

Analysis of DPRK's nuclear strategy for developing modeling indicators

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1. Introduction

The Korea Institute of Nuclear non-proliferation And Control(KINAC) has developed a simulation tool for estimating DPRK's nuclear material production [1]. However, since the simulation includes many assumptions, it is necessary to supplement these assumptions rationally and concretely. In particular, in highly enriched uranium production, it is possible to continuously produce it without technical limitations if it is possible to provide a sufficient amount of ore and enrichment capacity. Accordingly, we would like to review the constraints that can affect highly enriched uranium production from a policy perspective. To this end, the authors investigated previous studies on the nuclear strategy to derive a predictable nuclear strategy of DPRK, to explore the number of nuclear weapons that DPRK is likely to possess.

2. Theories of nuclear strategy

DPRK, which recognizes nuclear weapons as a means of maintaining its political power, has continuously expanded its nuclear capabilities despite the international community's contemplation and pressure. However, it is complicated to obtain information about nuclear weapons due to DPRK's closed diplomatic activities. Accordingly, Researchers conducted various theoretical studies on the nuclear strategy targeted by DPRK. The following table 1 summarizes the theories dealing with nuclear strategies of weaker countries similar to DPRK.

Summarizing the above nuclear strategy (table 1), it can be as follows. In the first nuclear age, the nuclear strategy as a balance of power between the great powers, led by the United States and the Soviet Union, was the critical point, so the basis of the nuclear strategy was the no first use (NFU) of the strategy. However, with the advent of the Second Nuclear Age, nuclear-armed states with asymmetric powers such as DPRK and Pakistan emerged, and the strategy shifted toward practical nuclear use such as nuclear warfighting strategies. As the weaker countries, which are far less than the strongest countries economically and militarily, they recognize the necessity of expanding nuclear weapons for military purposes and political and diplomatic means. According to the previous studies, the decision-maker decides the nuclear strategy by policy, and it varies from the non-use of nuclear weapons to the preemptive attack

or first strike, depending on the will of the leadership. In general, the experts thought the use of nuclear weapons would only occur under certain thresholds, such as armed provocation at a level that cannot be responding with conventional tactics.

3. Analysis of DPRK's nuclear strategy

DPRK's ruling ideology is known as the 'Jucheism', the 'Songun policy (military first)', and 'Kim Il-sung and Kim Jong-ilism'. If these independent routes are summarized, they can be economic independence and independent defense. In particular, the military-first politics for self-defense can be a core governing ideology, such as implementing military preferential policies even during 'arduous marches'. To achieve the two goals of economic independence and self-defense, DPRK advocated an economic and nuclear parallel path in 2013 and showed its will to continue nuclear development. [12] It can be seen that the military and diplomatic effect of the first nuclear weapon is much more significant than the reinforcement of the conventional strategy, so it can be seen that the independent defense system is being built through asymmetrical forces rather than a general independent defense system. Considering DPRK's diplomatic pressure by powerful countries and the economic situation, it can be seen as a natural outcome to show nuclear weapons ambition. Such asymmetric forces are likely to be used as a means (confirmation retaliation) to ensure the stability of the DPRK regime, and in the event of an all-out war, the use of nuclear weapons may be considered an asymmetric expansion strategy.

According to the results of the previous studies examined above, it is assumed that the leadership goals determine the nuclear strategy, but this hypothesis has the risk of underestimating the nuclear capability and nuclear posture of the other party. It would be more reasonable not to focus on the leadership goals but to predict the level at which DPRK can expect maximum utility by analyzing its advantages from possessing nuclear weapons to avoid that underestimation

Factors are needed to predict the level of nuclear strategy. Following are some of the main factors based on previous research cases.

- Nuclear capability (qualitative and quantitative level)
- Transparency of information

- Transfer of command and control system
- Scale of conventional power
- Level of throwing means (ICBM, SLBM)
- Missile base's survivability (concealment, dispersion, etc.)
- Diplomatic relations with neighboring countries

Based on the above primary factors, the current DPRK nuclear strategy level is as follows. First of all, DPRK has shown a willingness to continue nuclear weapons and is in a state of diplomatic and economic isolation amid various international sanctions. Besides, the deterioration of the economic situation and the media's development have revealed some instability in maintaining the regime. To overcome these various hostile environments, DPRK makes an effort to maintain more robust deterrence. Using advanced nuclear weapons as a means of propaganda of the system eliminates the instability of the internal regime, advocates a nuclear strategy as a political and diplomatic means externally, and uses nuclear weapons as a negotiating card. To achieve a practical effect as a card for such negotiations, DPRK must possess nuclear weapons and advance nuclear weapons to a level that can be positively retaliated against, and it must be promoted. This can be seen through efforts such as ICBM and SLBM-related missile tests, solid-fuel development, and vehicle launch pad development, which DPRK is continuing to try. Through this, it can be predicted that DPRK has established a nuclear strategy at a level capable of confirming retaliation to some extent, and for the same purpose, it can be predicted that the quantitative level of nuclear weapons will continue to improve to a certain level.

However, since Kim Jong-un's efforts to concentrate and strengthen his power have not been carried out, the transfer of command power and the reorganization of the command system for nuclear battle posture have not been made, so it can be said that it is a limited confirmation retaliation system to maintain the Kim Jong-un regime. Therefore, it is necessary to prepare for the denuclearization of the Korean Peninsula in response to DPRK's nuclear strategy by analyzing military, economic, political, and topographical redlines, keeping in mind that a preemptive nuclear attack may also occur in specific situations that may be an obstacle to maintaining the system.

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Table 1. List of nuclear strategies

Nuclear Strategy											
Bruce W. Bennett[2]	<p>Deterrence and coercion in peacetime</p> <ul style="list-style-type: none"> - North Korea actively uses its nuclear weapons for deterrence and coercion in peacetime. - North Korea might also use its nuclear weapons early in a conflict. 										
Paul Bracken[3]	<p>Launch on warning</p> <p>Leadership to adopt a semi-automatic nuclear launch-on-warning posture in the second nuclear age</p>										
Vipin Narang[4]	<table border="1"> <tr> <td>the “catalytic” posture stops just short of overt declaration of nuclear weapons acquisition, aiming instead to use that possibility as a diplomatic card to force superpower intervention at a moment of supreme national emergency</td> <td>the “assured retaliation” posture develops a credible second-strike capability and an equally credible commitment not to launch a first strike</td> <td>the “asymmetric retaliation” posture develops a credible threat to use nuclear weapons first in order to nullify an opponent’s conventional military advantage</td> </tr> </table>	the “catalytic” posture stops just short of overt declaration of nuclear weapons acquisition, aiming instead to use that possibility as a diplomatic card to force superpower intervention at a moment of supreme national emergency	the “assured retaliation” posture develops a credible second-strike capability and an equally credible commitment not to launch a first strike	the “asymmetric retaliation” posture develops a credible threat to use nuclear weapons first in order to nullify an opponent’s conventional military advantage							
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Keir A. Lieber and Daryl G. Press[6]	<p>Coercive Nuclear Escalation</p> <p>leadership face powerful and rational incentives to create a stalemate and coerce an end to combat very quickly – before suffering too many major battlefield defeats</p>										
Robert Brad[7]	<p>three “zones of deterrence”</p> <table border="1"> <tr> <td>“gray zone” of coercion and provocation</td> <td>“red zone” in which combat is underway but the adversary attempts to keep its actions beneath the U.S. nuclear response threshold</td> <td>“black and white zone” involving nuclear attack against U.S. assets, allies, or forces</td> </tr> </table>	“gray zone” of coercion and provocation	“red zone” in which combat is underway but the adversary attempts to keep its actions beneath the U.S. nuclear response threshold	“black and white zone” involving nuclear attack against U.S. assets, allies, or forces							
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Parachini [9]	<table border="1"> <tr> <td>Minimum deterrence</td> <td>Catalytic</td> <td>Massive preemption</td> <td>Assured retaliation</td> <td>Asymmetric escalation</td> </tr> <tr> <td colspan="5">- bolstering regime strength through prestige, legitimacy, coercive power, and nationalist credibility - deterring U.S. coercion or attack - in extreme circumstances, supporting offensive operations through escalation dominance, empowering provocation, or offensive warfare</td> </tr> </table>	Minimum deterrence	Catalytic	Massive preemption	Assured retaliation	Asymmetric escalation	- bolstering regime strength through prestige, legitimacy, coercive power, and nationalist credibility - deterring U.S. coercion or attack - in extreme circumstances, supporting offensive operations through escalation dominance, empowering provocation, or offensive warfare				
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Russia’s strategy [10] (Elbridge Colby)	<ul style="list-style-type: none"> - limited use of nuclear weapons that will enable them to deter or stop an attack of superior conventional forces without escalation into total nuclear exchange or large-scale regional war - the objective of such nuclear employment : ‘de-escalation of aggression’, ‘escalation to de-escalate’ 										
Pakistan’s strategy [11] (Henry Sokolski)	<p>Preemptive attack or first strike strategy</p> <p>Four red lines that could prompt Pakistan to use nuclear weapons : territorial redline / communications(economic strangling) / military redline(destroy a large part of Pakistan’s land / political redline(destabilize Pakistan politically)</p>										