Calculations are based off one battery of each system firing for three consecutive minutes. Detailed calculations can be found in Appendix B.

158  2021 PLA base location data from Janes and 2021’s congressional report on the Chinese military both mentioned the existence of a border defense brigade and a combined arms brigade located in Dandong City. One of these bases is adjacent to the Zhenxing district and could be hit by the midrange DPRK artillery based in Sinuiju, just across the river from Dandong.

159  Locations are approximate. Base location data triangulated from Military and Security Developments Involving the People’s Republic of China (OSD 2021), Janes, and Lawrence “Sid” Trevethan.
If the KPA decides to try to delay PLA movement, the KPA artillery units could destroy major border bridges along the Yalu. However, such an operation will likely only delay troop movement by a day or two, as PLA civil engineers could build temporary bridges to facilitate troop movement. Furthermore, the PLA could conduct amphibious and airdrop operations, limiting the effect of destroying the bridges. Further, the KPA may not be able to keep up these strikes for more than a day due to system and transportation limitations. Finally, the PLA could try to stop the attacks by using airstrikes and counterbattery fires.

**Conclusion: DPRK limited conventional Artillery Attacks Are Unlikely to Deter or Stop Chinese Intervention**

Even if successful, attacks of this magnitude are unlikely to deter or stop the PRC from intervening in the DPRK—the attacks just would not do enough damage. In fact, such threats might lead to preemptive PRC action, and if carried out, these audacious military attacks may compel Beijing to employ even greater military action to punish Pyongyang. For example, the PLA could conduct large-scale retaliatory attacks on Sinuiju, a densely-populated, relatively prosperous city, inflicting far more damage than the DPRK had done to Dandong.

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160 Destruction and construction of bridges were common tactics utilized during the Korean War to slow down ground troop movement. Given Korea’s mountains terrains, bridges were often critical to troop mobilization around the peninsula. The Yalu and Tumen rivers run along the Sino-Korean border, and PLA ground troops would likely have to utilize bridges to cross.
Strikes on Yalu River bridges could delay intervention but are also unlikely to stop it. For the DPRK to signal a more credible deterrence message, it would likely need to use more powerful weapons.

Analysis: Limited DPRK Nuclear Weapon Attacks

The DPRK might hope to cause greater damage to the PRC using tactical nuclear weapons and thereby achieve deterrence or denial.

DPRK’s Current and Projected Tactical Nuclear Weapon (TNW) Capabilities

For the purposes of this dissertation, TNWs are defined as sub-strategic low-yield nuclear weapons that are for short-range applications utilizing land, sea, and air-based launch capabilities. Although yields of TNW vary, here the term is used to refer to roughly 15-Kt weapons.

The DPRK’s TNW capabilities are unclear. According to the speech made by Kim Jong Un at the Eighth Party Congress in January of 2021, Kim stated that the DPRK already developed the nuclear technology necessary to miniaturize their weapons. Separately, a United Nations report released in 2020 stated that the DPRK likely has developed miniaturized, low-yield nuclear weapons. However, due to varying definitions of TNWs and the clandestine nature of the DPRK, it is difficult to definitely gauge whether the DPRK truly has employable TNWs as of today.

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162 For comparative reference, the atomic bomb dropped on Hiroshima was 15 KT.


Still, for the purposes of this research (and recognizing that this development is likely just a matter of time if not completed yet), I assume that the DPRK has developed TNWs that can be used with theater ballistic missiles. As of 2021, the DPRK has four types of short-range ballistic missiles (SRBMs) with ranges of 300 km to 500 km, well within striking distance of neighboring Chinese cities. The DPRK’s current development of a SLBM that can carry TNWs adds to the DPRK’s capabilities.

Moreover, development of TNWs, which require less fissile material than strategic nuclear weapons, could allow the DPRK to more rapidly build up its nuclear weapon inventory more rapidly. In fact, the DPRK could have up to 151 to 242 nuclear weapons by 2027. The scenario vignettes assume that this is the case.

In addition to developing warheads, the DPRK is also developing their ballistic missile launch capabilities. The DPRK has mobile transport erector launchers (TELs) and has also tested rail-mobile SRBMs in September of 2021. During the October 2020 military parade, the DPRK showcased 52 solid propellant SRBMs on six different wheeled and tracked TEL chassis. These mobile launch platforms can be very survivable. They give the KPA greater flexibility in launching nuclear attacks.

“Shoot” and “Scoot” Tactics

The “shoot and scoot” tactic refers to a battlefield maneuver where one combatant moves its weapons systems shortly after firing. This tactic can improve survivability, as it makes finding the launching system, which may have moved miles from the launch location within minutes, far more challenging.

Applying these battlefield concepts to nuclear weapons, TELs, and rail-launch systems enhances launcher survivability and makes finding the launcher far more difficult. Rail-launch systems, which can hide inside tunnels, provide a particular advantage in the

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DPRK’s mountainous terrain. Launching nuclear weapons from mobile platforms also greatly expands the number of potential operating locations.

DPRK nuclear warheads would have to be mated with the missiles prior to launch. Open-source intelligence identifies the Yongdoktong facility, located northeast of Kusong to be the DPRK’s main nuclear warhead storage. (See Figure 3.2.) Given the close proximity of Yongdoktong to the Sino-Korean border, tactical ballistic missiles using TELs and rail-launchers operate close to the border could hit targets hundreds of km inside the PRC.

Figure 3.2. Yongdoktong Nuclear Warhead Storage Facility

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169 Bermudez, “What Is the Significance of North Korea’s Rail-Mobile Ballistic Missile Launcher?”

170 Ankit Panda, Kim Jong Un and the Bomb: Survival and Deterrence in North Korea (Oxford University Press, 2020), 244.


172 Lewis.
Nuclear Weapon Damage Calculations: Surface vs. Air Burst

A nuclear weapon can be employed in a number of ways. If it is detonated as a ground burst, it creates a crater in which the nuclear fireball vaporizes objects on the earth’s surface and sends them high in the air, eventually becoming fallout as the nuclear cloud cools. Alternatively, they can be detonated well above the ground as an airburst, it may not create a crater or much fallout depending upon the burst height, and may also maximize the blast effect. The “peak overpressure” is one element of the nuclear blast and it is important in considering the destructive effect of a blast wave. In order to maximize this value (measured in pounds per square inch, or psi), the height of burst (HOB) matters a great deal. Weapons used in the attacks on Hiroshima and Nagasaki were detonated at 1,970 and 1,650 feet to maximize damage. The following plot shows various optimal HOBs for various overpressure psi levels with a 1 Kt weapon smaller than those used against Hiroshima or Nagasaki.

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174 Glasstone.


176 5 psi was sufficient to destroy homes in Nagasaki and Hiroshima at the time.
Air burst attacks generally yield greater causalities than surface bursts.\footnote{177} Considering most buildings in Chinese cities are far stronger than those destroyed in Hiroshima and Nagasaki, greater overpressure will likely be desired. For the purposes of the calculations, 15-KT warheads were detonated at an altitude optimized for a 20-psi peak overpressure. Peak overpressure changes the extent of the damages that nuclear weapons can cause. For example, 20-psi can destroy reinforced concrete structures that the DPRK would ostensibly target.\footnote{178}

\textit{The Hypothetical Effects of DPRK TNW Attacks on the PRC}

Nuclear escalation strategists broadly categorize targets for nuclear weapons into two categories: countervalue and counterforce.\footnote{179} Countervalue targets typically encompass civilian infrastructure and population that have significant economic and societal value. In contrast, counterforce targets refer to military targets and production facilities that

\footnote{177} However, nuclear weapons detonated in the air tend to produce less fallout compared to surface bursts, so this changes the calculation when it comes to calculating damage associated with fallout

\footnote{178} Glasstone, \textit{The Effects of Nuclear Weapons}.

manufacture military weapons. Two countervalue and two counterforce targets were selected to demonstrate the range of DPRK’s viable tactical nuclear options.

For capability and fatality calculations, NUKEMAP and MISSILEMAP were utilized to estimate weapons’ range capabilities and their related damage calculations.\textsuperscript{180} Launch locations from the DPRK were based on sites where missiles have been traditionally tested from in the past thirty years.

**Countervalue Targets:**
The two countervalue targets were the Shenyang Heavy Industrial Plant in Shenyang and the Dalian Hi-Tech Zone in Dalian. These places were chosen based on their economic value and role in military production. According to Chinese sources, the Shenyang Heavy Industrial Plant is valued at approximately $1.6 billion while the Dalian Hi-Tech Zone has an estimated value of $16.09 billion.

![Figure 3.4. DPRK Tactical Nuclear Weapon Strikes on Shenyang and Dalian](source: Author's depiction)

\textsuperscript{180} NUKEMAP and MISSILEMAP are interactive, open-source data visualizations by Alex Wellerstein, an assistant professor of Science and Technology studies at the College of Arts and Letters at the Stevens Institute of Technology.
TNW attacks on these facilities could generate 10,000 civilian fatalities and 70,000 injuries. Over time, these attacks will cause significant collateral damage to the local economy and population. Survivors will likely suffer from long-term health effects that will have lasting consequences for the region. Furthermore, given that these industrial targets have been identified as being of high development interest by the CCP, economic effects would be substantial.

Even a conservative estimate of 10 percent damage to the facility would result in $160 million in damages for the Shenyang Heavy Industrial Plant, and approximately $1.609 billion in damage to the Hi-Tech zone in Dalian.

Moreover, attacks on Shenyang and Dalian could have broader economic and even military ramifications. Both Shenyang and Dalian comprise of the “North Rim” of the PRC’s Bohai Rim Economic Circle, which have been generating significant investment interests in the past two decades. Further, these cities house key port and rail facilities (Dalian Port and China Railways, respectively) which could be needed to support PLA intervention in the DPRK.

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181 Detailed calculations and maps can be found in Appendix B.


Targeting the Dalian Hi-Tech Zone for instance, would have broader economic ramifications for the Bohai Rim area given that the Dalian Port is located nearby. Given that the area also has attracted significant foreign investment, its long-term economic effects could be affected by the region losing foreign investments.

In addition to major economic targets, the DPRK could also target Chinese research centers such as one of “The Seven Sons of National Defense” universities which are institutions with extensive connections to Chinese military industry. The Harbin Engineering University which specializes in maritime technology, nuclear, aeronautics, astronautics, and armaments is within the DPRK’s MRBM range. This institution alone is associated with five declared cases of espionage related to the PRC’s nuclear weapons program. Targets such as these blur the lines between countervalue and counterforce assets, potentially creating great ambiguity in a nuclear escalation scenario.

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185 Wu, Perl, and Sun, “Bigger and Different.”


187 Joske, 12.
Counterforce Targets:

The two counterforce targets selected for this calculation were two PLARF bases in the NTC: the 652nd mobile launch brigade in Tonghua and the 651st launch brigade located in Dalian. These bases were selected for their capabilities and their proximity to the DPRK’s missiles. The 652nd mobile launch brigade reportedly stores the DF-21C (MRBM) and possibly the DF-31 (ICBM), as well as 12 nuclear warheads. The 651st operates the DF-21A (MRBM), but no known nuclear warheads (see figure 3.6 below). Like the DPRK, the PRC does not mate their nuclear warheads with their missiles during peacetime. Attacking these bases could limit the PRC’s ability to retaliate. However, the DPRK’s TNWs lack the capacity to destroy these systems with confidence. Destroying the underground nuclear weapons storage, command bunkers, and missile silos will require weapons generating 100-psi or more, something that DPRK nuclear weapons delivered by tactical ballistic missiles may not be able to achieve against the indicated facilities.

It is important to note that even if the DPRK could destroy the assets at these PRC missile bases, such an attack would not disarm the PRC’s nuclear forces. The PRC would still have many missile units that could fire nuclear weapons at North Korea. In particular, the PRC’s new missile bases that will apparently provide hundreds of nuclear armed ballistic missiles will provide the PRC with nuclear capabilities that go well beyond DPRK attack capabilities.

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188 Lawrence “Sid” Trevethan, CASI 2021
189 Alexander Glaser, “Effects of Nuclear Weapons” (Princeton University, February 12, 2007), https://www.princeton.edu/~aglaser/lecture2007_weaponeffects.pdf. A table of damage characteristics for specific overpressures can be found in Appendix B, as can the damage calculations.
Alternatively, DPRK TNWs could still be used to attack PLA, PLAAF, and PLAN bases, limiting the ability of the forces at those locations to support an invasion. It could also delay (or seriously deny) Chinese ground troop movement by targeting PLA bases along the Sino-Korean border, to include border defense brigades and the PAP.

Attacks on PAP bases (triangles in Figure 3.7) would also be of great concern, especially if the contingency were to produce a heavy influx of North Korean refugees. Moreover, these bases are located in major northeastern Chinese cities. These troops would likely play an important role in protecting their cities during a DPRK contingency scenario. Some of these units would also play a major role in securing the border infrastructure with North Korea to facilitate a PLA crossing of the border into North Korea.

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Conclusions from Research Question Two

The damage calculations demonstrate the potential effects of the DPRK TNW strikes. Although conventional artillery strikes may not deter Chinese intervention, TNWs could inflict significant damage, potentially delaying Chinese retaliation and intervention. Furthermore, given the PRC’s emphasis on developing its northeastern economy and the country’s concerns about North Korean refugee influx, the PRC would certainly want to avoid the damage that could be caused by a combination of the DPRK’s conventional and TNWs. However, such North Korean attacks would surely invite major PRC retaliation.

Still, the DPRK would likely need to threaten strategic nuclear attacks against more high-profile targets to deter PRC intervention. Moreover, if the conflict were to cross the strategic nuclear threshold, Pyongyang would need to demonstrate that it can

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manage nuclear escalation. Therefore, DPRK strategic forces would have to be capable of generating clearly unacceptable consequences for Beijing.

Furthermore, having both tactical and strategic nuclear weapons can give Kim a wider range of options, allowing for greater flexibility in moving up the escalation ladder. The next research question will explore how DPRK-PRC nuclear escalation might play out under different circumstances.
4. Research Question 3: DPRK’s Nuclear Threat Towards the PRC

Can the DPRK deter or sufficiently delay PRC intervention without causing an escalation spiral that ends the regime?

Intent of Research Question

Research question one found that the DPRK’s current conventional capabilities are inferior to those of the PRC. As a result, the DPRK probably cannot prevail in a conventional conflict against the PRC. Research question 2 found that the DPRK probably cannot cause sufficient damage to the PRC to stop PRC intervention with conventional strikes, and may not be able to cause sufficient damage with tactical nuclear strikes. Therefore, if Pyongyang wants to deter Beijing from intervening, the regime may need to credibly threaten China with strategic nuclear strikes.

As described in previous chapters, the PRC’s primary policy objective vs. the DPRK has been maintaining the status quo. This has worked in Pyongyang’s favor because it has created a strategic environment in which the regime could develop its nuclear forces. But Pyongyang could try to use its nuclear forces to deter or coerce Beijing if the PRC chooses to intervene in North Korea—this should be a significant concern for Beijing.

This research question will explore whether the DPRK’s nuclear weapons can help Pyongyang achieve its political and/or military objectives vs. the PRC during a future contingency. While traditional security studies literature holds that a state’s acquisition of nuclear weapons is necessary for deterring adversaries from initiating conventional attacks in fear of nuclear escalation, deterrence achieved via nuclear forces is only effective insofar as the intent, willingness, and the ability to utilize it are credibly established and signaled to the opponent. If the DPRK believes it can manage escalation against the PRC, or if it finds itself with no alternative, it may be tempted to threaten the use of nuclear weapons and actually employ them. The chapter will explore

192 Again, this scenario presupposes Beijing will intervene to stop Kim’s aggression against the South or to deal with serious instability in the North.

193 In this case, Pyongyang’s goal would be to deter the Chinese from intervening against the DPRK or potentially getting Beijing to side with Pyongyang.

nuclear escalation dynamics through scenario vignettes involving the DPRK and the PRC.\textsuperscript{195} It will highlight the current nuclear weapons doctrine of the PRC and DPRK, their evolving relationship, and explore hypothetical nuclear use-cases in the context of both traditional and modern nuclear security literature. Information gathered in discussions with academics, US attaches in the ROK, CFC operation planners, and USFK strategists have been used to supplement findings.\textsuperscript{196}

If the dynamics reveal that the DPRK’s growing arsenal may allow it to manage nuclear escalation against nuclear-armed adversaries in future conflicts, the implications would be profound for both Beijing and Washington.\textsuperscript{197}

Background: North Korean Strategic Nuclear Weapon Thinking

Summary of DPRK-PRC Nuclear Relations

The PRC’s chief concerns over the DPRK’s nuclear weapons have traditionally been the DPRK’s \textit{indirect} threat to the PRC’s interests. Perhaps the most concerning of these is that the DPRK’s nuclear weapons may trigger a nuclear arms race in the region.\textsuperscript{198} Moreover, Pyongyang’s nuclear ambitions could further missile defense cooperation between the US and its regional partners. Further, nuclear fallout from a nuclear exchange on the Peninsula could cause collateral damage to nearby Chinese provinces. Skepticism has been growing within the PRC about the feasibility of DPRK

\textsuperscript{195} Readers are encouraged to suspend their disbelief on the issue of DPRK’s nuclear weapons being a threat to the PRC. This research question examines challenging normative thinking on the issue by utilizing abstract models that demonstrate scenarios where the DPRK’s nuclear weapons may pose a real threat against the PRC.

\textsuperscript{196} These interviews were conducted in May of 2022 in the ROK in accordance with RAND’s Human Subjects Protection Committee (HSPC) approval. Interview participants will be referred to their organizational affiliations (unless asked otherwise) in the report. The list of participants/organizations who participated in the interview can be found in Appendix C.

\textsuperscript{197} To win against an adversary in a nuclear conflict, one must be able to manage its related escalation successfully and dominate in the escalatory ladder. Although the DPRK’s kinetic usage of nuclear weapons and how it may manage escalation in such scenario has never been tested, one could argue that the DPRK has demonstrated shrewdness in general escalation management when considering their provocation cycles during the past seventy years. Although Pyongyang has successfully managed to launch a series of military provocations against the US/ROK since the Korean War that have cost ROK and US lives, it was able to act in a manner that never fully escalated to a war or protracted kinetic conflict. Moreover, Pyongyang’s provocation cycles have led its adversaries to come to the negotiation table, where the North has been able to obtain concessions, (e.g., Agreed Framework) with seemingly little consequence (for the regime, at least) from violating its agreements.

denuclearization. Beijing realizes how important those weapons are to the regime and seems to understand that Pyongyang will never trust Beijing to protect it.\textsuperscript{199} Given such realities, the likelihood of the DPRK giving up its nuclear weapons seems distant.\textsuperscript{200} However, there has been a “modest shift” in perceptions among Chinese military officers and nuclear experts that the DPRK’s nuclear weapons might pose a \textit{direct} threat towards the PRC.\textsuperscript{201}

If the DPRK acquires 151 to 242 nuclear weapons by 2027, Pyongyang may be able to deter Beijing from intervening in a future contingency, especially if Beijing chooses to act against Pyongyang.\textsuperscript{202} Although the PRC will have a considerable numerical advantage in nuclear weapons (the PRC may have up to 700 deliverable nuclear warheads by 2027\textsuperscript{203}), numerical superiority may not matter. The threat of nuclear strikes may be enough to dissuade China from intervening. This creates a compelling case for exploring the DPRK’s \textit{direct} nuclear threats against the PRC, which is what this research question will focus on.

\textbf{DPRK and PRC’s Nuclear Strategies}

Pyongyang’s nuclear strategy will likely become more nuanced and sophisticated in the future.\textsuperscript{204} Experts believe that the DPRK will continue to develop their nuclear arsenal to the point where they can achieve assured strategic retaliation. The DPRK will try to develop their nuclear weapons inventory and delivery capability to allow them to integrate these weapons in their war-fighting strategy, at least for coercive purposes.

\begin{flushright}

\textsuperscript{200} This looks even more true after Russia’s invasion of Ukraine.


\textsuperscript{204} Smith, “North Korea’s Evolving Nuclear Strategy.”
\end{flushright}
Achieving these goals will require: 1) larger warhead inventories; 2) developing accurate, long range delivery systems; 3) assuring delivery system survivability; 4) robust command, control and communications capabilities; and 5) formulating a robust strategy for employment.205

Furthermore, although Kim has declared his nuclear weapons are not intended for preemptive use, his actual position on no-first use (NFU) remains ambiguous based on his public speeches:

“Our war deterrent, which is intended to defend the rights to independence and existence of our state and safeguard peace in the region, will never be abused or used as a means for preemptive strike.”206

“But, if, and if, any forces infringe upon the security of our state and attempt to have recourse to military force against us, I will enlist all our most powerful offensive strength in advance to punish them.”207

At this point, Kim seems to maintain a position of flexibility when it comes to nuclear weapons usage.

Unlike the DPRK’s nuclear strategy (which remains largely unwritten and only available through limited state plenary speeches) the PRC’s nuclear strategy is better developed and more clearly articulated. According to the 2020 Science of Military Strategy, much of the PRC’s writing on nuclear deterrence and warfare thinking seems to borrow from US nuclear literature.208 The document refers to nuclear deterrence as:

206 Note: the vernacular might more accurately be translated as “will by no means be misused and will never be used preemptively.”
“…the use of nuclear power as a backing, through threats to use nuclear weapons or determination to implement a nuclear counterattack to shock and contain the deterrent behavior or state of opponents. The essence of nuclear deterrence is to warn the other party in advance of the ability and determination to use nuclear weapons or carry out nuclear counterattacks, and the serious consequences that may be caused by such actions, so that they can develop a sense of fear through the balance of pros and cons and are forced to obey the deterrer's will or abandon the original designs, thus enabling the deterrer to achieve his own political goals.”

The Chinese conception of deterrence (weishe) however, also connotes compellence. Therefore, the meaning has both a coercive and dissuasive element. Though there is no evidence that the compellence aspect of weishe applies to the PRC’s nuclear use, Beijing could bend or even break its NFU posture to assume some aspect of compellence at some point in the future.

2021 saw one of the most rapid build-ups of Chinese nuclear forces, with satellite imagery revealing construction of new nuclear missile sites. This nuclear buildup and changes in posture seems contrary to this commitment and could signal changes in its NFU policy. These changes signal adjusted Chinese perceptions about the current geopolitical environment, but it remains unclear if the PRC’s conception of parity vs. other nuclear powers has changed with it. Traditionally, the PRC adopted a defensive position by developing assured, survivable second

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strike capabilities. Rather than seeking parity with these powers, the PRC has opted for a “lean and effective” minimum nuclear deterrent, as they see nuclear weapons to have limited utility. Some argue that the PRC’s recent build-up merely adds redundancy to its assured retaliation posture, and therefore is not necessarily a step towards an arms race. Therefore, the PRC’s nuclear thinking on maintaining “minimal means of reprisal” may have not really changed.

Most existing literature analyzing DPRK and PRC strategic forces focuses on the implications for the US and its allies’ interests writ large. In this chapter, I analyze how the evolving geopolitical environment could challenge the conventional wisdom that the DPRK and the PRC share a “blood-alliance” in the context of nuclear literature and hypothetical scenario vignettes.

Thinking About the Unthinkable: Applying Deterrence Literature to Future DPRK Contingency Scenarios

On Deterrence

Deterrence is “discouraging or restraining someone—in world politics, usually a nation state—from taking unwanted actions such as armed attack...involves the effort to stop or prevent an action.” There are two main forms of deterrence, deterrence by denial and deterrence by punishment. Deterrence by denial restrains aggressor action by undermining its ability to succeed. In contrast, deterrence by punishment threatens severe penalties if the adversary were to pursue action, making the escalation not worth its costs.


214 Vaddi and Panda, “When It Comes to China’s Nuclear Weapons, Numbers Aren’t Everything.”

In our scenario, the DPRK would try to deter Chinese intervention by using the threat of denial or punishment. The DPRK’s nuclear weapon inventory and evolving strategy will be important drivers for either type of deterrence.

*Desired Action*  
**Deterrence** = The DPRK wants to deter the PRC from taking military action against its initiated offensive into the ROK.  

During the Cold War, Herman Kahn published a series of works on nuclear warfare. Borrowing from his works such as *Thinking about the Unthinkable* and *On Escalation*, the next section will explain how a DPRK-PRC nuclear conflict progress in various contexts. The hypothetical vignettes proposed in this dissertation raise policy questions that should motivate consideration and preparation for decision makers.

President Xi’s objective of preventing war or chaos on the Korean peninsula gives the PRC a major incentive to intervene, though not necessarily in support of the DPRK, particularly if Pyongyang is the aggressor. In such a case, the DPRK could threaten nuclear attacks to deter PRC intervention.

Several factors need to be considered when pondering potential DPRK nuclear weapons use. For instance, questions of whether the DPRK would be the first to use them, and how decision makers perceive the threats (and intent) are critical. Figure 4.1 illustrates the types of nuclear first use in conflict proposed by Davis and Bennett:

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216 An alternative use for Pyongyang to establish nuclear deterrence against Beijing would be to prevent Beijing from invading the DPRK. Such scenarios have gained less traction in modern times, especially with Beijing prioritizing stability. This dissertation does not explore such use-case scenario, however.

217 Herman Kahn was a military strategist at the RAND Corporation and founder of the Hudson Institute.

218 Kahn, *Thinking About The Unthinkable*.


220 “Thinking about the Unthinkable” is the title of a book by Hermann Khan in 1962 where the possible scenario of thermonuclear warfare was proposed and outlined different ways to prevent such event from happening. The book challenged critics who pushed back on nuclear warfare thinking by stating that just because these possibilities are “unthinkable” and harsh, does not mean that thinking on this matter should not exist.

221 Bennett et al., “Countering the Risks of North Korean Nuclear Weapons,” 46.
 Though the use of nuclear weapons under any circumstances as outlined above may seem unthinkable, their use is not necessarily indicative of a state’s irrationality, but rather shows the implications of having asymmetric information within the realm of an individual’s (or group’s) bounded rationality. Similarly, rationality in classical nuclear deterrence theory does not always lend itself well to thinking outside of a narrow definitional range of how nuclear states are “supposed” to think, and often does not reference non-American cultural contexts.

The Kim regime has repeatedly faced questions of its rationality. More recently, Kim Jong Un’s continued missile tests in 2017 sparked controversy in the security community about him being a “madman”. However, this was another reminder that the regime’s actions need to be understood within the context of its environment and cognition rather than what Western thinkers may believe to be rational.

Relatedly, mistakes in peacetime, unintended escalation, and intentional first use are concepts rooted in decades of nuclear warfare research and historical close calls. Moreover, when signaling clear intentions becomes increasingly difficult in the chaos of conflict, mistakes that lead to inadvertent escalation can become more likely.

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222 Herbert A. Simon first introduced the term “bounded rationality” in the 1950s as a counter to the assumptions surrounding rationality as understood by homo economicus scholars. The concept suggests that human behavior often departs from what neoclassical economists see as perfectly rational because humans inherently lack perfect information due to the influence of their environments, cognition, culture, etc.


Inadvertent escalation occurs when an actor takes actions that are not intended to be escalatory but are perceived that way by the adversary.\textsuperscript{225} Although this type of mistake can be managed by clearly signaling thresholds in conflict, such signaling can become difficult to achieve due to the fog of war. The DPRK and the PRC could find themselves at the crossroads of one of these use-cases in a future conflict.\textsuperscript{226}

Relatedly, intentional first use and deliberate escalations could also occur if there is perceived asymmetry in the players’ stakes in denial-based deterrence, or from one or both pursuing dissuasive signaling.\textsuperscript{227} For instance, the PRC’s attempt to use punishment-based deterrence may be ineffective, especially if the Kim regime, facing imminent collapse, feels it has nothing to lose.

Thus, the PRC may need to rely on deterrence by denial, in which PRC forces prevent the DPRK from achieving its campaign objectives. In contrast, the DPRK may be able to discourage the PRC from acting by using punishment-based deterrence, in which the DPRK convinces the PRC that the benefits of intervention are not worth the cost.

\textit{On Compellence}

Nuclear compellence is when the threat of nuclear weapons strikes can be employed to change the behavior of a country.\textsuperscript{228} The cases above describe how a nuclear conflict could develop if deterrence fails. However, in our hypothetical scenario, the DPRK’s objective could be to utilize its nuclear weapons to compel a Chinese action.

\textit{Desired Action} \textit{Compellence} = The DPRK wants to \textit{compel} the PRC to support the DPRK in its offensive militarily and/or politically.

According to Shelling’s \textit{Arms and Influence}, compellence is also different from deterrence because it introduces a kind of coercive diplomacy in which a country can


\textsuperscript{226} Furthermore, the likelihood of the proposed vignettes in this chapter will also change with the evolving nuclear strategy and doctrine adopted by the DPRK and PRC.

\textsuperscript{227} Morgan et al., “Dangerous Thresholds.”

pressure another to act in a desired way.\textsuperscript{229} Compellence requires greater communication and initiative, as the country must clearly signal the desired action.

The DPRK might try to compel Beijing to provide political or military assistance for its invasion of the ROK. If the DPRK were to request assistance, the PRC would want to ensure that its actions are not perceived as being driven by DPRK threats, which would weaken its image as a rising power.

On Escalation Theories

\textit{DPRK’s Escalation Theory: Case for Weaker State’s Escalation}

The case for the DPRK initiating nuclear escalation against its significantly stronger nuclear adversary may seem counterintuitive—why would a comparatively weaker state risk escalation against a stronger one? Angstrom and Petersson provide four factors that may drive a weaker state to pursue such actions: 1) to provoke an overreaction from the strong adversary, which can trigger outside intervention, 2) if they (the aggressors) have the ability to limit the conflict to a given domain, 3) escalate to create a division of labor with a stronger ally, and 4) escalate to forge a strong front, assuming that the long-run benefits outweigh the cost.\textsuperscript{230}

In a PRC vs. DPRK scenario, the second and fourth reasons are most applicable. If the DPRK perceives that they can manage nuclear escalation, deterring intervention by the PRC, it may feel the risks are worth taking. As for reason four, the DPRK could try to deter PRC intervention by threatening to use nuclear weapons and even demonstrating their willingness to do so by employing low-yield tactical weapons to signal resolve. Additionally, Pyongyang could use nuclear weapons first when facing the prospect of

\textsuperscript{229} Thomas C. Schelling, \textit{Arms and Influence} (New Haven, CT: Yale University Press, 2008).

For instance, if Pyongyang perceives that its strategic weapons will not survive Beijing’s attacks, it may have an incentive to strike first.\textsuperscript{232}

**PRC’s Escalation Theory**

The PLA refers to escalation management as “war control” (zhanzheng kongzhi) and considers it an important strategic concept in their military doctrine, especially in recent years.\textsuperscript{233} PLA writings highlight the importance of focusing on the strategic objective in war, tailoring military operations to help accomplish political objectives. The writings also mention the importance of seizing the initiative (especially during the early stages of a crisis) tempered by preserving stability and flexibility during conflict to limit escalation.\textsuperscript{234}

These writings, however, do not discuss the preferred ways to operate, nor how preemptive activities could be misconstrued as escalatory behaviors.\textsuperscript{235} Further, the Chinese writings do not clearly address situations where accidental or inadvertent escalation could be caused by its actions. The absence of these discussions raises questions about whether Chinese strategists have had these debates or whether these topics are reserved for internal debate in an effort to maintain strategic ambiguity.

The Chinese have stated that wars must not cause fundamental harm to the nation’s economy, which Beijing seems to see as critical to the nation’s survival and national development.\textsuperscript{236} Commanders are urged to:

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\textsuperscript{231} The “use-it-or-lose-it” is a dilemma in deterrence theory where at least one of the States involved in a nuclear conflict perceives doubt in the survivability of its nuclear force if the adversary were to launch a disarming first strike. Therefore, the weaker nuclear state is presented with a dilemma of launching a first strike which will assuredly invite destructive retaliation by the opponent or wait and risk the possibility of an equally destructive disarmament strike.

\textsuperscript{232} Some US operational planners from the Combined Forces Command (C5) noted that the development of the DPRK’s credible second-strike capabilities is not a question of if, but when.

\textsuperscript{233} Experts claim that the Chinese seldom write about the concept of escalation or escalation management, but rather talks about escalation in the framework of containment and control of military crisis. The term war control broadly covers various phases of conflict, see: Burgess Laird, “War Control: Chinese Writings on the Control of Escalation in Crisis and Conflict,” *Center for New American Security*, April 2017, 5.

\textsuperscript{234} Alison A Kaufman and Daniel M Hartnett, “Managing Conflict: Examining Recent PLA Writings on Escalation Control” (CNA China Studies, February 2016).

\textsuperscript{235} Kaufman and Hartnett.

\textsuperscript{236} Laird, “War Control: Chinese Writings on the Control of Escalation in Crisis and Conflict,” 7.
“...not overdo the degree of force in war, and not take as primary threatening of the adversary’s survival and comprehensive stripping away of the adversary’s military capability, but rather take forcing the adversary to come to terms as the primary; see that the size of the operational scope is moderate, and not try to cover the entire space of the enemy and friendly sides’ homelands, but rather limit the scope to within a certain area (zone)...”  

The emphasis on refraining from engaging in military conflict during the country’s “period of strategic opportunity” remains a consistent theme throughout Chinese writings on war control and reinforces the Chinese thinking that the CCP’s ability to provide economic prosperity for its people is inseparable to its very own legitimacy and survival.  

In addition to refraining from taking unnecessary military actions, Chinese writings also mention leveraging crises as “windows of opportunity” to expand its national interests. Western critics of the PLA’s dual objective approach offer the concern that such operations carry a risk of inadvertent escalation. In the DPRK scenario, this trouble could be manifested by the PRC’s efforts to establish a Chinese-backed puppet regime in Pyongyang.  

A striking difference in the Chinese conception of war control to that of Western thinking is the notion that the Chinese strategists seemingly believe that wars can be precisely controlled by adhering to the “correct processes and scientific principles” aided by the advances in ISR, command and control (C2) protocols, and precision weaponry. Such

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238 Former PRC President Jiang Zemin referred to the “strategic opportunity period” as the first two decades of the 21st century, which is a critical time for preventing domestic and international disruptions as China pursues economic development, see: Laird, “War Control: Chinese Writings on the Control of Escalation in Crisis and Conflict,” 8.  

239 Laird, 12.  


optimism departs from the traditional view of Western strategists who typically underscore the uncertainty of war due to the inevitable chaos of conflict.\textsuperscript{242}

Further examination of Chinese writings on nuclear deterrence shows that their thinking has remained largely unchanged over the last two decades. The 2012 version of the \textit{China Strategic Missile Force Encyclopedia} characterized nuclear deterrence under three different conditions: during peacetime, crisis conditions, and conventional warfare.\textsuperscript{243} In addition, the Chinese have persistently emphasized the concept of “inexorable momentum”— the PLA’s conception of deterrence signaling.\textsuperscript{244} The PLA sees deterrence signaling as an important mechanism to show China’s intent and willingness to act unless the adversary backs down. However, PLA writings do not address instances where PLA actions to signal deterrence can lead to inadvertent escalation nor the situations where an adversary does not back down.\textsuperscript{245} Moreover, the Chinese conception of deterrence signaling is further complicated by their potential adoption of a launch-on-warning posture.\textsuperscript{246} The Chinese seem to believe that adopting such a posture will enhance their current deterrence, as they believe such systems are consistent with their NFU policy. Again, their publications fail to address instances when such capabilities can lead to crisis instability by generating attacks in response to false warnings of incoming strikes.

\textsuperscript{242} Laird, 15.

\textsuperscript{243} Laird, 20.

\textsuperscript{244} Laird, 20.; According to Alastair Johnston from his 2016 journal article, the latest version of the (Chinese) National Defense University’s \textit{Science of Strategy} lists eight methods of deterrence signaling: “public statements indicating a willingness to use force; raising of the level of weapons preparations; displays of strength through publicized exercises; redeployment of forces; raising of military alert levels; attacks on the adversary’s information systems (including cyber-attacks); weapons tests and proactive disruption of the adversary’s military movements; and limited attacks as warning signals,” see: Alastair Johnston, “The Evolution of Interstate Security Crisis-Management Theory and Practice in China,” \textit{Naval War College Review} 69, no. 1 (March 8, 2018): 20, https://digital-commons.usnwc.edu/nwc-review/vol69/iss1/4.

\textsuperscript{245} Laird, “War Control: Chinese Writings on the Control of Escalation in Crisis and Conflict,” 20.

\textsuperscript{246} The latest edition of \textit{The Science of Military Strategy} suggests that the Chinese may be moving towards a launch-on-warning nuclear posture for its strategic early-warning capabilities, see: “China’s Offensive Missile Forces: Testimony by James M. Acton,” April 1, 2015, https://www.uscc.gov/sites/default/files/Acton%20USCC%20Testimony%201%20Apr%202015.pdf.
Additionally, while the Chinese conception of limited nuclear retaliation remains unclear, the 2004 *Science of Second Artillery Campaign* contains two sentences about limited nuclear retaliation. The first mentions that a nuclear counterattack force should be divided into the initial assault group (*shouci tujigun*) and a follow-on assault group (*erhou tujigun*). The second sentence states the PLARF’s forces involved should be organized into two models: one in two or more missile bases and the other involving one missile base.247 The PLA may hold some of its forces in reserve to see how the opponent responds, then utilize the rest of its forces accordingly. These sentences seem to suggest that the PLA may have thought about using tailored nuclear strikes that would involve limited retaliation at the onset of nuclear conflict. Extrapolating from these statements, however, the Chinese could employ a similar strategy to carry out a limited first use of nuclear weapons to demonstrate resolve and/or create a military advantage at the start of a conflict.248

The PLA’s silence (at least in public writings and discourse) about inadvertent escalation and what may happen if deterrence fails raise concerns about whether the Chinese are thinking about these concepts at all. From what can be gathered from open sources, the PRC seems to be fairly optimistic about their ability to manage escalation.249

*Beijing Operating Under Pyongyang’s Nuclear Shadow*

During the Kennedy Administration, the US’s nuclear strategy shifted from the Eisenhower Administration’s policy of ‘massive retaliation’ to ‘flexible response’, which was intended to give the President more options in dealing with the Soviet threat to Western Europe.250 While history did not test whether one policy was more effective than the other, it left open important questions about the nature of nuclear warfare and whether limited warfare is possible in a nuclear conflict.

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248 Cunningham and Fravel.

249 The subsequent vignettes explored later in this chapter will apply the DPRK and PRC’s escalation theories to demonstrate how DPRK-PRC nuclear escalations may play out. However, a senior Chinese security expert at RAND has stated that when similar wargaming exercises have been carried about among senior level officials, however, official doctrine and written strategy tend to become less relevant as players decide to maximize payoffs by doing what is necessary to achieve those outcomes.

During the late 70s and early 80s, Soviet leaders criticized the US’s policy by decrying the possibility of a limited nuclear warfare. However, some experts claimed that subsequent examination of the Soviet’s strategic thinking suggested that Moscow may have adopted a similar line. This analysis has been widely contested, with analysts positing arguments on either side as to what the Soviets really thought. A more neutral conclusion may be that the Soviets may have had some interest in limiting the use of nuclear weapons in a conflict but remained largely unconvinced as to whether a conflict would have remained limited.

Borrowing from this line of thinking, the characteristics of a potential nuclear conflict in a DPRK contingency that could bring PRC intervention invokes the question of whether parties would exercise nuclear restraint. If so, what would constitute ‘unacceptable’ losses for each side? The question of what an unacceptable loss may be for the PRC, DPRK, and the US/ROK are contingent on what is considered ‘rational’ for each side.

The DPRK may be willing to engage in nuclear escalation if the survival of the regime is at stake. The PRC does not face such a risk. The DPRK could potentially leverage these differences in risk acceptability to escalate in such a manner that makes Beijing reluctant to engage. In 2005, former Deputy Commander Zhao Xijun of the PLARF (formerly known as the PLA Second Artillery Corps) noted that even superpowers

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252 Warner, 43.

253 Herman Kahn proposed escalatory responses for limited nuclear warfare by providing how a defender should act after suffering certain arbitrary damage percentages (see Table C.1 in Appendix C). The problem with this model is that it does not provide what context to what that damage percentage looks like, and such calculus will likely differ based on the perceptions of the actor. It is impossible to know exactly what 20% of PRC damage would be, for instance.

“become very cautious” when considering military intervention against nuclear powers.\textsuperscript{255}

This sense of reluctancy and asymmetry in nuclear use leads to the question of how Beijing would respond to living in Pyongyang’s nuclear shadow.\textsuperscript{256} Though doctrine and declared policy may reveal some insight on how each State may behave, the nature of those actions is unclear, especially in the backdrop of a chaotic contingency. Moreover, if Beijing is forced to operate under Pyongyang’s nuclear shadow in a future DPRK contingency, such dynamics will have profound implications not only for Beijing, but also for Washington as the DoD formulates its future response strategies in the region.\textsuperscript{257}

Scenario Descriptions: The Vignettes

For research question three, I propose three vignettes stemming from the main scenario (see p. 27) in which conflict could escalate to the nuclear level.\textsuperscript{258}

In the scenario, heightened political and economic instability within the DPRK drive the Kim regime to initiate a conflict with the ROK. Kim’s main objective is to prevent regime collapse. Thus far, Kim’s security services and military have been effective in putting...


\textsuperscript{256} The term “nuclear shadow” originates from the Cold War where policymakers believed that nuclear-armed adversaries would try to avoid conventional military provocations in fear that conflict could further escalate to the nuclear exchange. However, policymakers also believed that nuclear weapons could embolden their actions by allowing them to take greater risks underneath the assurance of a nuclear shadow (this is often referred to as the stability-instability paradox). When applying this logic to the DPRK example, Pyongyang may feel emboldened to take greater risks at the conventional threshold in hopes that Beijing will be reluctant to engage in fears that the conflict could escalate to the nuclear level. Of course, this would presume that Beijing’s objectives in its Korea intervention would be limited, thereby making its intervention unworthy of the potential costs it could impose on Beijing (i.e., nuclear war), see: David Brewster, “Fighting a War in the Nuclear Shadow,” Australian Strategic Policy Institute, March 10, 2022, https://www.aspistrategist.org.au/fighting-a-war-in-the-nuclear-shadow/.

\textsuperscript{257} While the analogy is not completely congruent with geopolitical nature of Russia’s invasion into Ukraine, one could draw comparisons with the US’s reluctance to directly engage in the conflict, let alone utilize their nuclear weapons against Russia to stop Moscow’s ambitions, see: Kelsey D. Atherton, “Cold War Tactical Nuclear Weapons Cast a Long Shadow over Ukraine,” Center for Public Integrity, April 2, 2022, http://publicintegrity.org/national-security/ukraine-in-crisis/cold-war-tactical-nuclear-weapons-case-a-long-shadow-over-ukraine/.

\textsuperscript{258} We are assuming these vignettes to take place in 2027 or later, where both the PRC may have 700+ nuclear warheads and the DPRK have amassed 200+ nuclear warheads.
down growing internal civil unrest, but bilateral negotiations with the ROK to gain assistance have gone nowhere, creating dissension among the KWP elites.\textsuperscript{259}

Fearing that a continued instability will foment a coup attempt, Kim decides to attack the ROK military with limited strikes in the hopes of forcing favorable concessions from Seoul while trying to deter US and PRC intervention. Kim’s military strategy is to destroy critical ROK defense capabilities, making the DPRK clearly militarily superior to the ROK, by using \textit{limited} numbers of nuclear weapons to demonstrate resolve while retaining sufficient nuclear reserves for deterrence and coercion. After rapid missile, aircraft, and drone attacks using nuclear and chemical weapons (supported by SOF), Kim plans to halt combat operations and sue for a prompt ceasefire with the ROK government so favorable to the North that he appears to have won a great victory, strengthening his regime. He will avoid attacks on US forces to limit the likelihood of US intervention. Kim hopes the threat of nuclear weapon strikes on the US and PRC will deter their intervention or at least delay it until the ceasefire is in place and intervention is no longer meaningful. Moreover, since Kim lacks the resources to wage a protracted war, he realizes that the longer the conflict goes on, the greater the likelihood of US and/or PRC intervention that threatens regime survival, and the lower the likelihood of success. Therefore, he hopes to rapidly bring the conflict to an end by negotiating a ceasefire agreement with Seoul. Settling the conflict on terms favorable to the DPRK should increase internal support for the regime considerably.

Moreover, Kim perceives the timing to be ideal, given that the ROK has elected an ultra-progressive administration that has weakened the ROK-US alliance. The new ROK president has opted for closer relations with the DPRK, reducing the ROK defense budget by 20 percent as a show of good faith. Although conditions for attacking the ROK seem more favorable, Kim also recognizes that attacks against a conventionally superior opponent will still be risky, and he has gradually prepared his forces for the attack while striving to retain as much strategic surprise as possible.\textsuperscript{260}

The PRC is concerned about consequences of an invasion and subsequently prepares to intervene under guise of military exercises in the NTC. Chinese leaders privately warn Kim not to attack the ROK, noting that they will not support him if he does. Kim assures Beijing that the offensive will not last more than two days and that if the PRC is unwilling to cooperate, it should stand aside. Kim wishes to avoid Beijing intervention

\textsuperscript{259} Kim’s regime could face a similar fate as the collapse of the Romanian Ceaușescu regime, which was precipitated by a sudden rebellion in the military.

\textsuperscript{260} Kim could discretely (to the extent that he can) mobilize minimal ground forces, maximize usage of his underground networks to disguise troop movement, and posture weapons systems to decrease the chances of getting caught preparing for an attack. However, he will likely have to leverage his nuclear weapons threat because: (1) his conventional forces will not cause the damage he needs to subjugate the ROK, and (2) he will lose a conventional war.
out of historical animosity and concerns that the PRC might try to replace him with a puppet government. Kim recognizes that the KPA’s conventional capabilities are vastly inferior to those of the ROK and US. In essence, he knows that the KPA does not have the ability to defeat the ROK using only conventional forces. To achieve his objectives, Kim must demonstrate that he is willing to use nuclear weapons to eliminate key ROK capabilities. He also needs to use nuclear weapons to deter the U.S. and PRC. Therefore, Kim makes his redlines clear to both nations: if the PRC or the US intervene, Kim will conduct nuclear strikes against major Chinese or US cities. At this point, Beijing and Washington will have to ask themselves, are they ready to trade Seoul for Beijing or New York?

Furthermore, in order for Kim’s nuclear threats to be credible, he must be able to penetrate through the ROK and PRC’s sophisticated air defense systems which will likely pose a significant challenge. The PLAA, PLAN, and PLAAF employ “tiered and layered approach” to their air defense systems. Each CA-BDE has an air defense regiment and PLAAF units having ground-based air defenses to include medium/long-range radar guided missiles, augmented by their manned aircraft. The PLAN in the NTC is outfitted with advanced SAMs to protect airspace over Qingdao and the Bohai Strait.

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261 Beijing could even opt to mobilize their PAP first since their paramilitary status gives them greater range of military ambiguity.

262 For critics who believe the DPRK will never be able to penetrate the US’s missile defense capabilities, this is not true as the US’s current missile defense capabilities present vulnerabilities to the DPRK’s ICBM threat. As Ankit Panda says, the current US missile defense’s “demonstrated capabilities’ remain poor and the GMD [ground-based midcourse defense] systems’ testing record is limited,” see: Ankit Panda, “North Korea and U.S. Missile Defense Capabilities,” The National Bureau of Asian Research, Congressional Briefing Series, 2021, 4.


264 Headquarters, Department of the Army, “ATP 7-100.3 Chinese Tactics.”

SA-20, HQ-9, and most recently, HQ-19.\textsuperscript{266} Moreover, the PLA’s integrated air defense systems employ a data network that integrates sensors from both the PLAA and the PLAAF, creating an effective SAM umbrella over Chinese territory. Additionally, the static nature of most of the SAM systems allows the network components of these defense weapons to be resilient and remote, making them less susceptible to jamming.\textsuperscript{267} In response to the DPRK’s ballistic missile threats, the ROK is also developing a layered and sophisticated air defense system, which is their own missile shield called the Korea Air and Missile Defense (KAMD) consisting of early warning systems, C2, and intercept systems. The ROK has invested in advanced air defense technology such as the Korean surface-to-air-anti-missile (K-SAAM) in addition to acquiring more Patriot defense batteries.\textsuperscript{268} Additionally, the ROK is developing the L-SAM system which is designed to shoot down DPRK’s ballistic missiles as an upper-tier interceptor for its KAMD.\textsuperscript{269} These systems will pose a significant challenge for the DPRK’s ballistic missiles to infiltrate—however, no air defense system is perfect. The quality of these air defense systems rely heavily on how well their radars are integrated and networked, but such capabilities are hard to fully judge until tested. Moreover, these systems will likely have to endure a significant stress-test if Kim were to launch numerous salvos of ballistic missiles outfitted with both conventional and nuclear warheads.

To weaken the ROK’s air defense systems, Kim orders the KPARF to conduct nuclear attacks on ROKAF airfields, ROKN ports, and major C2 facilities assisted by KPA SOF units attacking the KAMD systems. The KPA also uses its forward echelon artillery to attack ROK army bases. Kim is careful to not attack Seoul’s civilian population, government buildings, major cities, or US military/civilian targets. Kim orders a major assault on the ROK military headquarters neighboring the Yongsan Garrison with his SOF units, while avoiding attacks on the ROK Presidential Offices located in the area.


\textsuperscript{267} Headquarters, Department of the Army, “ATP 7-100.3 Chinese Tactics.”


Kim wants the ROK leadership to be able to quickly negotiate a ceasefire favorable to Kim.

Kim privately warns Beijing to not escalate further by intervening and threatens to attack US military facilities on the Peninsula if the US conducts retaliatory strikes against the DPRK. Similarly, Kim does not attack Japan, but threatens to attack Tokyo if it intervenes or aids the US/ROK.

Kim hopes to complete his ROK offensive and achieve a ceasefire in two days and believes the destruction of bridges on the DPRK/PRC border will buy enough time. He knows that this gambit could fail. But Kim thinks that the probability of failure is relatively low if he can continue to deter or at least delay Chinese intervention by threatening further strikes. Kim’s strategic view is thus:

**Figure 4.2. DPRK Cost Benefit Framework for Deterring PRC Intervention**

(Strategic Level)

Source: Author’s assessment

The following vignettes illustrate how the conflict’s outcome could change with some key variations to the main scenario. The first vignette explores a DPRK nuclear first use case where Kim has had sufficient time to prepare for his offensive. The second examines a DPRK nuclear first use case in which regime failure is imminent. The final vignette looks into a PRC nuclear first use case.

**Vignette One: DPRK First Use Case**

In vignette one, Kim launches a limited attack against the ROK to force political concessions, while simultaneously preparing for Beijing’s intervention believing that he can manage nuclear escalation (should he be forced to escalate) at a lower threshold
without inviting serious retaliation from the PRC. To delay PLA intervention, Kim orders the KPA to destroy major bridges along the Yalu River on the DPRK side of the border with low-yield nuclear weapons. The destruction of these bridges forces the PLA to create temporary bridges, slowing their movement. PLA units must also cross through radioactive areas, forcing them to periodically decontaminate vehicles, further slowing them down. Kim believes that using small-yield nuclear weapons detonated on his territory could limit the likelihood of nuclear retaliation. He believes that blowing up the bridges gives him a temporary operational advantage, potentially allowing him to achieve his objectives in the ROK.

The desired outcome for the DPRK would be to deter or stop PRC intervention while achieving its objectives in the ROK. Kim hopes that the PRC will be unwilling to escalate above the “intense crisis threshold,” allowing the DPRK to reach an advantageous ceasefire agreement with the ROK. For the DPRK to initiate the first strike (blowing up bridges along the Yalu), Kim’s perceived benefits of action must outweigh the cost of such actions. Figure 4.3 shows Kim’s presumed cost-benefit of acting as the first mover:

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270 Vignette one presupposes that the PLA and PAP have already started to mobilize some of their forces closer to the border, after receiving intelligence that the DPRK has been mobilizing its troops against the ROK.

271 Kim views low-yield nuclear weapons as sub-strategic, and therefore may believe that detonating 5 kT weapons (for instance) does not constitute as escalating into the strategic nuclear threshold.

272 Preemptive nuclear strike in this case is characterized differently than the nuclear first strike commonly understood by nuclear scholars. Traditionally, preemptive strike refers to a states’ ability to strike another nuclear power, reducing the ability of the opposite side to further escalate by reducing their capabilities. In this scenario, preemptive nuclear strikes (even of small yields) along the Yalu is more consistent with “first-mover’s advantage” in game theory literature, which allows Kim to signal his nuclear credibility and willingness to use nuclear weapons, while giving the KPA a narrow window of operational advantage to accomplish their limited goals in the ROK.

273 The “Intense Crisis” rung of the nuclear escalation ladder is what Herman Kahn referred to as the “no nuclear use threshold” level characterized by “super-ready status” and where states exchange “nuclear ultimatums” with each other to avoid nuclear confrontation, but prepares to carry them out if needed, see: Kahn, *On Escalation.*
For Kim’s strategy to be successful, the costs for Beijing to escalate by intervening must outweigh the benefits. Using nuclear weapons to blow up the bridges along the Yalu demonstrates Kim’s willingness to use nuclear weapons even against PRC equities, though doing so on DPRK soil minimizes the direct threat to the PRC. This action may prevent the PLA ground forces from entering the DPRK temporarily but will have no effect on China’s air and naval forces. Moreover, it may not delay the PLA for more than a few days.\textsuperscript{274} Therefore, Kim must hold other Chinese countervalue and counterforce targets at risk and communicate these threats to Beijing.\textsuperscript{275}

\textsuperscript{274} The PLA could also mobilize its marines, airborne troops, and SOF units to enter the DPRK—therefore, destroying the bridges is intended to demonstrate a willingness to use nuclear weapons, and impose a temporary delay on PLA troop movement, but does not serve as a longer-term solution.

\textsuperscript{275} Kim could threaten nuclear attacks against the Chinese steel-belt factories located in the Hebei Province of the PRC. These factories are significant as they serve as the economic hub for the region. To carefully manage the PRC’s retaliations, the DPRK should be careful to not aggravate Beijing. Therefore, Kim should be making these threats privately to Beijing, to help the PRC “save face” in their international political front.
Kim could try to deter China from attempting a decapitation operation by threatening an attack on Shanghai or other PRC cities. Kim would hope that the prospects of significant damage to a major city would constitute an “unacceptable loss” and deter an attack. Even a DPRK nuclear weapons would only do partial damage to any PRC city, but the interconnectivity of the PRC economy would cause substantial PRC economic losses beyond the immediate damage to Shanghai. And a nuclear attack of Beijing with a 230 Kt DPRK nuclear weapon could cause such damage to the PRC bureaucracy that the PRC leadership may have difficulty ruling the PRC for an extended period.

As such, Kim may hope that Beijing’s cost for escalating any further in the nuclear threshold will outweigh the benefits of doing so:

**Figure 4.4. Kim’s Desired PRC Cost Benefit Framework for Vignette One**

- **Cost of Action**
  - May put Kim in a use-it-or-lose-it dilemma, spiraling his bellicose ambitions to make good on his threats, believing he has nothing else to lose
  - Undeterred Kim may wage a war against ROK anyway, but conflict becomes protracted, and US nuclear weapons are employed in the region
  - Damaging Chinese image and economy as a superpower nation by suffering DPRK-caused damage
  - Possibly deal with a failed regime and DPRK refugee crisis

- **Benefits of Action**
  - PLA destroys and secures some DPRK nuclear weapons and missiles
  - Other Factors*

*Other factors encompass a multitude of intangible, unknown variables to Kim that could push Beijing into action. For instance, this could be the PRC’s need to establish regional dominance at all costs, Beijing’s belief that it can manage nuclear escalation against Kim, protecting PRC’s image, etc.

If the cost of action (left) outweighs the benefit (right), the PRC could be deterred from further escalating.

Source: Author’s Depiction

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276 Vignette one presupposes the survivability of the DPRK’s nuclear arsenal even after a Chinese retaliatory attack, and Kim having second and even third strike capabilities.

277 See Appendix C.
Kim likely understands that destroying the bridges along the Yalu could cause China to retaliate. However, Kim would hope that, based on his perceived costs to Beijing, the PRC will stop their intervention after a limited retaliatory strike.\footnote{The scenario proposed here show Kim's perceptions of reality, which may or may not be the true reality of conflict. This research is not designed adjudicate or predict the future, but rather to illustrate how these dangerous perceptions of reality can create unintended consequences leading to major destruction.}

Each cost-benefit decision will take into consideration perceived capabilities. The opponent’s threat may not always be credible.\footnote{James D. Fearon proposes three conditions for war under his bargaining model: uncertainty, commitment problems, and indivisibility of a good. In this case, the DPRK and PRC’s conditions for potentially climbing up the escalation ladder can be characterized by the first condition: uncertainty. Fearon posits that actors can miscalculate each other’s capabilities, preferences, and resolve, see: Fearon, James D. "Rationalist Explanations for War." International Organization 49, no. 3 (1995): 379–414.} For Kim’s escalate-to-deescalate strategy to work, Beijing would halt escalation since Kim cannot fight a protracted conventional conflict, let alone nuclear war, against Beijing while fighting in the ROK.\footnote{As nuclear escalation continues, the risks of government destruction, uncertainty in the fog of war, and damage increase for both sides—at each critical juncture (escalate, deescalate, or exit points on the ladder), Beijing would have to decide if intervening and subsequently escalating against Pyongyang is worth the cost of potentially unacceptable losses. As an alternative, the PRC could also pursue non-kinetic means to pressure and punish Kim (as a show of condemnation for the international community for the DPRK’s actions), but those actions will likely not be sufficient to deter Kim from attacking the ROK.}

If Kim has secure second strike capabilities, Beijing may be reluctant to escalate any further and may even seek a ceasefire, especially if it perceives Pyongyang’s threats to be credible. A hypothetical escalation dynamic for vignette one could be the following:
Ultimately, Kim must decide how to respond to whatever size nuclear retaliation that Kim carries out. If he uses nuclear weapons to attack China, he could well find himself in a nuclear escalation spiral. If he hopes that the PRC will limit itself to a few limited strikes, he might be able to achieve the agreement he wants with the ROK and avoid further nuclear weapon attacks.

Key Takeaways from Vignette One:

Vignette one explores the DPRK’s potential operational advantage gained from using nuclear weapons first in dealing with the PRC. Kim knows that doing so will not stop Beijing from intervening but might buy him some time to achieve his campaign objectives with Seoul. To deter Chinese retaliatory nuclear strikes, Kim may have to threaten to escalate. Even if the PRC retaliates with nuclear weapons, it must be careful to avoid strikes that could cause the regime to collapse.

Vignette Two: DPRK First Use—Imminent Regime Collapse

In vignette two Kim is facing significant instability. Here, weakened regime control over the KWP and the KPA has called into question Kim’s sustained leadership. Elites within the KWP have factionalized into two groups, with Kim’s loyalists wanting to preserve the regime while Beijing sympathizers wanting to replace him. An increasingly desperate Kim is concerned that the pro-Chinese elites and military commanders will orchestrate a coup. He fears that some of the KPA commanders involved in the coup may also be...
part of the KPA Strategic Rocket Forces. With Beijing saying little in response, Kim becomes more nervous by the day. Facing a potential coup, Kim finds himself inching closer to a use-it-or-lose-it dilemma with his nuclear weapons.\textsuperscript{282}

In this vignette, a desperate Kim, facing regime collapse decides to launch a limited conventional and nuclear weapon attack on the ROK, aiming to achieve the same limited objectives as vignette one. In this case he does not warn the Chinese. Kim hopes that a sudden attack on the ROK and a subsequent negotiated settlement will appease the disgruntled, hawkish elites and prevent the impending coup.

Overnight, Kim launches a surprise limited nuclear attack on the ROK, targeting key military assets while being careful to avoid US installations. The attack comes as a complete surprise. The suddenness of the attack does not give the PLA sufficient time to mobilize. In response, the CMC starts discussing possible courses of action to intervene to seize or destroy Kim’s nuclear weapons. Kim fears Beijing will attempt to remove him from power after his use of nuclear weapons. Beijing condemns the use of nuclear weapons on the Peninsula and tells Kim to solve the issue through diplomatic means.

Sensing PLA movement along the border, Kim warns Beijing not to intervene. Kim believes that PLA forces in the NTC will be ready to intervene in the next 48 hours. Kim still needs another day to achieve his objectives and bring Seoul to the negotiating table. As in vignette one, he destroys several key bridges along the Yalu using small-yield nuclear weapons and threatens to attack Chinese targets if Beijing intervenes.\textsuperscript{283} Kim hopes that before PLA forces can cross the border, he would have struck a ceasefire agreement with Seoul.

Regime survival is the most important goal for the Kim family; preserving it would justify the use of nuclear weapons. The PRC could nevertheless intervene if it does not believe Kim will use nuclear weapons against it or if it believes it can manage escalation. However, if his regime is sufficiently threatened, Kim could decide to launch a nuclear attack on a major Chinese city as an escalated show of force.\textsuperscript{284} If Kim believes that Beijing will seize his nuclear weapons, then his only chance for regime

\textsuperscript{282} Paul K. Davis and Bruce W. Bennett, “Nuclear-Use Cases For Contemplating Crisis And Conflict On The Korean Peninsula,”\textit{Journal for Peace and Nuclear Disarmament} 0, no. 0 (March 21, 2022): 14, https://doi.org/10.1080/25751654.2022.2053426.

\textsuperscript{283} Similar to vignette one, utilizing small yield nuclear weapons to destroy the bridges along the Yalu River demonstrates resolve to utilize nuclear weapons and temporarily slows PLA border crossing.

\textsuperscript{284} Kim could be thrown into a use-it-or-lose-it dilemma if his chances of regime survival look slim with Beijing’s intervention, especially if Beijing orders the PLA to seize/destroy Kim’s nuclear weapons. Keeping in mind that Kim is operating under high cognitive duress and fears of regime failure, his likelihood to act precipitously and assume the worst could also be elevated.
survival could be to strike against the PRC.\textsuperscript{285} Moreover, a mismatch in perceived capabilities and willingness to use nuclear weapons could lead to a dangerous information asymmetry between Pyongyang and Beijing. Escalating may be worth it to Kim if he believes that the alternative is regime failure. A possible cost benefit framework for the Kim to launch a nuclear attack on the ROK and destroy the Yalu bridges is as follows:

\textbf{Figure 4.6. DRPK Cost Benefit Framework for Vignette Two}

If using nuclear weapons can increase the likelihood that his regime survives, Kim will likely make this choice.\textsuperscript{286} Moreover, this vignette assumes that Kim will be operating under significant duress which could lead to poor judgements. By contrast, the PRC may be more reluctant to use nuclear weapons, as it is skeptical that nuclear escalation can be managed against a desperate Kim.\textsuperscript{287}

\textsuperscript{285} Davis and Bennett, "Nuclear-Use Cases For Contemplating Crisis And Conflict On The Korean Peninsula."

\textsuperscript{286} The other consideration is whether Kim, his family, and loyalists have enough time to escape the DPRK—if the country falls under the control of the opposing faction with Beijing’s support, Kim will surely be executed. This might be another reason to threaten or carry out a preemptive nuclear strike.

\textsuperscript{287} Cunningham and Fravel, “Dangerous Confidence? Chinese Views on Nuclear Escalation.”
The PRC may choose not to intervene if it believes such actions could bring nuclear escalation. Overall, the costs of escalation for the PRC could vastly outweigh the benefits (as illustrated in Figure 4.7)—in which case Beijing has no incentive to continue intervening. However, uncertainty about Kim’s willingness to use nuclear weapons and the number of warheads he has control over could cause Beijing to escalate if it believes that it has a good chance of managing nuclear escalation. A potential escalation scenario could look like the following:

Note: If the cost of action (left) outweighs the benefit (right), the PRC would be deterred from further escalating in the nuclear threshold.

Source: Author’s depiction

An important consideration not illustrated above is the potential cost of Chinese inaction if Beijing decides to stay out of the conflict by not responding to the DPRK’s aggression against the ROK and the bombing of the Yalu bridges. This would send a strong message to the international community that even comparatively weaker and smaller countries like the DPRK can successfully deter superpower intervention and aggression if it has nuclear weapons, even if it is of a smaller inventory. This would reinforce the how powerful nuclear weapons can be in creating a deterrence effect, and could cause other actors, particularly countries like the ROK and Japan to seriously consider developing indigenous nuclear weapons capabilities.

This would be different, however, if the preservation of the regime poses a direct national security threat against the PRC that is as grave as a potential nuclear denotation scenario in the PRC.

Miller, “China’s War Plans for Pyongyang.” Beijing has an alleged contingency operational plan similar to the OPLAN 5029 of the CFC called the “Chick Plan” that outlines procedures for a DPRK regime collapse scenario. The details of this plan, however, remains dubious.
As illustrated above, the conflict could terminate in Kim’s favor for vignette two if Beijing finds the cost to escalate poses an unacceptable risk. To avoid an escalation spiral, Beijing may feel compelled to terminate its escalation.

Key Takeaways of Vignette Two:

Kim, fearing that his nuclear weapons will not survive Chinese conventional or nuclear attacks, may threaten to use nuclear weapons before the PRC is ready to intervene. Meanwhile, Beijing may be hesitant to intervene if it faces significant risk of DPRK nuclear attacks. In this vignette, the DPRK’s ability to conceal its impending attack on the ROK preserved the element of surprise, which, in turn, hindered China’s ability to rapidly intervene. As a result, having that ability may have increased the DPRK’s chances of success given the DPRK’s short goals for its invasion of the ROK. However, Kim’s need to preserve the regime and Beijing’s desire to remove or disarm him, could lead to rapid escalation.

Vignette Three: PRC First Use

In vignette three, the PRC conducts a preemptive nuclear strike on the DPRK. This may be the least likely of the three vignettes, given their official NFU posture. However, the

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291 Cunningham and Fravel call the PRC’s NFU policy as having “limited ambiguity”. Therefore, in efforts to keep a somewhat lean nuclear arsenal, the Chinese have committed to their NFU policy, while having assured retaliatory strike capabilities for subsequent escalations (if needed). The PRC’s 2006 White Paper on national defense describes this strategy as “counterattack in self-defense” (ziwei fanji) and the “limited development” of nuclear weapons (youxian fazhan); see: M. Taylor Fravel and Evan S. Medeiros,
可能性的PRC先发制胜打击不能被忽视。开创性的中国文献表明，敌方核攻击的可信预警可能导致核先发制胜。进一步，“高能”常规攻击对PLARF部队可能同样促使中国采取核回应。

292 例如，KPARF对其导弹系统的动员可被用作PLARF对DPRK核武器打击的借口。

293 一个先发制胜打击将只有在充分中立化了DPRK的报复性能力之后才有效。DPRK武器的数量和位置将决定这种打击的可行性。假设DPRK核弹头数量有限，并在相对集中位置上。

294 北京的先发制胜打击可以减轻这种威胁，如果存在充分的情报的话。

295 进一步，中国决定采取先发制胜打击可能依赖于多个因素：

1. 中国确定DPRK核武器位置的能力。
2. 朝鲜核弹头系统的脆弱性。
3. 是否先发制胜打击能严重限制进一步核交换。

296 在这个案例中，我假定中国情报机构确定了朝鲜计划使用核武器攻击韩国。这个前景足以充分使用核武器来防止朝鲜对韩国的攻击。


292 Fravel and Medeiros, 80.

293 但是，如果金有相对较小的库存，他可能被迫在被捕获或摧毁前使用这些武器。

294 获得朝鲜核资产的完全情报是极不可能的，因为他可能分散在移动发射器和埋藏在地下掩体中。中国的情报机构在确定这些设施位置上是非常非常不可能拥有完全情报的。

295 如前所述，拥有朝鲜核资产的完全情报是极不可能的。


297 如果中国采取这种先发制胜打击，即使乐观地评估摧毁金25%的核武器，仍会剩下大约50个核弹头（假定金至少拥有200个核弹头在2027年）。因此，北京会...
In this vignette, Kim launches a limited attack on the ROK while threatening nuclear strikes if Beijing intervenes. In response, the PLARF conducts massive strikes against DPRK strategic forces. Although the attacks destroy some of Kim’s strategic withholds and ICBMs (likely ones that Kim would have threatened to use against the US), though other DPRK nuclear delivery systems had been dispersed to hide sites prior to the conflict.

Kim destroys the bridges along the Yalu and threatens to conduct nuclear strikes against large Chinese cities. While Kim wants to avoid further aggravating Beijing, he still needs to demonstrate to his elites that his regime will not be bullied by foreigners.

have to assess how Kim will utilize his remaining nuclear weapons. With Kim already losing popularity within his government with KWP elites dissatisfied with Kim’s inability to extort the ROK of economic aid and establish itself as a formidable power in the region, him losing 75% of his strategic arsenal may be synonymous with losing political legitimacy. As such, Kim will have to retaliate against the PRC with his nuclear weapons if he wants any chance at regaining the respect of his elites. Though his weapons have severely decreased at this point, 50 warheads are still sufficient at delivering a lethal attack on major Chinese cities. In essence, unless the PRC can definitely disarm the DPRK completely with the first preemptive strike, the probability for nuclear escalation will likely only increase.
Furthermore, Chinese confidence in escalation management largely stems from their confidence in their ability to compartmentalize conventional and nuclear conflicts, particularly leveraging their multidomain capabilities. However, those capabilities (e.g., cyber, electronic warfare, counterspace, etc.) may not be particularly effective against the DPRK, given the DPRK’s limited reliance on these systems.

In private, Kim strongly threatens to attack Shanghai, the NTC headquarters, or even Beijing with nuclear weapons if the PRC continues to intervene. Although the prospects of Kim even threatening these major targets may seem unthinkable, these extreme threats may be necessary to prevent the PRC’s intervention by making the cost of intervention too high. The logic of threatening major Chinese cities such as Beijing, Shenyang, and Shanghai is to seriously disturb the PRC’s key military, government bureaucracies, and economic centers. Moreover, given that these institutions are highly integrated into the broader Chinese society, the destruction of these key institutions would create seriously unacceptable losses for the CCP and its military. For instance, taking out the CMC headquarters in Beijing and the NTC headquarters in Shenyang would seriously blunder the PLA’s core C2 infrastructure. Attacking Shanghai would destroy the most important Chinese financial and economic hub given that the city is its main commercial capital and the most populace city. Beyond the catastrophic fatalities and injuries such attacks would have on these targets, the related societal shock would be unimaginable.

As such, a potential escalation dynamic involving these threats could look like the following:

298 Cunningham and Fravel, “Dangerous Confidence? Chinese Views on Nuclear Escalation.”

299 Hypothetical nuclear damage calculations for each major Chinese target can be found in Appendix C. The calculations include both a 10 kT and a 230 kT damage estimate for each target. The rationale for showing both calculations is that the 10 kT (or what Kim would likely see as tactical nuclear weapon) while lethal, is unlikely to cause damage sufficient enough to deter Chinese intervention. Therefore, Kim needs to threaten Beijing with the most lethal yield he has, which is like 230 kT based on their tests from 2017, see: Esteban J. Chaves, Thorne Lay, and Dimitri P. Voytan, "Yield Estimate (230 Kt) for a Mueller-Murphy Model of the 3 September 2017, North Korean Nuclear Test (MbNEIC = 6.3) From Teleseismic Broadband P Waves Assuming Extensive Near-Source Damage," Geophysical Research Letters 45 (October 1, 2018): 10,314-10,322, https://doi.org/10.1029/2018GL079343.
The PRC, fearing that their inability to stop nuclear strikes on the ROK may invite US nuclear attacks on the DPRK, could then decide to conduct a decapitation attack against Pyongyang. At this point, Beijing is uncertain about how many nuclear warheads the regime has left (not to mention their CBW stockpiles) and hopes that its decapitation attack will buy time to seize or destroy the remaining weapons. In response, Kim launches nuclear strikes against Shanghai. Kim, believing that Beijing would strike Pyongyang next, has moved to a remote, undisclosed command and control site to limit the threat to him.

As shown in the figure above, vignette three ends with the DPRK and the PRC falling into a nuclear escalation spiral, with conflict terminating with Shanghai in ruins and the DPRK a failed state, a terrible outcome for both parties, and a Pyrrhic victory for Beijing. Yet the negative consequences for the PRC are not limited to the destruction

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300 Kim believes that a commensurate response to Beijing’s decapitation attempt against him is to attack Beijing.
301 Alternatively, Beijing could terminate the escalation at any point without going as far as to fall into the escalation spiral. Actors take large risks every time it decides to climb the escalation ladder with hopes that each large risk will hopefully illicit favorable behavior from the opponent, but failure to yield those behaviors leads them to an escalation spiral. As demonstrated above, the DPRK and the PRC can find themselves in an escalation spiral very quickly when actions do not result in the intended reactions. Jervis refers to this as the spiral model, see: Jervis, Robert. “Chapter Three. Deterrence, the Spiral Model, and Intentions of the Adversary.” In Chapter Three. Deterrence, the Spiral Model, and Intentions of the Adversary, 58–114. Princeton University Press, 2017. https://doi.org/10.1515/9781400885114-006.
302 “Pyrrhic victory” is a metaphor named after King Pyrrhus, the King of Epirus who led the first battles between the Greeks and the Romans. The metaphor refers to “victory or success which is gained at so
of a city. The PLA would have move forces into the DPRK to try to secure loose nuclear weapons. Moreover, the PRC will likely try to put in place a puppet leader in the DPRK, while preventing the ROK from gaining control. Beijing might also have to deal with a refugee crisis, nuclear fallout, and ensuring the safety of its citizens close to the Sino-Korean border.

Key Takeaway from Vignette Three:
This is arguably the worst-case scenario for both the DPRK and the PRC. It is one that Kim would want to avoid at all costs. A Chinese preemptive attack on his nuclear forces can lead to a use-it-or-lose-it dilemma, especially when he is operating at the backdrop of internal instability.

Vignette three is intended to demonstrate just how easily an escalation spiral can ensue after a pre-emptive nuclear strike. While Beijing may hope that its preemptive counterforce attack will deter Pyongyang from escalating further, it could also cause Kim to rapidly escalate to attacking Chinese cities. If the PRC and the DPRK find themselves in such an escalation spiral, the Kim regime would likely be destroyed. Beijing will have to deal with a devastated city and a failed neighboring state, with the attendant refugee flows and security issues.

Kim, facing such a disastrous outcome, would want to deter Chinese preemptive strike at all costs. To avoid this outcome, Kim would have to make very clear to Beijing that attacks on his strategic forces would lead to devastating retaliation.

Summary
The dynamics of these vignettes suggest that DPRK nuclear escalation against the PRC is possible, and that threats of nuclear strikes may deter Chinese intervention; however, Kim would likely face Chinese retaliation. The development of DPRK’s second-strike capabilities (if they do not already exist) and its willingness (and ability) to engage in a nuclear conflict against the PRC may create an opportunity for Pyongyang to deter PRC intervention. Such dynamic creates several strategic issues for Beijing. First, giving in to the DPRK’s demands fundamentally changes the DPRK’s “little brother” client state status and a change in the balance of power in the region.303

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303 For a hegemon that takes “saving face” as an integral part of its political image, such outcomes would be unacceptable. Moreover, this goes back to Beijing and Pyongyang having divergent political objectives in the region: Beijing’s ultimate strategic goal for the Peninsula would be to have a pro-China DPRK/Korean government and a denuclearized peninsula. Pyongyang’s goal is to become a regional superpower, guarantee Kim’s regime survival as a result, and become an official nuclear weapons state.
Further, these escalation dynamics illustrate that any nation considering an action that could threaten the DPRK regime will have to deal with the prospect of nuclear attacks. Relatedly, such a bold action by Kim could send a strong message to the international community that Kim will prioritize the survival of the regime above all else, and that even the superpowers are not immune to the DPRK’s nuclear threats—Kim may believe this will be sufficient to keep the US from honoring its extended deterrence guarantee to the ROK while deterring PRC intervention.

These vignettes are designed to promote consideration of unthinkable scenarios, but escalation dynamics in real life may not be as clear cut—smaller escalations in multiple domains could augment the large jumps on the escalation ladder.  

Figure 4.12. Summary of Research Question Three Findings

| V1: DPRK First Use | Gradually escalating confrontation; PRC preparing to intervene  
|                    | Kim employs escalate-to-deescalate strategy  
|                    | Kim hopes to delay PRC’s intervention  
|                    | Kim seeks rapid ROK ceasefire to limit prospect of PRC intervention |

| V2: DPRK First Use (Preventing Imminent Regime Collapse) | Imminent regime collapse, Kim launches surprise attack  
|                                                        | Kim strikes ROK before PRC is ready to intervene  
|                                                        | Kim’s desperate, bellicose actions might deter Beijing from intervening |

| V3: PRC First Use | Arguably the worst vignette for both DPRK and PRC  
|                  | High possibility of escalation spiral  
|                  | High likelihood of regime failure caused by Beijing |

Source: Author’s depiction

Even if nuclear conflict starts at a lower level, it can quickly spiral even if the actors are very careful. Moreover, inadvertent, or accidental nuclear escalation caused by

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that reunifies the Peninsula under its regime. The DPRK desires to be an independent power, free from foreign influence, especially from countries that have a historical track record of invading its territory.  

It is impossible to address every possible permutation of the hypothetical scenarios. These vignettes are designed to illustrate a just a few potential possibilities.
miscalculation and misperception could also occur. For instance, DPRK attacks on the NTC’s nuclear command and control bases using conventional weapons could be considered a strategic attack and prompt Chinese nuclear retaliation even though Kim may have considered them conventional. Relatedly, if a DPRK conventional ballistic missile salvo is mistakenly categorized as a nuclear strike, the PRC could respond with nuclear weapons before knowing the actual character of the DPRK attack.\textsuperscript{305} Furthermore, given the geographic proximity between the two countries, an SRBM or an MRBM would have a very short time of flight, limiting time for deliberation, which could generate rushed and possibly erroneous decisions.

Further, it is unclear as to what the Chinese define as “first-use.” For instance, the PRC could choose to employ conventional means to destroy Kim’s nuclear weapons preemptively.\textsuperscript{306} However, Pyongyang may interpret such an attack as a strategic threat and respond with nuclear weapons. Moreover, if a disarming Chinese nuclear strike or a decapitation operation seems imminent, Kim might feel compelled to use nuclear weapons. Thus, ambiguity in the use of force or the threat of use of force could be devastating.

Other considerations such as information asymmetry (involving capabilities, motivations, and willingness), hidden actions, and political incentives complicate this theoretical game of chicken. The DPRK has been a notoriously difficult state to gain intelligence on, and thus how much the Chinese know about the DPRK’s nuclear weapons capabilities is uncertain.\textsuperscript{307} Finally, misperceptions and miscalculations in capabilities and Pyongyang’s willingness to use nuclear weapons could increase the likelihood of nuclear escalation. At every critical decision-making node in the DPRK’s escalation ladder, Kim will prioritize regime survival. Although the vignettes examined three potential courses of action, the possibilities for alternative outcomes are endless.\textsuperscript{308}

In all cases, however, post-conflict termination will be a critical concern for the PRC, ROK, and US. Without a clear delineation of the roles in a future DPRK contingency, the PLA and the CFC could race to secure Kim’s loose nuclear weapons, while attempting

\textsuperscript{305} Inadvertent escalation can become even more probable if the CMC were to decide to give regional commanders, who may be more inclined to use nuclear weapons, the authority to launch them.

\textsuperscript{306} If Beijing is successful at destroying a hundred percent of Kim’s nuclear weapons, Kim would have nothing to retaliate with, ending the nuclear escalation. However, the Kim could still potentially utilize other WMDs against the PRC, to include CBW.

\textsuperscript{307} The PRC would have to obtain intelligence on Pyongyang’s weapons dispersal locations to have a chance at destroying them.

\textsuperscript{308} Moreover, the vignettes become far more complicated when potential US, ROK, Japan, and even Russian actions are considered.
to maintain governance in regions they control. Moreover, Kim’s usage of nuclear weapons against the ROK may catalyze the US to employ nuclear weapons to fulfill its extended deterrence commitment. This could also trigger a response from the PRC and broaden the conflict. Therefore, research question three is an especially salient matter to consider not only for Beijing, but also for CFC and ROK/US policymakers.

Special thanks to interview participants: Andrei Lankov, US embassy attaché office, USFK Strategy Office (J5), US Operations Planners from the CFC (C5), Dr. Victor Cha, Dr. Oriana Skylar Mastro

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309 At the tactical and operational levels, CFC ground units deployed to the DPRK could become collateral casualties if caught in the crossfire of PRC-DPRK nuclear exchanges. The presence of PRC and ROK forces in the DPRK creates questions over how these forces will conduct operations in close proximity to one another, potentially at cross purposes. Additionally, the ROK will not want the PRC to secure the DPRK nuclear weapons—given that the ROK maintains a hostile relationship with the PRC and distrusts their intentions. Instead, it could attempt to do so, potentially at the risk of conflict with the PRC.
5. Conclusions

The DPRK’s expanding nuclear arsenal poses a security threat towards all parties, to include the PRC. Moreover, their rapidly growing arsenal creates an increasingly destabilizing effect in the region, challenging conventional geopolitical thinking. Conventional wisdom on the DPRK-PRC relationship misconstrues the foundations of the partnership which are flawed and weak. Whether the Chinese intervene in a conflict in the DPRK will depend on the type of contingency and the conditions of the geopolitical environment.

This dissertation presented three different research questions examining ways in which the DPRK might use military force against the PRC. Research question one found that the KPA’s conventional forces are inferior to those in China’s NTC and unlikely to prevail in a conflict. The first part of research question two explored how KPA’s artillery strikes could damage Chinese cities. However, these attacks are unlikely to deter Chinese intervention. Moreover, the KPA artillery systems in the rear lack the capability to destroy a substantial share of NTC forces. The second part of research question two explored the potential effects of the DPRK TNWs attacks on Chinese strategic and conventional forces. TNWs lack the capability to significantly damage Chinese strategic rocket forces. While they could create widespread damage at army bases, air bases, and naval ports, such attacks are likely to bring retaliatory nuclear strikes.

Therefore, in order for the DPRK to even have a chance at managing escalation against the PRC, it would need second-strike capabilities, to allow it to escalate further if Beijing conducted retaliatory nuclear strikes.

In research question three, I examined whether the DPRK could credibly manage conflict escalation involving both low and high yield nuclear weapons in vignettes with different assumptions about DPRK and PRC objectives and moves. The consequences of nuclear conflict are disastrous for all parties involved. However, the propensity or likelihood for DPRK to use nuclear weapons may be greater than that for the PRC under certain circumstances (vignette two of research question three). This should pose a serious concern for Beijing.

Thus, the DPRK’s nuclear weapons could be credibly used to try to deter PRC intervention in the context of a DPRK-ROK conventional conflict. Furthermore, as the DPRK the development of second-strike capabilities could create an opportunity
for Pyongyang to not only deter Chinese intervention and influence Beijing’s policies towards the DPRK.

Interviews with warfighters, planners, and strategists in the ROK suggest that the DPRK nuclear threat is passively acknowledged, but not actively planned for, especially when contextualized in the backdrop of PLA intervention on the Korean Peninsula.

The U.S. should reconsider what extended deterrence looks like for the ROK, what changing geopolitical shifts in the region mean for future force posture, and what the implications of fundamentally changing US position on the DPRK could look like (i.e., accepting them as a formal nuclear weapon state). Moreover, future research should on what a shift in focus from DPRK denuclearization to arms control could look like and how to while holding and strengthening US security commitments and partnerships in Asia. Opportunities to cooperate with Beijing to achieve shared security goals, such as limiting the likelihood of a nuclear exchange on the Peninsula, should also be discussed.
6. Policy Implications and Recommendations

In this chapter, we discuss the implications of our conclusions for policy makers and provide recommendations to the CFC, and relevant policymakers on ways to address the emerging threat of DPRK nuclear weapon use and the possibility of Chinese intervention in a future conflict between the DPRK and ROK.

Policy Implications of Continued DPRK Nuclear Weapons Growth:

**Kim’s increasing arsenal of nuclear weapons will likely embolden him to engage in saber-rattling to gain concessions in future negotiations.** Pyongyang could similarly extend such practices onto Beijing, especially if the Chinese refuse to give in to some of Kim’s requests (e.g., economic and/or military aid, diplomatic support). As illustrated in research question three, this could force the PRC to operate under the DPRK’s nuclear shadow. Doing so would have significant political ramifications for Beijing—a DPRK with large numbers of nuclear weapons could be less beholden to the PRC. Furthermore, such actions could encourage other nations in the region to acquire their own arsenal, an unwelcome prospect for both Beijing and Washington. More specifically, Kim’s expanding nuclear arsenal has spurred doubts about the US’s extended deterrence commitment and could spur the ROK to develop nuclear weapons to deter the DPRK from conducting nuclear strikes against it.

**The DPRK’s increasing nuclear weapons arsenal pose strategic challenges for the PRC and the US/ROK.** The security environment on the Korean Peninsula is vastly different from that of the 1950s. The DPRK and the PRC have acquired their own nuclear weapons, the PRC has amassed a sizeable military arsenal to deter the US, DPRK-PRC relations are fragile, and the ROK has developed into a prosperous democratic nation. The current command architecture of the CFC, which strongly favors the U.S., may not be viable for much longer.\(^{310}\) Having three nuclear actors in the region

\(^{310}\) The current command architecture stipulates that the SUSMOAK has operational control (OPCON) of both US and ROK armed forces during wartime on the Korean Peninsula. This command architecture has been cited as one of the most “remarkable concessions of sovereignty” in the modern times. The perennial debate over the efficacy of the OPCON transfer will likely remain unabated in the future and will be even more consequential if we believe the DPRK could leverage its WMDs in a contingency, see: Won-je Son, “The ‘Most Remarkable Concession of Sovereignty in the Entire World,’” *Hankyoreh* November 4, 2014, https://english.hani.co.kr/arti/english_edition/e_international/662856.html; Jina Kim, “Military Considerations for OPCON Transfer on the Korean Peninsula,” Council on Foreign Relations, March 20, 2020, https://www.cfr.org/blog/military-considerations-opcon-transfer-korean-peninsula.
will increase the potential for escalation and complicate future conflicts. Moreover, the PRC weary about a US-led missile defense cooperation among the ROK, US, and Japan. These are significant challenges for Washington and the ROK to navigate. However, fractures between the DPRK and the PRC could create an opportunity for the U.S. to achieve its geopolitical objectives in the region without risking excessive US military involvement—if the U.S. can successfully convince the PRC to take the DPRK’s nuclear threat more seriously, than could increase its countermeasures to contain Pyongyang’s nuclear weapons expansion which will result in significant geopolitical gains for both the ROK and the U.S.

**Policy Implications of DPRK Nuclear Attacks on the ROK:**

**The DPRK’s threat of the use of nuclear weapons use or actual use of those weapons in a future conflict against the ROK cannot be discounted.** Kim Jong Un appears to be expanding his nuclear weapons arsenal to provide more lethal capabilities that could be employed alongside conventional forces. This is primarily exemplified by their development of battlefield (tactical) nuclear weapons. US commanders in the ROK have been clear that they can easily defeat a North Korean conventional attack. Therefore, the DPRK views nuclear weapons as an important asset to augment their conventional military forces which are weak relative to the ROK’s modernized military. The DPRK seems to believe that even a modest-sized nuclear force could badly damage its adversaries and help Pyongyang achieve its objectives in a future conflict. A scenario demonstrating how these weapons might be used was discussed in Chapter 3. In light of such growing threats, the current incremental updates to the CFC’s operational plans, while important, may be insufficient to adequately address future nuclear contingencies.

**The threat of DPRK nuclear attacks on the ROK warrants robust response and protection measures to protect civilians and warfighters.** CFC strategists should consider integrating nuclear weapons into its warfighting strategy. This could provide a more comprehensive approach for the CFC’s current war plans that will help deter, and failing that counter, the DPRK nuclear threat. Enhancements to active defenses, passive defenses, and training will be critical.

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Policy Implications of Chinese Intervention:

The CFC needs to be preparing and planning for a potential PLA intervention in a future Korean contingency scenario. The CFC’s operational planning needs to address both the DPRK and the PRC nuclear operations in future Korean contingency, seeking especially to (1) identify potential and actual nuclear attacks, (2) protect forward-deployed CFC forces from collateral damage (such as having robust combat search and rescue capabilities, decontamination capacity), and (3) exploit opportunities to cooperatively reduce DPRK threats. Moreover, the lack of prior coordination and communication between the PLA and the CFC can lead to collateral damage and inadvertent escalation that could be disastrous for all. For instance, during times of conflict and chaos, PLARF and KPARF nuclear strikes against each other could be mistaken for those targeting CFC assets. Relatedly, CFC units mobilized to seize and/or destroy Kim’s nuclear weapons could be competing against PLA units that are ordered to do the same—without clear delineation of roles on how to contain Kim’s loose nukes, such competition could escalate the conflict to higher thresholds.

The lack of trust between the PRC and the US and the PRC and the ROK can create higher likelihood of miscommunication and mistakes during times of crisis, potentially escalating the DPRK vs. ROK conflict to one of the PRC vs. US. Limiting operational risks during a DPRK contingency will be critical in avoiding mistakes that could lead to inadvertent escalation between the CFC and the PLA (e.g., a PRC SAM mistakenly shooting down a USAF fighter). Moreover, the PRC and the ROK/US have competing interests in the region—in the case of a Kim regime collapse, both parties will want to stabilize the chaotic effects such predicament will have on the Peninsula, but they would also likely want to be the country that has control over Kim’s loose nukes. Without the ROK/US deconflicting airspace and territory in the aftermath of a regime failure, could easily escalate into a US-China war.

Recommendations

The CFC needs to enhance its integrated conventional/nuclear warfighting plans and missile defense capabilities as the DPRK’s nuclear threat evolves. Simultaneously, the United States needs to strengthen ROK assurance of the US extended deterrence commitments, including the “nuclear umbrella.”

Enhanced active defenses, such as additional missile defense systems, can intercept weapons tens of miles from the target, limiting the likelihood of damage.

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313 The ROK would likely want the CFC to capture the DPRK’s nuclear weapons and facilities first before the Chinese can get to them. This made clear from expert interviews with academics and warfighters on the Korean Peninsula.
Although the ROK is currently developing and procuring some of these systems (e.g., KAMD, THAAD, Iron Dome etc.). These active missile systems must be integrated into an air and missile defense architecture that is resilient, redundant, and reliable. The ROK still has significant ways to go in terms of procuring the systems and integrating the capabilities.\(^{314}\) Therefore, the ROK should prioritize investments in these capabilities and integrating them with their existing missile defense systems. However, given the PRC’s response to previous ROK missile defense acquisitions, Seoul will need to carefully navigate the Chinese reaction to these enhancements.\(^ {315}\)

Relatedly, implementing robust passive defenses, such as underground facilities, improving air filtration systems, enhancing decontamination systems, and developing related nuclear safety protocols for both military and civilian protection can limit the damage from DPRK strikes that get through ROK air defenses. By training and maintaining large decontamination units, the CFC can allow for its forces and buildings to return to normal operations more rapidly after a nuclear strike. Other measures, such as force dispersal, rapid identification of contaminated zones and avoidance of those areas, treatment of personnel injured by nuclear weapon effects, are also important to implement in the CFC’s operational plans. Moreover, key thresholds, redlines, and related nuclear attack response plans should be developed and implemented as regular safety drills for the ROK civilian populace to reduce overall collateral damage.

In addition, the United States should strengthen its extended deterrence commitments to the ROK, including the US “nuclear umbrella.” Many in the ROK are doubting this assurance now. Strengthening it will also help deter North Korean


\(^{315}\) Soon after the 2016 THAAD dispute between the ROK and the PRC, the Moon administration resumed normal economic relations with Beijing after committing to their “three noes” consisting of (1) no addition deployment of THAAD batteries, (2) no ROK integration into US-led missile defense system, and (3) not pursuing a ROK-US-Japan trilateral alliance, see: Troy Stangarone, “Did South Korea’s Three Noes Matter? Not So Much.,” The Diplomat, October 30, 2019, https://thediplomat.com/2019/10/did-south-koreas-three-noes-matter-not-so-much/.

However, given recent nuclear threats from the DPRK, the new Yoon administration may be reconsidering this policy, see: Christy Lee, “South Korea’s THAAD Missile Shield Reconsidered After North Korean Threats,” VOA, August 5, 2022, https://www.voanews.com/a/south-korea-s-thaad-missile-shield-reconsidered-after-north-korean-threats/6687971.html.
nuclear attacks and reduce the chances of the ROK developing its own nuclear weapons, an action which could further destabilize the Korean peninsula.

**Furthermore, cadres of ROK officials and CFC warfighters should receive enhanced training on responding to nuclear weapon employment.** Although a few ROK military officers are already involved in a number of international military education and training programs sponsored in the US for nuclear weapons, the scope and scale of this training are still limited, with heavy focus on nuclear engineering.\(^{316}\) Given the DPRK’s growing nuclear threat, PME on these subjects should be more widely offered to ROK officers and civilian national security experts to give them a better understanding of how to operate in nuclear warfighting environments. Moreover, relatively few US military personnel assigned to Korea are experts in nuclear weapon issues. Given the DPRK’s nuclear threat, PME on these subjects should be more widely offered to military personnel assigned to Korea. The required PME needs to focus on potential DPRK nuclear weapon effects and what must be done by the CFC to defend against them and respond to them.

By integrating the nuclear component into the CFC’s conventional warfighting plans, ROK and US warfighters can be better prepared to address future DPRK contingency scenarios involving nuclear weapons. Though Strategic Command (USSTRATCOM) holds jurisdiction over providing deterrence via nuclear weapons, the need for the CFC to familiarize itself with nuclear warfare at the tactical and operational level will likely become more salient as Kim desires to integrate nuclear weapons into its own conventional warfighting strategy.

*The CFC needs to prepare to deal with PRC intervention in the DPRK in future contingencies.*

**Specific lines of actions could include plans for deconflicting airspace, sharing information on the location of ground forces and operations preventing/limiting collateral damage to US/ROK and PRC forces from attacks on the DPRK, avoiding/containing escalation in the event of inadvertent attacks, and ways to clearly communicate CFC intent to their PLA counterparts.**\(^{317}\) Relatedly,

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\(^{316}\) Based on expert interviews.

\(^{317}\) Former SUSMOAK General Robert Abrams stated in a public interview that Seoul and Washington should update their war plans to address threats from both the PRC and the DPRK. He stated that the PLA involvement must be “accounted for in the war plan that the current Strategic Planning Guideline does not contain,” see: Jeongmin Kim, “Ex-USFK Commander Says Joint War Plans Should Address China. Seoul Isn’t Happy,” NK News, December 29, 2021, https://www.nknews.org/2021/12/ex-usfk-commander-says-joint-war-plan-must-address-china-and-seoul-isnt-happy/.

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coordination among the USFK, CFC, and US Indo-Pacific Command (USINDOPACOM) should be frequently revisited to plan for future contingencies in which the PRC is involved.\footnote{PLA involvement could trigger the involvement of USINDOPACOM especially if the US military’s footprint has to extend beyond the Peninsula (i.e., US forces crossing the Sino-Korean border). Coordination can start by the CFC identifying its needs when dealing with a potential PLA intervention and addressing those concerns with USINDOPACOM. It would also require US warfighters to clearly communicate how such contingency could potentially trigger the involvement of multiple theater commands to their ROK counterparts.}

**The CFC needs to closely monitor activities in the NTC.** This includes keeping close tabs on various Chinese public media and written military doctrine that addresses potential shifts in Chinese views on the DPRK threat. PLA activities could include changes in border defense posturing, equipment transfers, strengthening of bases, basing of missile defense systems, and increasing force projection capabilities in the NTC, particularly along the Sino-Korean border. US policymakers should also monitor information on the PLA’s battle, strategy, operational concepts, PLARF nuclear forces, and other related capabilities in the NTC.

**The CFC needs to prepare for potential Chinese nuclear weapons employment in its operational planning and force development.**\footnote{If the DPRK were to threaten or even use its nuclear weapons against the PRC, the CMC’s military doctrine suggests assured Chinese nuclear retaliation is certain, and their preemption may become necessary to avoid compromising on major national security interests.} This could reduce the collateral damage that could be caused if US and ROK forces were caught up in a DPRK-PRC nuclear exchange. Relatedly, the CFC needs an ability to rapidly determine where and how nuclear weapons have been employed to allow decision makers to react accordingly. The CFC also needs to understand how the US use of nuclear weapons against the DPRK in response to nuclear strikes on the ROK could be viewed by Beijing and whether such actions could trigger escalation by the PRC.

The amalgamation of these potential challenges makes clear that the US, ROK, and the PRC need to establish clear lines of communication during a future contingency to deconflict and coordinate for effective operations to stabilize the DPRK (to be addressed in the next policy recommendation). However, in the case that political issues bar the countries from creating clear standard operating procedures (SOPs) and agreements on how to delineate roles during a potential conflict. The CFC needs to be prepared to operate in a conflict environment where the PRC intervenes. Failing to do so could cost the lives of tens of thousands of ROK and American lives.
Include Korea nuclear contingency as a key topic of discussion in future PRC-ROK-US engagements. Examine ways to limit the likelihood, and consequences of nuclear weapon use.

Washington and Seoul should initiate regular trilateral summits among the PRC, ROK, and the US to discuss potential future DPRK contingencies. These trilateral discussions should cite specific scenario and situations, such as the ones proposed in this research, in which Pyongyang's use of nuclear weapons could pose a serious threat to all stakeholders. By bringing Beijing into the conversation, the three countries can reduce ambiguity of operating in a future DPRK contingency and potentially build trust in the process. Lines of communication among the three countries could be established by establishing liaison offices and inviting the PLA to future CFC operational planning circles. Moreover, conversations about airspace and territory deconfliction and missile defense protocols can help to reduce inadvertent escalation in the fog of war. These liaison offices and planning circles should be certain to address how each country approaches nuclear escalation management and their protocols for dealing with a contingency that involves three separate nuclear actors. Relatedly, the ROK and the PRC should come to consensus on Seoul's missile defense mechanisms, namely the usage of THAAD and the KAMD to try to ensure that the 2016 dispute does not repeat.320

US policymakers should reassure its regional allies (i.e., ROK and Japan) that they will be protected in the event of a nuclear attack while discouraging allied proliferation. Relatedly, the US should simultaneously communicate to its allies that creating independent nuclear forces is unwise.321 In tandem, US analysts need to be cognizant of the evolving security landscape in East Asia by addressing concerns of its partners to increase trust and strengthen their alliances.

These policy recommendations are aimed specifically to reduce operational ambiguity and uncertainty among the US, ROK, and the PRC which will be invaluable for avoiding unwanted collateral damage, and a potential nuclear catastrophe. Moreover, a unified front on this issue could further build confidence and trust among US allies about


Washington’s ability to manage conflict in the region while including the PRC in the conversation.\textsuperscript{322}

\textsuperscript{322} The author inherently understands the political infeasibility of such prospects given the on-going strategic competition between the US and the PRC.
Appendix A: Research Question 1 Calculations

Given the limited availability in the open-source literature surrounding the PRC and the DPRK’s exact military force configuration (specifically their equipment and personnel counts) much of the first research question relied on approximations aided by the inputs of subject matter experts.

Table A.1. JICM Weapon Classes

<table>
<thead>
<tr>
<th>Type</th>
<th>Weapon Class</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tanks</td>
<td>Tanks</td>
<td>All medium and heavy tanks (e.g., M1-A1 or T-80)</td>
</tr>
<tr>
<td>Armor supporting</td>
<td>Anti-armor</td>
<td>All armored infantry carriers with an anti-armor capability (e.g., BMP or Bradley)</td>
</tr>
<tr>
<td>IFV/APC</td>
<td></td>
<td></td>
</tr>
<tr>
<td>infantry</td>
<td>Other anti-</td>
<td>All other armored vehicles (ARVs and anti-armor vehicles) with an anti-armor capability (e.g., ITV, BRDM with AT-3, or PT-76)</td>
</tr>
<tr>
<td>armor armor</td>
<td>Other APCs</td>
<td>Armored infantry carriers without an anti-armor capability (e.g., M-113 or BTR-50)</td>
</tr>
<tr>
<td>Other vehicles</td>
<td>Other armor</td>
<td>Other armored vehicles without an anti-armor capability (e.g., Ferret)</td>
</tr>
<tr>
<td>Infantry</td>
<td>Long-range</td>
<td>Long-range anti-armor systems carried by infantry, mounted on light vehicles, or towed (e.g., man pack TOW, AT-3, or anti-tank guns)</td>
</tr>
<tr>
<td>anti-armor</td>
<td>Short-range</td>
<td>Short-range anti-armor system (e.g., LAWS, Dragon, and recoilless rifles)</td>
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<tr>
<td>antiarmor</td>
<td>Mortars</td>
<td>Mortars under 100 mm</td>
</tr>
<tr>
<td>infantry</td>
<td>Small arms</td>
<td>Rifles, machine guns, and similar weapons carried by combat infantry forces</td>
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<tr>
<td>Artillery</td>
<td>SP artillery</td>
<td>Self-propelled artillery, multiple rocket launchers, and mortars over 100 mm (e.g., MLRS or M-109)</td>
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<tr>
<td>Towed Artillery</td>
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<td>Towed artillery and mortars over 100 mm (e.g., M-114 or D-30)</td>
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<td>Helicopters</td>
<td>Attack</td>
<td>Helicopters with a primary anti-armor or indirect fire mission (e.g., AH-64 or Hind)</td>
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<td>Air Defense</td>
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<td>Organic air defense systems with radar homing (e.g., SA-8 or Roland)</td>
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<tr>
<td></td>
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<td>Organic air defense systems requiring optical sighting and/or IR homing (e.g., Stinger or Vulcan)</td>
</tr>
<tr>
<td></td>
<td>homing</td>
<td></td>
</tr>
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<td>Other</td>
<td>To be determined</td>
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Source: RAND, 2020
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<th>Quantity</th>
<th>Type</th>
<th>Scores</th>
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<td>CAB: 46th + 200th</td>
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<td>Medium</td>
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<td>CAB: 199th + 203rd</td>
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### XIII Infantry Corps

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### IX Corps

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<th>Type</th>
<th>Quantity</th>
<th>Scores (L)</th>
<th>Scores (H)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Infantry Division (AD)</td>
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<td>662.13</td>
<td>945.9</td>
</tr>
<tr>
<td>Tank BDE</td>
<td>1</td>
<td>258.93</td>
<td>369.9</td>
</tr>
<tr>
<td>Sniper BDE</td>
<td>1</td>
<td>420</td>
<td>600</td>
</tr>
<tr>
<td>(SOF) LT Infantry BDE</td>
<td>1</td>
<td>226.1</td>
<td>323</td>
</tr>
<tr>
<td>Artillery (MRL) BDE</td>
<td>1</td>
<td>177.8</td>
<td>254</td>
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<tr>
<td>Corps SP Artillery BDE</td>
<td>1</td>
<td>224</td>
<td>320</td>
</tr>
<tr>
<td>Anti-Tank BN</td>
<td>1</td>
<td>44.73</td>
<td>63.9</td>
</tr>
<tr>
<td>AAA Regiment</td>
<td>1</td>
<td>60.144</td>
<td>85.92</td>
</tr>
<tr>
<td>AAA BN</td>
<td>1</td>
<td>20.048</td>
<td>28.64</td>
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### XII Corps

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<th>Scores (H)</th>
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<tr>
<td>Type</td>
<td>Quantity</td>
<td>Scores (L)</td>
<td>Scores (H)</td>
</tr>
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<td>------------------------------</td>
<td>----------</td>
<td>-------------</td>
<td>------------</td>
</tr>
<tr>
<td>Tank BDE</td>
<td>1</td>
<td>258.93</td>
<td>369.9</td>
</tr>
<tr>
<td>Sniper BDE</td>
<td>1</td>
<td>420</td>
<td>600</td>
</tr>
<tr>
<td>(SOF) LT Infantry BDE</td>
<td>1</td>
<td>226.1</td>
<td>323</td>
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<tr>
<td>Artillery (MRL) BDE</td>
<td>1</td>
<td>177.8</td>
<td>254</td>
</tr>
<tr>
<td>Corps SP Artillery BDE</td>
<td>1</td>
<td>224</td>
<td>320</td>
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<tr>
<td>Anti-Tank BN</td>
<td>1</td>
<td>44.73</td>
<td>63.9</td>
</tr>
<tr>
<td>AAA Regiment</td>
<td>1</td>
<td>60.144</td>
<td>85.92</td>
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<tr>
<td>AAA BN</td>
<td>1</td>
<td>20.048</td>
<td>28.64</td>
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<td><strong>2045.36</strong></td>
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### 425th Mechanized Infantry Division

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<thead>
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<th>Type</th>
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<td>Mechanized Infantry BDE</td>
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<td>2609.425</td>
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<td>SP Artillery BDE</td>
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<tr>
<td>Light Infantry BDE</td>
<td>1</td>
<td>226.1</td>
<td>323</td>
</tr>
<tr>
<td>AAA BN</td>
<td>1</td>
<td>20.048</td>
<td>28.64</td>
</tr>
<tr>
<td>Anti-Tank BN</td>
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<td>44.73</td>
<td>63.9</td>
</tr>
<tr>
<td><strong>Total</strong></td>
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<td><strong>4463.29</strong></td>
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### 108th Mechanized Infantry Division

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<th>Type</th>
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<th>Scores (L)</th>
<th>Scores (H)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Equipment</td>
<td>Quantity</td>
<td></td>
<td></td>
</tr>
<tr>
<td>----------------------------</td>
<td>----------</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mechanized Infantry BDE</td>
<td>5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SP Artillery BDE</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Light Infantry BDE</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>AAA BN</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Anti-Tank BN</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>3124.303</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Rear Echelon KPAGF Total</th>
<th></th>
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</thead>
<tbody>
<tr>
<td>Low Estimate</td>
<td>11870</td>
</tr>
<tr>
<td>High Estimate</td>
<td>16950</td>
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<table>
<thead>
<tr>
<th>NTC PLA Total</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Estimate</td>
<td>30510</td>
</tr>
</tbody>
</table>

**Table A.2. PLAN North Sea Fleet Sea Order of Battle**

<table>
<thead>
<tr>
<th>Equipment</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Submersible Ship Nuclear (SSN)</td>
<td>4</td>
</tr>
<tr>
<td>Submersible Ship Diesel-Electric (SSK)</td>
<td>16</td>
</tr>
<tr>
<td>Fleet Aircraft Carrier (CV)</td>
<td>1</td>
</tr>
<tr>
<td>Cruisers and Guided Missile Cruisers (CGHM)</td>
<td>1</td>
</tr>
<tr>
<td>Guided Missile Destroyers (DDGHM)</td>
<td>7</td>
</tr>
<tr>
<td>Guided Missile Destroyers (DDGM)</td>
<td>2</td>
</tr>
<tr>
<td>Guided Missile Frigate (FFGHM)</td>
<td>11</td>
</tr>
<tr>
<td>Guided Missile Frigate (FFG)</td>
<td>2</td>
</tr>
<tr>
<td>Guided Missile Corvette (FSGM)</td>
<td>10</td>
</tr>
</tbody>
</table>
Table A.3. Northern Sea Fleet PLAN Aviation

<table>
<thead>
<tr>
<th>Unit</th>
<th>Equipment</th>
</tr>
</thead>
<tbody>
<tr>
<td>2&lt;sup&gt;nd&lt;/sup&gt; Naval Air Division</td>
<td>1 EW/ISR/ASW Regiment with KQ-200</td>
</tr>
<tr>
<td></td>
<td>Y-8JB/X</td>
</tr>
<tr>
<td></td>
<td>Y-9JZ</td>
</tr>
<tr>
<td></td>
<td>AEW&amp;C Regiment with Y-8J; KJ-200; KJ-500</td>
</tr>
<tr>
<td>Other Forces</td>
<td>1 FGA Regiment with J-15</td>
</tr>
<tr>
<td></td>
<td>1 FGA Brigade with JH-7A; J-8F</td>
</tr>
</tbody>
</table>

Source: Military Balance+ 2021, IISS
Note: Training regiments were not included

Table A.4. PLAN East Sea Fleet Sea Order of Battle

<table>
<thead>
<tr>
<th>Equipment</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Submersible Ship Diesel-Electric (SSK)</td>
<td>18</td>
</tr>
<tr>
<td>Guided Missile Destroyers (DDGHM)</td>
<td>12</td>
</tr>
<tr>
<td>Guided Missile Frigate (FFGHM)</td>
<td>17</td>
</tr>
<tr>
<td>Guided Missile Frigate (FFG)</td>
<td>2</td>
</tr>
<tr>
<td>Guided Missile Corvette (FSGM)</td>
<td>23</td>
</tr>
<tr>
<td>Patrol Ships (PCFG/PCG)</td>
<td>30</td>
</tr>
<tr>
<td>Mine Countermeasures Vessel (MCMV)</td>
<td>22</td>
</tr>
<tr>
<td>Amphibious Transport Dock (LPD)</td>
<td>2</td>
</tr>
<tr>
<td>Landing Ship, Tank (LST/M)</td>
<td>22</td>
</tr>
</tbody>
</table>

Source: Military Balance+ 2021, IISS
### Table A.5. Eastern Sea Fleet PLAN Aviation

<table>
<thead>
<tr>
<th>Unit</th>
<th>Equipment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st Naval Air Division</td>
<td>1 AEW&amp;C regt with KJ-500: 1 ASW regt with KQ-200</td>
</tr>
<tr>
<td>Other Forces</td>
<td>1 bbr regt with H-6DU/G/J; 1 FGA bde with JH-7; 1 FGA bde with Su-30MK2; J-10A; 1 helo regt with Ka27PS; Ka-28; Ka-31</td>
</tr>
</tbody>
</table>

Source: Military Balance+ 2021, IISS

### Table A.6. KPAN West and East Fleet

#### Sea Order of Battle (Country Total)

<table>
<thead>
<tr>
<th>Equipment</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Submarines</td>
<td>71</td>
</tr>
<tr>
<td>Principal Surface Combatants</td>
<td>2</td>
</tr>
<tr>
<td>Patrol and Coastal Combatants</td>
<td>383</td>
</tr>
<tr>
<td>Mine Warfare and Mine Countermeasures</td>
<td>20</td>
</tr>
<tr>
<td>Amphibious Landing Crafts</td>
<td>265</td>
</tr>
<tr>
<td>Various Auxiliary Sea Crafts</td>
<td>23</td>
</tr>
</tbody>
</table>

Source: Military Balance+ 2021, IISS
### Table A.7. KPAN West Sea Fleet
#### Sea Order of Battle

<table>
<thead>
<tr>
<th>Equipment</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Submarines of all Types (Mostly Sang-O)</td>
<td>26</td>
</tr>
<tr>
<td>Small Patrol Craft/Boats</td>
<td>161</td>
</tr>
<tr>
<td>Large Patrol Boats/Frigates/Destroyer</td>
<td>18</td>
</tr>
<tr>
<td>Slender Vessels</td>
<td>11</td>
</tr>
<tr>
<td>Hovercraft</td>
<td>71</td>
</tr>
<tr>
<td>Landing Craft</td>
<td>8</td>
</tr>
</tbody>
</table>

Source: Joseph Bermudez  
Note: Based on satellite imagery analysis, unclear exact types of vessels  
Excludes navy auxiliaries and infiltration motherships

### Table A.8. Key Naval Equipment Comparison by Type
#### Country Total

<table>
<thead>
<tr>
<th>Type</th>
<th>Hull Classification</th>
<th>KPAN</th>
<th>Quantity</th>
<th>PLAN</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Submarine</td>
<td>SSB</td>
<td>Gorae (Sinpo-B)</td>
<td>1</td>
<td>Type-032 (Qing)</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>SSK</td>
<td>Type-033 (Romeo)</td>
<td>20</td>
<td>Project 877 (Kilo)</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Project 636</td>
<td>2</td>
</tr>
<tr>
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<td></td>
<td>Project 636M</td>
<td>8</td>
</tr>
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<td></td>
<td></td>
<td></td>
<td>Type-035B (Ming)</td>
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<td></td>
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<td></td>
<td>Type-039(G) (Song)</td>
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<tr>
<td>Principal Surface Combatants</td>
<td>Type-039A (Yuan)</td>
<td>4</td>
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<td></td>
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<tr>
<td>------------------------------</td>
<td>------------------</td>
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<td></td>
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<td></td>
<td>Type-039B (Yuan)</td>
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<td>SSC</td>
<td>Sang-O/II</td>
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<td>Type-093A (Shang II)</td>
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<td>Type-053H1 (Jianghu I)</td>
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<td>Type-053H1G (Jianghu I Upgrade)</td>
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<td>CV</td>
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<td>None</td>
<td>Type-001 (Kuznetsov)</td>
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<td></td>
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<td>Type-002 (Kuznetsov mod)</td>
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<td>CGHM</td>
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<td>Type-055 (Renhai)</td>
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<td>DDGHM</td>
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<td>Hangzhou (Project 956E (Sovremenny I))</td>
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<td>Hangzhou (Project 956EM (Sovremenny II))</td>
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<td></td>
<td>Hangzhou (Project 956E (Sovremenny III))</td>
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<td>Type-051B (Luhai)</td>
<td>Type-052 (Luhu)</td>
<td>Type-052B (Luyang)</td>
<td>Type-052C (Luyang II)</td>
<td>Type-052D (Luyang III)</td>
<td>Type-052D (Luyang III)</td>
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<td>None</td>
<td>Type-529 (Wonang)</td>
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<td>Hantae</td>
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<td>Type-073-II (Yudeng)</td>
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<td>Type-073A (Yunshu)</td>
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<td>Type-074 (Yuhai)</td>
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<td>Type-072A (Yuting II)</td>
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<td>Type-072B (Yuting II)</td>
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<td>Kongbang</td>
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Source: Military Balance+ 2021, IISS
Note: Reserve naval equipment not counted for the PLAN

Table A.9. PLAAF (NTC) and KPAAF (Country Total) Fighter Aircraft Comparison
<table>
<thead>
<tr>
<th>Generation</th>
<th>Fighter Types</th>
<th>Quantity</th>
<th>Fighter Types</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>1&lt;sup&gt;st&lt;/sup&gt;</td>
<td>N/A</td>
<td>N/A</td>
<td>MiG-15, MiG-17, J-5, J-6</td>
<td>107</td>
</tr>
<tr>
<td>2&lt;sup&gt;nd&lt;/sup&gt;</td>
<td>J-7 &amp; J-8</td>
<td>109</td>
<td>MiG-19, MiG-21, J-7</td>
<td>220</td>
</tr>
<tr>
<td>3&lt;sup&gt;rd&lt;/sup&gt;</td>
<td>JH-7, J-10, J-11, SU-30</td>
<td>237</td>
<td>MiG-23</td>
<td>56</td>
</tr>
<tr>
<td>4&lt;sup&gt;th&lt;/sup&gt;</td>
<td>J-16, J-10C, J-11B</td>
<td>142</td>
<td>MiG-29</td>
<td>18</td>
</tr>
<tr>
<td>5&lt;sup&gt;th&lt;/sup&gt;</td>
<td>J-20</td>
<td>16</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>500+</td>
<td><strong>Total</strong></td>
<td>400+</td>
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</tr>
</tbody>
</table>

Source: Military Balance +, 2021

Table A.10. PLAAF and KPAAF Fighter Aircraft Comparison (Country Total)

<table>
<thead>
<tr>
<th>Generation</th>
<th>Fighter Types</th>
<th>Quantity</th>
<th>Fighter Types</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>1&lt;sup&gt;st&lt;/sup&gt;</td>
<td>N/A</td>
<td></td>
<td>MiG-15, MiG-17, J-5, J-6</td>
<td>107</td>
</tr>
<tr>
<td>2&lt;sup&gt;nd&lt;/sup&gt;</td>
<td>J-7 &amp; J-8</td>
<td>390</td>
<td>MiG-19, MiG-21, J-7</td>
<td>220</td>
</tr>
<tr>
<td>3&lt;sup&gt;rd&lt;/sup&gt;</td>
<td>JH-7, J-10, J-11, SU-30/27</td>
<td>630</td>
<td>MiG-23</td>
<td>56</td>
</tr>
<tr>
<td>4&lt;sup&gt;th&lt;/sup&gt;</td>
<td>J-16, J-10C, J-11B, SU-35</td>
<td>480</td>
<td>MiG-29</td>
<td>18</td>
</tr>
<tr>
<td>5&lt;sup&gt;th&lt;/sup&gt;</td>
<td>J-20</td>
<td>24+.&lt;sup&gt;323&lt;/sup&gt;</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>1500+</td>
<td><strong>Total</strong></td>
<td>400+</td>
<td></td>
</tr>
</tbody>
</table>

Source: Military Balance +, 2021

<sup>323</sup> Other sources have presented larger inventory of the both the J-20 and J-20A; this may have also increased during 2021.
Table A.11. KPAAF FTR, FGA, ATK Inventory (Country Total)

<table>
<thead>
<tr>
<th>Combat Aircraft</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>MiG-15 Fagot</td>
<td></td>
</tr>
<tr>
<td>MiG-17 Fresco</td>
<td>107</td>
</tr>
<tr>
<td>J-5</td>
<td></td>
</tr>
<tr>
<td>MiG-19 Farmer</td>
<td>100</td>
</tr>
<tr>
<td>J-6</td>
<td></td>
</tr>
<tr>
<td>MiG-21F-13 Fishbed C</td>
<td>120</td>
</tr>
<tr>
<td>J-7</td>
<td></td>
</tr>
<tr>
<td>MiG-21PFM Fishbed F</td>
<td></td>
</tr>
<tr>
<td>MiG-23ML Flogger</td>
<td>46</td>
</tr>
<tr>
<td>MiG-23 Flogger</td>
<td>10</td>
</tr>
<tr>
<td>MiG-29 Fulcrum A/S/UB</td>
<td>18</td>
</tr>
<tr>
<td>MiG-21bis Fishbed</td>
<td>30</td>
</tr>
<tr>
<td>SU-25K/UBK Frogfoot</td>
<td>34</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>470+</strong></td>
</tr>
</tbody>
</table>

Source: Military Balance +, 2021
Note: FTR: Fighter ; FGA: Fighter/Ground Attack ; ATK: Attack
Table A.12. PLAAF FTR, FGA, ATK Inventory (Country Total)

<table>
<thead>
<tr>
<th>Aircraft Type</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>J-7 Fishcan</td>
<td>100</td>
</tr>
<tr>
<td>J-7E Fishcan</td>
<td>120</td>
</tr>
<tr>
<td>J-7G</td>
<td>120</td>
</tr>
<tr>
<td>J-8F/H</td>
<td>50</td>
</tr>
<tr>
<td>J-11</td>
<td>95</td>
</tr>
<tr>
<td>SU-27UBK Flanker</td>
<td>32</td>
</tr>
<tr>
<td>J-10A Firebird</td>
<td>220</td>
</tr>
<tr>
<td>J-10B Firebird</td>
<td>55</td>
</tr>
<tr>
<td>J-10C Firebird</td>
<td>120</td>
</tr>
<tr>
<td>J-10S Firebird</td>
<td>70</td>
</tr>
<tr>
<td>J-11B/BS Flanker L</td>
<td>130</td>
</tr>
<tr>
<td>J-16 Flanker</td>
<td>150+</td>
</tr>
<tr>
<td>J-20A</td>
<td>24+</td>
</tr>
<tr>
<td>Su-30MKK</td>
<td>73</td>
</tr>
<tr>
<td>Su-35 Flanker</td>
<td>24</td>
</tr>
<tr>
<td>JH-7A Flounder</td>
<td>140</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>1500+</td>
</tr>
</tbody>
</table>

Source: Military Balance +, 2021
Note: FTR: Fighter; FGA: Fighter/Ground Attack; ATK: Attack

For reference, these are direct translations of the PLAAF’s units from English to Chinese:
Table A.13. PLAAF Units Translated

<table>
<thead>
<tr>
<th>US Equivalent</th>
<th>Pinyin</th>
<th>Chinese</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unit</td>
<td>budui</td>
<td>部队</td>
</tr>
<tr>
<td>Element (aka</td>
<td>fendui</td>
<td>分队</td>
</tr>
<tr>
<td>subunit and</td>
<td></td>
<td></td>
</tr>
<tr>
<td>detachment)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Theater</td>
<td>zhanqu</td>
<td>战区空军</td>
</tr>
<tr>
<td>Command Air</td>
<td>kongjun</td>
<td></td>
</tr>
<tr>
<td>Force (TCAF)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Air Division</td>
<td>hangkongbing</td>
<td>航空兵师</td>
</tr>
<tr>
<td>shi</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Air Brigade</td>
<td></td>
<td>航空兵旅</td>
</tr>
<tr>
<td>Air Regiment</td>
<td>hangkongbing</td>
<td>航空兵团</td>
</tr>
<tr>
<td>tuan</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Flight Group</td>
<td>dadui</td>
<td>大队</td>
</tr>
<tr>
<td>Flight Squadron</td>
<td>zhongdui</td>
<td>中队</td>
</tr>
</tbody>
</table>

Source: Lawrence Trevethan, 2021

Figure A.1. PLAAF Base-Brigade Organization

Source: Kenneth W. Allen, 2021
Table A-14. NTC PLAAF Brigade Battle of Order

<table>
<thead>
<tr>
<th>Parent Formation</th>
<th>Airfield Location</th>
<th>Aircraft Designation</th>
<th>Aircraft Type</th>
<th>Primary Aircraft Inventory</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dalian Base</td>
<td>Anshan</td>
<td>J-11B</td>
<td>Fighter/Ground Attack</td>
<td>8</td>
</tr>
<tr>
<td>Dalian Base</td>
<td>Anshan</td>
<td>J-20A</td>
<td>Fighter/Ground Attack</td>
<td>8 to 16</td>
</tr>
<tr>
<td>Dalian Base</td>
<td>Chifeng</td>
<td>J-10A</td>
<td>Fighter/Ground Attack</td>
<td>8</td>
</tr>
<tr>
<td>Dalian Base</td>
<td>Chifeng</td>
<td>J-10C</td>
<td>Fighter/Ground Attack</td>
<td>16</td>
</tr>
<tr>
<td>Dalian Base</td>
<td>Qiqihar</td>
<td>J-16</td>
<td>Fighter/Ground Attack</td>
<td>28</td>
</tr>
<tr>
<td>Dalian Base</td>
<td>Siping</td>
<td>JH-7A</td>
<td>Ground Attack</td>
<td>24</td>
</tr>
<tr>
<td>Dalian Base</td>
<td>Yanji</td>
<td>J-10B</td>
<td>Fighter/Ground Attack</td>
<td>24</td>
</tr>
<tr>
<td>Dalian Base</td>
<td>Mudanjiang-Hailang</td>
<td>J-7H</td>
<td>Fighter</td>
<td>24 to 40</td>
</tr>
<tr>
<td>Dalian Base</td>
<td>Pulandian</td>
<td>J-11B</td>
<td>Fighter/Ground Attack</td>
<td>24</td>
</tr>
<tr>
<td>Dalian Base</td>
<td>Dandong</td>
<td>J-7E</td>
<td>Fighter</td>
<td>29</td>
</tr>
<tr>
<td>Dalian Base</td>
<td>Liuhe</td>
<td>J-7E</td>
<td>Fighter</td>
<td>16</td>
</tr>
<tr>
<td>Location</td>
<td>City</td>
<td>Aircraft</td>
<td>Type</td>
<td>Quantity</td>
</tr>
<tr>
<td>---------------</td>
<td>------------</td>
<td>----------</td>
<td>-----------------------</td>
<td>----------</td>
</tr>
<tr>
<td>Jinan Base</td>
<td>Weifang</td>
<td>JH-7A</td>
<td>Ground Attack</td>
<td>24</td>
</tr>
<tr>
<td>Jinan Base</td>
<td>Qihe</td>
<td>J-10A</td>
<td>Fighter/Ground Attack</td>
<td>24</td>
</tr>
<tr>
<td>Jinan Base</td>
<td>Wendeng</td>
<td>J-7G</td>
<td>Fighter</td>
<td>18 to 24</td>
</tr>
</tbody>
</table>

Source: CASI, 2021
Figure B.1. Peak Overpressure and Dynamic Pressure for 1 kg TNT

Source: Federation of American Scientists
Damage Calculations of DPRK’s Conventional Artillery on the PRC

Table B.1. 152 mm SP Howitzer (M-1974) Damage on Dandong City

<table>
<thead>
<tr>
<th>Lethal Radius Calculation</th>
<th>Warhead Weight: 43.56 kg</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Lethal Radius (LR) Optimized for 5 PSI:</td>
</tr>
<tr>
<td></td>
<td>$LR_{152mm} \approx (2 \times 43.56 \text{ kg})^{(1/3)} \times 4.1 \text{ m}$</td>
</tr>
<tr>
<td></td>
<td>$LR_{152mm} \approx 18.18 \text{ m}$</td>
</tr>
<tr>
<td></td>
<td>Approximately 20 meters</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Casualty Estimates &amp; Sensitivity Analysis</th>
<th>Dandong Population Density: 8,014 People / km²</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Lower End Approximations:</td>
</tr>
<tr>
<td></td>
<td>__Casualty Estimates per Artillery Shell</td>
</tr>
<tr>
<td></td>
<td>$\approx \pi \times (20 \text{ meters})^2 \times \frac{8,000 \text{ People}}{1,000,000 \text{ meters}^2} \approx 10 \text{ Deaths/Shell}$</td>
</tr>
<tr>
<td></td>
<td>Assuming 6 tubes/battery and 4 rds/min</td>
</tr>
<tr>
<td></td>
<td>Total Deaths for 3 Minutes of Firing (for 1 Battery)</td>
</tr>
<tr>
<td></td>
<td>$\approx 3 \times \frac{4 \text{ shells}}{\text{ min}} \times \frac{10 \text{ deaths}}{\text{ shell}} \times 6 \text{ tubes}$</td>
</tr>
<tr>
<td></td>
<td>$\approx 720 \text{ Deaths} \text{ (Lower Approximate Total)}$</td>
</tr>
<tr>
<td></td>
<td>Higher End Approximations:</td>
</tr>
<tr>
<td></td>
<td>__Casualty Estimates per Artillery Shell</td>
</tr>
<tr>
<td></td>
<td>$\approx 1.5 \times \pi \times (20 \text{ meters})^2 \times \frac{8,000 \text{ People}}{1,000,000 \text{ meters}^2} \approx 15 \text{ Deaths/Shell}$</td>
</tr>
<tr>
<td></td>
<td>Assuming 6 tubes/battery and 6 rds/min</td>
</tr>
<tr>
<td></td>
<td>Total Deaths for 3 Minutes of Firing (for 1 Battery)</td>
</tr>
<tr>
<td></td>
<td>$\approx 3 \times \frac{6 \text{ shells}}{\text{ min}} \times \frac{15 \text{ deaths}}{\text{ shell}} \times 6 \text{ tubes}$</td>
</tr>
<tr>
<td></td>
<td>$\approx 1,600 \text{ Deaths} \text{ (Higher Approximate Total)}$</td>
</tr>
</tbody>
</table>
### Table B.2. 122 mm SPG (M-1981) Damage on Dandong City

<table>
<thead>
<tr>
<th>Lethal Radius Calculation</th>
<th>Warhead Weight: 27.3 kg</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Lethal Radius (LR) Optimized for 5 PSI</td>
</tr>
<tr>
<td></td>
<td>$LR_{122\text{mm}} \approx (2 \times 27.3\text{kg})^{(1/3)} \times 4.1\text{ m}$</td>
</tr>
<tr>
<td></td>
<td>$LR_{122\text{mm}} \approx 15.55\text{ m or 0.01555 km}$</td>
</tr>
<tr>
<td></td>
<td>Approximately 15 meters</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Casualty Estimates &amp; Sensitivity Analysis</th>
<th>Dandong Population Density $^{324}$: 8,014 People/ km²</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>Lower End Approximations:</strong></td>
</tr>
<tr>
<td></td>
<td><em>Casualty Estimates per Artillery Shell</em></td>
</tr>
<tr>
<td></td>
<td>$\approx \pi \times (15 \text{ meters})^2 \times \frac{8,000 \text{ People}}{1,000,000 \text{ meters}^2} \approx 5 \text{ Deaths/Shell}$</td>
</tr>
<tr>
<td></td>
<td>Assuming 6 tubes/battery and 4 rds/min</td>
</tr>
<tr>
<td></td>
<td><strong>Total Deaths for 3 Minutes of Firing</strong></td>
</tr>
<tr>
<td></td>
<td>$\approx 3 \times \frac{4 \text{ shells}}{1 \text{ tube}} \times 6 \text{ tubes} \times \frac{5 \text{ deaths}}{\text{shell}}$</td>
</tr>
<tr>
<td></td>
<td>$\approx 360 \text{ Deaths (Lower Approximate Total)}$</td>
</tr>
</tbody>
</table>

|                                          | **Higher End Approximations:**                           |
|                                          | *Casualty Estimates per Artillery Shell*                 |
|                                          | $\approx 1.5 \times \pi \times (15 \text{ meters})^2 \times \frac{8,000 \text{ People}}{1,000,000 \text{ meters}^2} \approx 8 \text{ Deaths/Shell}$ |
|                                          | Assuming 6 tubes/battery and 6 rds/min                   |
|                                          | **Total Deaths for 3 Minutes of Firing**                 |
|                                          | $\approx 3 \times \frac{6 \text{ shells}}{1 \text{ tube}} \times 6 \text{ Tubes} \times \frac{8 \text{ deaths}}{\text{shell}}$ |
|                                          | $\approx 920 \text{ Deaths (Higher Approximate Total)}$ |

---

$^{324}$ Population density from Chinese Statistical Yearbook (2021)
### Table B.3. KPA's Operational Missiles
(40 km to 2000 km)

<table>
<thead>
<tr>
<th>Missile Name</th>
<th>Type</th>
<th>Range</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Koksan M1978</td>
<td>Artillery</td>
<td>40 - 60 km</td>
<td>Operational</td>
</tr>
<tr>
<td>KN-01</td>
<td>ASCM</td>
<td>110 - 160 km</td>
<td>Operational</td>
</tr>
<tr>
<td>M1985/M1991</td>
<td>MLRS</td>
<td>40 - 60 km</td>
<td>Operational</td>
</tr>
<tr>
<td>Hwasong 7 (Nodong 1)</td>
<td>MRBM</td>
<td>1,200 - 1,500 km</td>
<td>Operational</td>
</tr>
<tr>
<td>Hwasong-9</td>
<td>MRBM</td>
<td>800 - 1,000 km</td>
<td>Operational</td>
</tr>
<tr>
<td>Pukguksong-2 (KN-15)</td>
<td>MRBM</td>
<td>1,200 - 2,000 km</td>
<td>Operational</td>
</tr>
<tr>
<td>KN-06 (Pon’gae-5)</td>
<td>SAM</td>
<td>150 km</td>
<td>Operational</td>
</tr>
<tr>
<td>Pukguksong-3 (KN-26)</td>
<td>SLBM</td>
<td>1,900 km</td>
<td>Operational</td>
</tr>
<tr>
<td>Hwasong-5</td>
<td>SRBM</td>
<td>300 km</td>
<td>Operational</td>
</tr>
<tr>
<td>Hwasong-6</td>
<td>SRBM</td>
<td>500 km</td>
<td>Operational</td>
</tr>
<tr>
<td>KN-02 (Toksa)</td>
<td>SRBM</td>
<td>120 - 170 km</td>
<td>Operational</td>
</tr>
<tr>
<td>KN-25</td>
<td>SRBM</td>
<td>380 km</td>
<td>Operational</td>
</tr>
</tbody>
</table>

Source: CSIS, 2021

### Table B.4. PLARF Bases in NTC

<table>
<thead>
<tr>
<th>Unit</th>
<th>Missile Type</th>
<th>Missile Class</th>
<th>Warhead Class</th>
<th>Unit HQ Element</th>
<th>Launchers</th>
<th>Missiles / Brigade</th>
<th>Nuclear Warheads</th>
</tr>
</thead>
</table>

134
<table>
<thead>
<tr>
<th>Location Name</th>
<th>Category</th>
<th>IRB</th>
<th>Style</th>
<th>Location</th>
<th>Num Launchers</th>
<th>Range</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>65th Base (第65基地)</td>
<td>Various</td>
<td>IRB M/MRBM</td>
<td>Conventional</td>
<td>Shenyang</td>
<td>156</td>
<td>108 to 144 (=828)</td>
<td>0</td>
</tr>
<tr>
<td>651st Launch Brigade (发射第651旅)</td>
<td>DF-21A</td>
<td>MRBM</td>
<td>Dual Capable</td>
<td>Dalian</td>
<td>24</td>
<td>144</td>
<td>0</td>
</tr>
<tr>
<td>652nd Mobile Launch Brigade (机动发射第652旅)</td>
<td>DF-21C (or DF-31?)</td>
<td>MRBM (ICBM?)</td>
<td>Conventional</td>
<td>Tonghua</td>
<td>24</td>
<td>144</td>
<td>0</td>
</tr>
<tr>
<td>653rd Launch Brigade (发射第663旅)</td>
<td>DF-21D</td>
<td>MRBM/ASBM</td>
<td>Conventional</td>
<td>Laiwu</td>
<td>24</td>
<td>144</td>
<td>0</td>
</tr>
<tr>
<td>654th Launch Brigade (发射第654旅)</td>
<td>DF-26</td>
<td>IRBM</td>
<td>Dual Capable</td>
<td>Dalian</td>
<td>36</td>
<td>108</td>
<td>12</td>
</tr>
<tr>
<td>655th Launch Brigade (发射第655旅)</td>
<td>DF-21D</td>
<td>MRBM/ASBM</td>
<td>Conventional</td>
<td>Tonghua</td>
<td>24</td>
<td>144</td>
<td>0</td>
</tr>
<tr>
<td>656th Launch Brigade (发射第656旅)</td>
<td>DF-21C</td>
<td>MRBM</td>
<td>Conventional</td>
<td>Jinan</td>
<td>24</td>
<td>144</td>
<td>0</td>
</tr>
<tr>
<td>65th Training</td>
<td>None</td>
<td>N/A</td>
<td>N/A</td>
<td>Panjin</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Regiment (65团)</td>
<td>None</td>
<td>N/A</td>
<td>N/A</td>
<td>Shen yang</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>65th Base Hospital (医院65基地)</td>
<td>None</td>
<td>N/A</td>
<td>N/A</td>
<td>Shen yang</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>65th Communication Regiment (通讯65团)</td>
<td>None</td>
<td>N/A</td>
<td>N/A</td>
<td>Shen yang</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>65th Operations Support Regiment (运营支持65团)</td>
<td>None</td>
<td>N/A</td>
<td>N/A</td>
<td>Shen yang</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>65th Comprehensive Support Regiment (综合支援65团)</td>
<td>None</td>
<td>N/A</td>
<td>N/A</td>
<td>Tong hua</td>
<td>0</td>
<td>0</td>
<td>12</td>
</tr>
<tr>
<td>65th Equipment Inspection Regiment (设备检验65团)</td>
<td>None</td>
<td>N/A</td>
<td>None</td>
<td>Tong hua</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

Source: Trevethan, China Aerospace Studies Institute, 2022
Damage Calculations for DPRK’s Tactical Nuclear Weapons on PRC Targets

Countervalue Assets:

**Option 1: Shenyang Mining Machinery Group Co., Ltd (Dandong District, Shenyang)**
Shenyang is the capital of Liaoning province and the most populated city in the region. It serves as a major transportation hub for the region and as an advanced equipment manufacturing base. The city is a key player in the Northeast Asia Economic Circle.  

<table>
<thead>
<tr>
<th>Type of Missile</th>
<th>Hwasong-5 (Scud-B)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>300 KM Range</td>
</tr>
<tr>
<td></td>
<td>300 in Inventory (Estimate)</td>
</tr>
<tr>
<td></td>
<td>Road-Mobile</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Launch Site</th>
<th>Mup'yong-ni Arms Plant PUG, Chagang Province</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(most recent test in 2021)</td>
</tr>
</tbody>
</table>

---


| Target | Shenyang Mining Machinery Group Co., Ltd (Dandong District, Shenyang), Owned by Northern Heavy Industries Group Co., Ltd./NHI  
State-Owned Enterprise  
Economic Value: $1.6 Billion  
11,000 Employees  
1.02 km² |
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Estimated Damage</td>
<td></td>
</tr>
</tbody>
</table>
Fatality: ~152,000  
Injuries: ~370,000  
Economic Damage: <$1.6 Billion |

**Calculated for 15 KT, overpressure set for 20 psi surface burst**

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328 Calculations Provided by NUKEMAP

329 Attacks were preset for 20-psi overpressure which create heavy blast damage radius of 0.69 km². 20-psi will severely damage/demolish heavily built concrete buildings, fatalities within lethal radius approach 100 percent.
Option 2: Dalian Hi-Tech Zone & Industry

Dalian is the second most populace city in the province of Liaoning, but its economy makes it one of the most important economic centers of Northeast PRC. Dalian is considered one of the fastest growing cities in both GDP and population. The Dalian Hi-Tech Zone is a national-level high technology industrial zone, located southwest of Dalian City. In addition to the Hi-Tech zone, Dalian is a central port city to key exports and commerce, with a nominal GDP of 700 billion RMB as of December 2021. 

<table>
<thead>
<tr>
<th>Type of Missile</th>
<th>KN-23 / KN-24 / Hwasong-6</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>410 - 500 KM Range (SRBM)</td>
</tr>
<tr>
<td></td>
<td>Total Inventory Unknown</td>
</tr>
<tr>
<td></td>
<td>Road-Mobile</td>
</tr>
</tbody>
</table>

Launch Site

Yangdok, South Pyongan Province (Approximate)

Assumes Rail-Launch

(Tested two railroad-launched KN-23 missiles in 2021 from this location.)

---


<table>
<thead>
<tr>
<th><strong>Target</strong></th>
<th>Dalian Hi-Tech Zone/Dalian Industrial Center</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>153 km²</td>
</tr>
<tr>
<td></td>
<td>Economic Value: $16.09 Billion&lt;sup&gt;333&lt;/sup&gt;</td>
</tr>
<tr>
<td><strong>Estimated Damage</strong></td>
<td>Fatality: ~51,000</td>
</tr>
<tr>
<td></td>
<td>Injuries: ~145,000</td>
</tr>
<tr>
<td></td>
<td>Economic Damage: &lt; $16.09 Billion</td>
</tr>
</tbody>
</table>

Calculated for 15 KT, overpressure set for 20 psi air burst

**Counterforce Assets:**

The two counterforce targets selected for these calculations are the PLARF’s 652<sup>nd</sup> and 651<sup>st</sup> launch brigades within the NTC. Though the missiles placed in these bases on nuclear-capable, these brigades operate MRBMs with conventional warheads. Furthermore, similar to the North Koreans, the Chinese do not mate their nuclear warheads to their ballistic missiles during peacetime.<sup>335</sup>

**Option 1: PLARF 652<sup>nd</sup> Mobile Launch Brigade, Tonghua**

<table>
<thead>
<tr>
<th>Type of Missile</th>
<th>KN-25&lt;sup&gt;336&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>380 KM</td>
</tr>
</tbody>
</table>

---

<sup>333</sup> “Dalian High-Tech Zone.”

<sup>334</sup> Calculations Provided by NUKEMAP

<sup>335</sup> Mark A. Stokes, *China’s Nuclear Warhead Storage and Handling System* (Project 2049 Institute, 2010).

<table>
<thead>
<tr>
<th>Launch Site</th>
<th>Road Mobile</th>
</tr>
</thead>
</table>
| Kaecheon Air Base, South Pyongan Province  
(Tested KN-25s in 2019)  
![Map of North Korea showing Tonghua and Kaecheon](image) |

| Target | 652<sup>nd</sup> PLARF Mobile Launch Brigade in Tonghua  
*Missile Class*: DF-21C (MRBM) & Possibly DF-31 (ICBM)  
*Warhead Class*: Conventional  
*Platforms*: 24 Launchers & 144 Missiles  
*Nuclear Warheads*: The 65<sup>th</sup> Equipment Inspection Regiment also located in Tonghua may have 12 nuclear warheads |

| Estimated Damage<sup>339</sup> | Fatality: 860  
Injuries: 2,090  
*Unlikely to destroy PLARF’s missile/nuclear warhead storage facilities* |

---

<sup>337</sup> CASI, 2022  
<sup>338</sup> CASI, 2022  
<sup>339</sup> Calculations Provided by NUKEMAP
Calculated for 15 KT, overpressure set for 20 psi surface burst

**Option 2: PLARF 651st Launch Brigade, Dalian**

| **Type of Missile** | KN-23 / KN-24 / Hwasong-6  
410 - 500 KM Range (SRBM)  
Total Inventory Unknown  
Road-Mobile |
|---------------------|---------------------------------|
| **Launch Site**     | Yangdok, South Pyongan Province (Approximate)  
Assumes Rail-Launch |
| **Target**          | 651st Launch Brigade in Dalian  
*Missile Class*: DF-21A (MRBM)  
*Warhead Class*: Dual Capable  
*Platforms*: 24 Launchers & 144 Missiles  
*Nuclear Warheads*: 12 |

340 CASI, 2022
Fatality: 1,620  
Injuries: 2,120  
Unlikely to destroy PLARF’s missile/nuclear warhead storage facilities  

Estimated Damage\textsuperscript{341} 

Calculated for 15 KT, overpressure set for 20 psi surface burst  

Table B.5. Damage Characteristics for Specific Overpressures  

<table>
<thead>
<tr>
<th>Damage</th>
<th>Overpressure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Light Housing Destroyed</td>
<td>5-psi</td>
</tr>
<tr>
<td>Brick Housing/Commercial Buildings Destroyed</td>
<td>10-psi</td>
</tr>
<tr>
<td>Reinforced Concrete Structure Destroyed</td>
<td>20-psi</td>
</tr>
<tr>
<td>Nuclear Weapon Storage Bunkers</td>
<td>100 – 500-psi</td>
</tr>
<tr>
<td>Command Bunkers</td>
<td>100 – 1000-psi</td>
</tr>
<tr>
<td>Missile Silo</td>
<td>500 – 10000-psi</td>
</tr>
<tr>
<td>Deep Underground Command Facilities</td>
<td>1000 – 10000-psi</td>
</tr>
</tbody>
</table>

Source: Glaser, 2007  

\textsuperscript{341} Calculations Provided by NUKEMAP
Appendix C: Research Question 3 Calculations

Interview Protocol

When planning for Korea contingency scenarios, what types of North Korean threats are considered and how is China included in the planning process?

[All answers must be strictly unclassified, open source]

- What type of contingency scenarios are considered?
  - Conventional weapons usage only?
  - Strategic weapons usage only?
  - Combination of both

- Do these contingency scenarios include Chinese intervention or consideration?
  - If so, what is the predicted nature of their involvement?
  - Are the Chinese invited to planning exercises?
  - Any aspirations to include them in tabletop exercises and/or planning meetings?

- If the Chinese were to intervene in a North Korean contingency scenario, what do the USFK-ROK joint warfighters have planned?

- The North Koreans seem to possess hundreds of short-range ballistic missiles—do planners have an idea of why this is and where those possible targets may be?

- How has North Korean and Chinese behavior changed in the last twenty-thirty years between each other?

- Is there any indication that the DPRK has credible nuclear command, control, communication systems or is at least in the process of building one?

- What do you think will be the evolving nuclear strategy of the DPRK?

- What do you think are Chinese thoughts on the growing DPRK strategic arsenal?

- Any other thoughts, comments, or concerns on the topic of concerning North Korean nuclear threat towards China?

Special thanks to all the interview participants and SME input:

---

[342] Interviewee expertise ranged from academics to warfighters. Exact names of interview participants were left out unless asked to be made explicit in the report. These views do not represent the official views of these organizations, but the views of the individual subject matter expertise associated with these offices. Some offices included multiple participants in the interview. Interviews were conducted in accordance with RAND’s Human Subjects Protection Committee (HSPC) guidance. Interview protocols and procedures in this dissertation have been approved by RAND’s institutional review board (IRB).
• Gen (ret) Thomas A. Schwartz, former Commander of USFK, CFC, UNC
• Lt Gen Charles Dawkins and Mr. Michael Shoults of HAF A/10
• USFK J5
• CFC C5 (US Planners)
• US Attaché Officers at US Embassy, ROK
• Z-Division, Lawrence Livermore National Laboratory
• Project on Nuclear Issues & Nuclear Scholars Initiative 2022 Cohort, CSIS
• Mark Cozad, RAND
• Edmund Burke, RAND
• Sid Trevethan and Kenneth Allen, CASI
• Dr. Shane Smith, USAF Institute for National Security Studies & United States Air Force Academy
• Dr. Brad Roberts, CGSR
• Dr. Oriana Skylar Mastro, Stanford University
• Dr. Andrei Lankov, Kookmin University
• Dr. Joseph Bermudez, CSIS
• Dr. James M. Minnich, APCSS
• Dr. Victor Cha, CSIS
• Dennis Blasko, National Defense University
### Table C.1. Flexible War Plans for Defender (From Herman Kahn's Model)

<table>
<thead>
<tr>
<th>Capability of Surviving Force</th>
<th>Assumed Level of Damage</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Negligible Counterforce</td>
<td>80-100 %</td>
<td>All-out countervalue</td>
</tr>
<tr>
<td>Moderate Counterforce</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Some Counterforce</td>
<td>40-80 %</td>
<td>All-out countervalue</td>
</tr>
<tr>
<td>High Countervalue</td>
<td></td>
<td>Some withholding</td>
</tr>
<tr>
<td>High Counterforce</td>
<td>10-40 %</td>
<td>Careful counterforce</td>
</tr>
<tr>
<td>High Countervalue</td>
<td></td>
<td>Much withholding</td>
</tr>
<tr>
<td>More than 90% of original capability</td>
<td>0-10 %</td>
<td>Temporizing Measure or very discriminating counterforce</td>
</tr>
</tbody>
</table>

Source: On Thermonuclear War, Kahn 2011

Note: First column characterizes the postattack capability of the force. Second column gives arbitrary numerical value to the level of damage that can be sustained by column one. This model is supposed to illustrate one set of possibilities.

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DPRK NUCLEAR ATTACK
NUCLEAR AIRBURST (1000 psi)\(^{344}\)

Target: Beijing, People’s Republic of China
Central Military Commission, Ministry of National Defense ‘Eight-One’ Building

10 kT: \(^{230}\)kT: \(^{345}\)

Target Description:

Beijing is the second most populated city in the PRC and serves as the capital. The target location was centered around the Central Military Commission (CMC), which is based in the Ministry of National Defense headquarters, located in the ‘Eight-One’ building in Beijing. The CMC is the highest national defense organization within the PRC and serves as the highest military command authority. It also controls the People’s Armed Police.

10-kT: Est. fatalities 45,780 / Est. injuries 116,690
230-kT: Est. fatalities 316,240 / Est. injuries 729,240\(^{346}\)
Total Population of Beijing as of 2020: 20.5 million

POTENTIAL DPRK DELIVERY SYSTEMS: MRBM CAPABILITIES

<table>
<thead>
<tr>
<th>Missile Type</th>
<th>Est. Range</th>
<th>Basing</th>
<th>Warhead</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hwasong-7 (Nodong 1)*</td>
<td>1200 – 1500 km</td>
<td>Road-Mobile</td>
<td>Single Warhead</td>
</tr>
<tr>
<td>Hwasong-9 (Scud-ER)*</td>
<td>800 – 1,000 km</td>
<td>Road-Mobile</td>
<td>HE, CBW, Submunition</td>
</tr>
<tr>
<td>Pukguksong-2 (KN-15)*</td>
<td>1,200 – 2,000 km</td>
<td>Road-Mobile</td>
<td>Single Warhead</td>
</tr>
</tbody>
</table>

Source: Missile Threat: CSIS Missile Defense Project, 2022
Note: *Operational as of 2022

\(^{344}\) An airburst is when a weapon is exploded in the air at an altitude below 100,000 ft and at an altitude that maximizes blast effects. The thermal radiation from the detonation travels long distances through the air and can cause moderately severe burns to exposed skin.


\(^{346}\) All images and damage calculations provided by NukeMap and MissileMap provided by Alex Wellerstein. Map imagery provided by Map data © OpenStreetMap contributors, CC-BY-SA, Imagery © Mapbox

\(^{347}\) The red circle diameter represents the area that can be covered by MRBM with an estimated ~1200 km range.
DPRK NUCLEAR ATTACK
NUCLEAR AIRBURST (50 psi)
Target: Shanghai, People’s Republic of China
Shanghai World Financial Center

10 kT: 230 kT:

Target Description:
Shanghai is the PRC’s commercial capital and the most populace city. Shanghai reached a total of $643.85 billion GDP in 2021 and has the highest GDP of any Chinese city. As a port city, Shanghai accounts for twenty percent of the country’s total domestic and international trade for both imports and exports. Shanghai is also the home to one of the two stock exchanges in the PRC: the Shanghai Stock Exchange.

10-kT: Est. fatalities 25,760 / Est. injuries 94,290
230-kT: Est. fatalities 295,450 / Est. injuries 1,432,480

POTENTIAL DPRK DELIVERY SYSTEMS: MRBM CAPABILITIES

<table>
<thead>
<tr>
<th>Missile Type</th>
<th>Est. Range</th>
<th>Basing</th>
<th>Warhead</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hwasong-7 (Nodong 1)*</td>
<td>1200 – 1500 km</td>
<td>Road-Mobile</td>
<td>Single Warhead</td>
</tr>
<tr>
<td>Hwasong-9 (Scud-ER)*</td>
<td>800 – 1,000 km</td>
<td>Road-Mobile</td>
<td>HE, CBW, Submunition</td>
</tr>
<tr>
<td>Pukguksong-2 (KN-15)*</td>
<td>1,200 – 2,000 km</td>
<td>Road-Mobile</td>
<td>Single Warhead</td>
</tr>
</tbody>
</table>

Source: Missile Threat: CSIS Missile Defense Project, 2022
Note: *Operational as of 2022

AT RISK:
CHINESE TARGETS WITHIN RANGE

348 All images and damage calculations provided by NukeMap and MissileMap provided by Alex Wellerstein.
Map imagery provided by Map data © OpenStreetMap contributors, CC-BY-SA, Imagery © Mapbox
349 The red circle diameter represents the area that can be covered by MRBM with an estimated ~2000 km range.
DPRK NUCLEAR ATTACK

NUCLEAR SURFACE BURST (1000 psi)

Target: Heping District, Shenyang, People’s Republic of China

Northern Theater Command Headquarters

10 kT: 230 kT:

10-kT:
Est. fatalities 52,990 / Est. injuries 136,810

230-kT:
Est. fatalities 455,500 / Est. injuries 833,210

POTENTIAL DPRK DELIVERY SYSTEMS: SRBM CAPABILITIES

<table>
<thead>
<tr>
<th>Missile Type</th>
<th>Est. Range</th>
<th>Basing</th>
<th>Warhead</th>
</tr>
</thead>
<tbody>
<tr>
<td>KN-25*</td>
<td>380 km</td>
<td>Road-Mobile</td>
<td>Unknown</td>
</tr>
<tr>
<td>Hwasong-5*</td>
<td>300 km</td>
<td>Road-Mobile</td>
<td>HE, CBW, Submunition</td>
</tr>
<tr>
<td>Hwasong-6 (Scud-C)*</td>
<td>500 km</td>
<td>Road-Mobile</td>
<td>HE, CBW, Nuclear</td>
</tr>
<tr>
<td>KN-18 (Scud MaRV)</td>
<td>450+ km</td>
<td>Road-Mobile</td>
<td>Unknown</td>
</tr>
<tr>
<td>KN-24 (Hwasong-11)</td>
<td>410 km</td>
<td>Road-Mobile</td>
<td>Unknown</td>
</tr>
</tbody>
</table>

Source: Missile Threat: CSIS Missile Defense Project, 2022

Note: *Operational as of 2022

Map imagery provided by Map data © OpenStreetMap contributors, CC-BY-SA, Imagery © Mapbox

The red circle diameter represents the area that can be covered by ballistic missiles with an estimated ~400 km range.

1000 psi surface burst destroys and/or severely damages hardened silos. The main objective is to destroy the NTC’s underground command and control bunkers, which is why a surface burst was selected over an air burst.

All images and damage calculations provided by NukeMap and MissileMap provided by Alex Wellerstein.

Target Description:

The Northern Theater Command’s headquarters is located in the Heping District of Shenyang City, which is in the Liaoning province. Given that the SRBMs that could be used in this scenario are road-mobile systems, the KPA would launch these missiles within proximate distance from Shenyang. For this scenario, an area near the Tonchang-ri Space Launch Center was selected for hypothetical demonstration of a potential launch site from the DPRK.

10-kT: Est. fatalities 52,990 / Est. injuries 136,810
230-kT: Est. fatalities 455,500 / Est. injuries 833,210
References:


———. “ATP 7-100.3 Chinese Tactics.” Headquarters, Department of the Army, August 2021. https://armypubs.army.mil/epubs/DR_pubs/DR_a/ARN33195-ATP_7-100.3-000-WEB-1.pdf.


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Stokes, Mark A. China’s Nuclear Warhead Storage and Handling System. Project 2049 Institute, 2010.


