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Linas Didvalis[*]
Vytautas Magnus University

Jiabin Song[**]
Vytautas Magnus University

Between Nuclear Autonomy and Foreign Extended Nuclear Deterrence Protection: the Case of Japan

The purpose of this article is to elucidate the problem of Japan's nuclear security deterrence strategy dilemma, which is balancing between pursuing nuclear autonomy and remaining under the United States' (the U.S.) extended nuclear deterrence protection. Through an examination of Japanese official documents, scholars' relevant literature on both Japanese and U.S. nuclear security and an analysis of Japan's geopolitical structure, the researchers resolve this dilemma through a nuclear deterrence perspective. Based on the evaluation of how Japan's nuclear deterrence credibility's potential is changing when pursuing either of the two options, the researchers conclude that the three geopolitical factors — the proximity to the strong nuclear adversary, the smallness of territory and lack of nuclear armament experience — determine that it is not in Japan's national interest to leave the U.S. nuclear umbrella and pursue autonomy through independent nuclear capabilities. In addition, given the similarity of three such geopolitical factors shared by them, the majority of small states (e.g. Eastern European countries such as Lithuania), it is reasonable to constitute them into an empirical model and conduct a further deductive study on the cases of other small cases.

Introduction

Deterrence — This is an age-old concept which can be found in the discussions of ancient strategic thinkers, such as Thucydides' record[1] of the Athens envoy's warning to the Spartan before the latter abolished the Thirty

[*] *Associate Professor Dr. Linas Didvalis* is the Head of the Centre for Asian Studies, Vytautas Magnus University. Address: V. Putvinskio st. 23-418, Kaunas 44243, Lithuania; email: linas.didvalis@vdu.lt
[**] *Jiabin Song* is a PhD Candidate at the Centre for Asian Studies, Vytautas Magnus University. Address: V. Putvinskio st. 23-417, Kaunas 44243, Lithuania; email: jiabin.song@vdu.lt

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Years' Peace treaty with recourse to war or in a more abstract way, such as Sun Tzu's statement, "a military/force-structure to subdue your adversary without fighting it" (Sun Tzu, 2017)[2], etc. Nevertheless, for thousands of years, regardless of how military forms have been changing, the essential logic of deterrence has remained intact, that is, to obtain and demonstrate a perceivable capability of inflicting a retaliatory cost that outweighs the potential gains of the adversary's aggression to dissuade the latter from conducting the aggressive act. Nuclear deterrence is merely a different form of deterrence — the essential logic is the same but with a bigger scale and quicker mechanism in terms of warfare withal. Furthermore, the so-called Extended Nuclear Deterrence (i.e., hereinafter: END) is a commitment of a nuclear deterrent patron to its client state(s) that the former will use its nuclear weapon to defend the latter in case the protected one is attacked under certain specified conditions in accordance with their patron-client treaty (i.e., regarding the nature of the aggression, such as they under conventional attack or nuclear attack? On which territorial area and to which extent? Etc.).

Apparently, such an END commitment with regard to the deterrence effect is a credibility problem, as is the individual deterrence *per se* — both are judged by the deterree's perception of which the former is about and how likely the patron will honour its words to risk itself by using the nuclear weapon in the event the deterree attacks its client. The latter is simply about how possible the deterrer's material capability really is as its claims that it will inflict the declared costs to respond to the deterree's attack. Therefore, for a nuclear deterrer, the essential thing is to enhance its credibility of retaliation, whether through demonstrating its own nuclear material capability or the affirmation of its nuclear protector's patron-client END commitment. In the case of Japan, the nuclear dilemma is whether to continue being a non-nuclear armed state residing under the U.S. END umbrella (Ministry of Foreign Affairs of Japan, 1960)[3] or to begin developing its own nuclear arsenal.[4] The dilemma is prompted by Japan's changing security environment, and at the core of it is the uncertainty of which of the two options is capable of providing Japan with better deterrence credibility.

This article deals with a dilemma that Japan has been facing for more than 70 years: whether or not to be a nuclear-weapon state. For a country that was traumatised by the atomic bombings of Hiroshima and Nagasaki and yet later faced nuclear tests conducted by its adversarial neighbours (first China and then North Korea), such a dilemma has been a difficult one. On the one hand, the Japanese government pursued two in-depth investigations (i.e., during 1968/70 and 1994/95) into whether the development of its own nuclear weapons would be a doable and effective policy. On the other

hand, constitutional restrictions, the strong influence of the U.S., economic calculations and multiple other factors led Japan to consider the extended nuclear umbrella provided by the American ally as the best option. However, the discussions are ongoing, and the dilemma is not regarded as solved (Bollfrass & Herzog, 2022).

As the literature review provided below will illustrate in more detail, the authors of this paper are not satisfied with the existing arguments for why Japan should or should not reconsider the existing status quo regarding its nuclear capabilities. Through examination of the Japanese official documents, both Japanese and the U.S. nuclear security scholars' relevant literature, and the analysis of Japan's geopolitical structure, the paper seeks to provide a stronger resolution to this dilemma through a nuclear deterrence perspective. As a result, the authors identify three geopolitical factors that were largely overlooked in the previous research that can alter the Japanese nuclear deterrence's credibility in the event of Japan shifting from the U.S. END option — the proximity to the strong nuclear adversary, the smallness of territory, and lack of nuclear armament experience. By evaluating how these three factors affect Japan's nuclear deterrence credibility's potential when it is pursuing either of the two options: becoming the nuclear-weapon state or keeping the status quo, the researchers of this article clarify this conundrum of the Japanese nuclear option.

The paper consists of three main parts: literature review and methodology excursus on both Japanese nuclear policy as well as the nuclear deterrence studies; the overview of the chronological evolution of Japan's nuclear dilemma with its background; and the analyses based on three geopolitical factors.

1. Literature Review and Methodology Excursus

The issue of Japan's reliance on the U.S. nuclear umbrella has attracted interest from numerous scholars who focus on small state nuclear security[5] besides the regional studies. According to the different dimensions approached by the studies, past scholarship on the subject can be generally divided into six types: 1) Probe into Japan's own security framework domain which is basically regarding the factors in the bilateral security cooperation between the U.S. – Japan relationship since 1950s, e.g., Emmott B. (Emmott, 2004: 50-56) , Samuels R., Schoff J. (Samuels & Schoff, 2015: 475-503), Smith S. (Smith, 2003), Lanoszka A. (Lanoszka, 2018) etc.; 2) Probe into the regional security context to explore the regional environment's change that might alter Japan's nuclear option

such as the rising of China or the North Korea's nascent nuclear arsenals, e.g., Jimbo K. (Jimbo, 2003), etc.; 3) Probe into the Japanese institutional factors and its political elites' perceptions such as regarding the reinterpretations and challenges to Japanese Constitution Article 9 or the defence institution reforms conducted by the Japanese PM Abe, e.g., Tatsumi Y. (Tatsumi, 2012: 137-161), Oros A. (Oros, 2003), Easley L. (Easly et al., 2010: 45-66) etc.; 4) Probe into the Japanese public opinion and political culture and their tendencies such as the anti-militarism originated from the traumatic political memories of the Hiroshima and Nagasaki, e.g., Akiyama N. (Akiyama, 2003) etc.; 5) Probe into the Japanese nuclear policy and its diplomatic activities such as its involvement in the different international cooperation like nuclear disarmament or the norms about the peaceful usage of nuclear power, e.g., Tosaki H. (Tosaki, 2017), DiFilippo A. (DiFilippo, 2003), Furukawa K. (Furukawa, 2003), Hook G. (Hook, 1988: 381-394) etc.; 6) Probe into the Japanese technology potential and other aspects as regards its nuclear armament build-up such as its space program's ICBM potential or Japan is the only non-nuclear armed country possessing the full-scale fuel cycle technology, e.g., Ofek R. (Ofek, 2018), Thompson J., Self B. (Thompson & Self, 2003).

In practice, these past studies usually concentrate on one dimension's analysis; meanwhile, their following interpretations also include and extend into other dimensions' elements. For instance, Roehrig's (Roehrig, 2017) book focuses on the U.S. END within the region while providing a general overview of the U.S. alliance with Japan and South Korea and dedicates a whole chapter to analysing Japan's standpoint in more detail. Roehrig concludes that 'Japan would incur a heavy cost, domestically and internationally, should it move to acquire nuclear weapons' (Roehrig, 2017: 122). Although the author briefly mentions operational obstacles related to deploying nuclear weapons, they are not considered in more detail. O'Neil (2013) provides similar information in his book, which contains a whole chapter focused on Japan's case. The same can be said about publications authored by Smith (2019), Mochizuki (2007), Kamiya (2002), Samuels & Schoff, Tatsumi, Dupont (2004), Izumi & Furukawa (2007), Barnabie & Burnie (2005), Mukai (2015), Hitoshi (2007), Knox et al. (2021), and others where the discussion mainly revolves around the issues of Japan's domestic anti-nuclear sentiment, the country's international image as a peace-loving nation that is against nuclear proliferation, and the possible negative impact of nuclearisation to the alliance with the U.S. and to a broader regional stability.

Of all the reviewed publications, Fitzpatrick's (2017) stands out as the most in-depth and inclusive analysis of Japan's nuclear policies and technical capabilities. Although Fitzpatrick makes many insightful points about Japan's

ability to produce nuclear weapons and existing constraints, the analysis lacks the perspectives offered in this article.[6] Overall, as the literature review reveals, there is a lack of a more detailed look into the feasibility of Japan having independent nuclear weapon capability. In other words, the current scholarship has not yet analysed the success of a scenario where Tokyo disregards economic, domestic, and international factors and chooses to develop its own nuclear deterrence.

Although this paper takes the existing research into consideration, it considers the existing arguments explaining Japan's behaviour lacking in certain aspects. To fill this knowledge gap, the article relies on the first two generations of nuclear deterrence theories (Powell, 2003, 2006) to resolve Japan's nuclear dilemma by elucidating the key aspects of the state's nuclear security amid the present-day Northeast Asia geopolitical environment — how do the two different strategic options change the credibility of Japan's nuclear deterrence? (See: Appendix 01: The research conceptual framework).

The reason the researchers choose such a theoretical framework based upon the works of Albert Wohlstetter (1961), Glenn Snyder (1961), Bernard Bodie (1959), William Kaufmann (1949, 1954), Thomas Schelling (1966, 1980) and Hermann Kahn (1961) comes from two considerations: firstly, regarding the subject, the Japanese dilemma *per se* is a question about the way enhancing Japan's national survival in a nuclear conflict scenario; therefore, it is a pure interstate analysis concerning the highest degree of national security risk rather than on the non-state actors' irregularly contingent hazards of relatively limited damage. Secondly, the analyses in this article focus more on the material factors such as Japan's geographical attributes, the nuclear weapons specifications, etc. These analyses can largely draw lessons from the first-generation deterrence theory's investigative methods, like that demonstrated in the Rand Corporation's (1953) studies on the bomber vulnerability and missile vulnerability (Brown, 1959) during the 1950s.

2. The Chronological Evolution of Japan's Nuclear Dilemma

Japan has been living with the dilemma of how much reliance on the U.S. as the key provider of security it should have and how much to develop independent capabilities since the end of WWII. Nowhere has this quandary been more perplexing and controversial than in the field of nuclear weapons capability, as revealed by a number of events that will be briefly presented

here by dividing them into four chronological stages.

The first stage is the period of 1951–1966, from the establishment of Yoshida doctrine to the eve of the first Japanese Tokai nuclear power plant (NPP), which began its successful operation on July 25, 1966. Regardless of whether there were any ambitions or intentions arising from Japanese politicians or not,[7] at this stage, Japan had no technical capability to build its own nuclear weaponry. Overall, Japan seemingly had few worries about being threatened by a nuclear attack and expressed no insistence on getting confirmation that its territory is covered by the U.S. nuclear umbrella.

The second stage spans from 1966 to 1970, starting with Japan possessing its first NPP and lasting until the eve of the first Japanese satellite put into orbit, which took place on February 11, 1970. The successful use of the Lambda 4S launch vehicle confirmed that Japan, for the first time, obtained its intercontinental ballistic missile (ICBM) potential capability. As a result, Japan proved to have a technical basis for both nuclear weaponisation and nuclear projection capability. This period is also marked by Japan's increasing concerns about China's nuclear weapons program, which made major breakthroughs in the mid-1960s and culminated with the first nuclear test. As a result, Japan's Prime Minister Sato actively sought reassurances from the U.S. about its readiness to deter China via the extended nuclear umbrella. After President Lyndon Johnson emphasised the U.S. commitment to Japan on several occasions, Sato expressed his famous Three Non-Nuclear Principles in 1967 and included reliance on the U.S. nuclear deterrence in the Four-Pillars Nuclear Policy announced in 1968 (Akimoto, 2020: 52).

The third stage was so far the longest, extending for 35 years from 1970 to 2006. During this period, Japan solidified its technical basis to develop nuclear capability but had hardly any security concerns that would be convincing (or used as a strong excuse) to invest in developing nuclear weapons in practice. This position experienced a major disruption on October 9, 2006, when North Korea conducted its first underground nuclear test, which literally and figuratively shook the whole region. During this period, Japan kept stressing the importance of the U.S. nuclear umbrella both in its public strategic documents (e.g. National Defense Program Outline/Guidelines) and internal reports (Kase, 2001: 55-68).

Finally, the fourth stage, since 2006, has been characterised by the Japanese government and security circle's reflections on the nuclear deterrence alternatives, which were ignited by North Korea's nuclear weapon development and alleged declining protection of the U.S. extended nuclear deterrence.[8] These debates among the Japanese political elite (TV Asahi, 1999-2012) and its intelligentsia regarding Japan's nuclear security have also

epitomised the essential question of this research: Should Japan start diverting from its age-old nuclear bandwagoning strategy under U.S. protection into a self-reliant nuclear autonomy strategy?

The developments in recent years led to the Japanese government repeatedly seeking U.S. reassurance on its commitment to using its nuclear weapons to defend Japan in a scenario of the country being attacked. Because it is axiomatic that even if a state has large interests in its ally, such interests still cannot match its own interests. The U.S. extended nuclear deterrence towards Japan means that if Japan is at risk of being defeated or under nuclear attack, the U.S. has an obligation to use its nuclear weapon to fight against the aggressor even if that aggressive state has a mutual assured destruction (MAD) capability in relation to the U.S. Namely, the uncertainty here is a question from Tokyo whether Washington "will go all-out for us?" Especially if we take the executive branch's accountability in a democratic system into account, when its own survival is at issue, the material support or conventional war involvement receives completely different considerations than joining a thermonuclear war.

Truly, besides these two nuclear options, there are also two other alternatives: 1) the hybrid option, which is a position between a complete autonomy approach and complete reliance on the U.S. nuclear umbrella; 2) the nuclear neutrality that manifests in its Three Non-nuclear Principles in the year 1967.

Regarding the 1) alternative, just like former Japanese Prime Minister Abe's hybrid approach in the Japan-USA conventional defence cooperation, which manifested in his different security and foreign policies reforms, in the nuclear security dimension, this option will lead to various studies due to its complexity according to different combinations of such an option. For instance, besides Japan's preference, the U.S. position per se is not likely to support such a nuclear hybrid option in the bilateral security relationship with Japan. In past studies (especially during the Cold War era), some scholars highlighted that a nuclear-armed Japan would jeopardise the Japan-U.S. relationship for two main reasons: one is the re-militarised Japan, plus its robust economy could be a worrisome existence for the U.S.; another was that the U.S. provided extended nuclear deterrence to an ally so as not to be bogged down into an unwanted nuclear crisis/war by its ally's autonomous choice. In addition, in recent years, along with China rising and becoming a bipolar hegemonic challenge for Washington, there is another voice that would favour its Northeast Asia allies, like Japan, to have nuclear weapons due to the much bigger stake they will gain if they are defeated by China.[9] Hence, in such a scenario, the balance of resolve is much in favour of them vis-à-vis China than

of the U.S. against China in terms of nuclear usage. The possible result of this is that these states commit nuclear suicide; however, China's state size will be largely maimed and unable to pose a threat to the U.S. anymore. Therefore, regardless of Tokyo's choice, it is not in the U.S.'s interest to have a hybrid option in the nuclear security cooperation with Japan.

As to the 2) alternative regarding the nuclear neutrality choice, it is an unrealistic option as well. Even Prime Minister Eisaku Sato, who at one point described his Three Non-Nuclear Principles as 'nonsense' (Volpe, 2015), cannot be considered a strong advocate of nuclear neutrality for Japan. The reasons are two. Firstly, even though the Treaty of Mutual Cooperation and Security between the U.S. and Japan does not oblige Japan to participate in military conflicts that take place between the U.S. and a third party, in practice, Japan is serving as a strategic supply base in Northeast Asia. Japan performed this function during the Vietnam War and might have no choice but to do it again in the future or even deal with direct attacks (e.g. we can imagine the scenario of a war erupting in Taiwan between China and the U.S. or Russia's ongoing invasion of Ukraine escalating and spreading into the Asian region).

Secondly, if Japan does go with a completely neutral foreign policy, that will make it lose both nuclear and conventional U.S. protection. Then, this neutrality will severely weaken Japan's survival capability due to the fact that nuclear deterrence and conventional deterrence are interlocked when the case comes to a confrontation with a nuclear adversary. Without nuclear capability, Japan cannot conventionally defend itself either because its adversary will use nuclear weapons to salvage the situation in case its conventional warfare performs badly. We can directly draw this conclusion from Russia's recent repeated threats to use its nuclear weapons to reverse the present trend of military setbacks in Ukraine. When your adversary does not appreciate your upper hand in conventional military performance and is aware of possessing a nuclear superiority over you, then it will most likely use the nuclear option to change its conventional military deficit. That implies you can never win a war against a nuclear adversary without external nuclear protection.

Table 1. **Notable events related to Japan's standpoint regarding nuclear weapons**

Date	Event
1951 September 8	Security Treaty between the U.S. and Japan is signed, thus marking the start of Yoshida Doctrine that promoted Japan's security reliance on the U.S. (replaced in 1960 by the Treaty of Mutual Cooperation and Security)
1955 December 19	Japan enacts the Atomic Energy Basic Law that restricts the development of atomic energy only for peaceful purposes.
1957 May 7	Japanese Prime Minister Nobusuke Kishi expresses his opinion that the possession of nuclear weapons would not be anti-constitutional.
1965 January	Japanese Prime Minister Sato received reassurance from U.S. President Lyndon Johnson that the U.S. will defend Japan with nuclear weapons.
1966 July 25	Tokai nuclear power plant, the first of such kind in Japan, starts operation.
1967 December	Japanese Prime Minister Sato announces the Three Non-Nuclear Principles.
1968 September–1970 January	Japanese government commissions a group of researchers to investigate possibilities of Japan's nuclear armament; the research is concluded by a classified report "Basic Research on Japan's Nuclear Policy".
1968 December	Reliance on the U.S. nuclear deterrence is included in Japan's Four-Pillars Nuclear Policy.
1970 February 11	First Japanese satellite put into orbit by using Lambda 4S launch vehicle confirms the country obtained ICBM potential capability.
1976 June 8	Japan ratifies Treaty on the Non-Proliferation of Nuclear Weapons.
1976 October 29	Japan formulates the National Defense Program Outline (NDPO) that stresses Japan's reliance on the U.S. nuclear umbrella. This statement is included in all further NDPOs.
1978 February–March	Japanese Prime Minister Takeo Fukuda calls for strict observation of the Three Non-Nuclear Principles while at the same time expressing consideration that possession of nuclear weapons would not be anti-constitutional.
1994–1995	The Japan Defence Agency organises an internal study group to examine the nuclear option; an internal report "A Report on the Problems of the Proliferation of Weapons of Mass Destruction" is released.
1997 July 8	Japan ratifies the Comprehensive Nuclear-Test-Ban Treaty.
2002 June	Japanese Prime Minister Junichiro Koizumi expresses consideration that possession of nuclear weapons would not be anti-constitutional.
2006 October 9	Japan is alarmed by North Korea's first underground nuclear test.
2011 June 20	Governor of Tokyo (1999–2012) Shintaro Ishihara openly advocates that Japan should develop nuclear weapons.
2022 May	Former Prime Minister Abe publicly encourages a more active debate about whether Japan should allow the U.S. to host nuclear weapons in its territory.

Source: compiled by the authors.

3. The Effect of Geopolitical Factors on Japan's Nuclear Deterrence Credibility

The term "national interests"[10] varies between states according to their political elites' perception; however, when the subject comes to nuclear security, the essential issue for a state is invariably to survive during the process of a nuclear conflict.[11] Therefore, although it is understandable that many pieces of research on Japan's nuclear security were diverted from this essence into other relatively less important dimensions (e.g. regional arms race, financial costs, domestic opinion, and international reputation, etc.), in this paper, the researchers will only focus on examining the potential changes in Japan's nuclear deterrent credibility. The latter plays as a determinant of Japan's survival capability when two different nuclear security options — development of nuclear weapons vs. reliance on the extended nuclear umbrella — are compared.

The nature of nuclear deterrence is based on the theoretical proposition that a psychological dissuasion to the nuclear deterree increases by the deterrer's potential nuclear retaliation capability, which can inflict an unbearable cost on the former in case it is the first to initiate a nuclear attack. Since Thomas Schelling's elucidation, the term 'deterrence' in a strategic sense is categorically different from "compellence" (Schelling, 1966: 69-78). However, the essential element of this seemingly defensive nuclear strategy's functioning is mainly from the state's nuclear offensive capability rather than defensive capability. The reasons are two:

1) On the strategic level, nuclear defence systems, like the BMD, mainly serve as an amplifier for the deterrer state's nuclear offensive capability, due to the key of having a psychological dissuasion to the deterree, that is, to let it apprehend the potential unbearable costs from its intended nuclear attack. The "costs" here must be generated from the deterrer state's nuclear offensive capability. Otherwise, even in a scenario in which a deterrer state can 100% ensure it is able to intercept all the incoming nuclear missiles from the deterree state it cannot "dissuade" the latter to refrain from its nuclear offence, namely, the deteree can just "keep trying" if its first wave of nuclear raid is completely foiled by the deterrer state's nuclear defensive system, because there is no consequential cost from its malicious behaviour. This is why present-day Japan's nuclear denial strategy must be underpinned by the U.S. nuclear retaliation capability in the Security Treaty between the United States and Japan framework and be reassured intermittently.

2) On the practical level, the contemporary nuclear defensive system like BMD is far from technological maturation, much less having a strategic denial effect. This is because, on the one hand, in terms of ballistic missiles, the

contemporary combination of technology, military organisation, and strategy of its nuclear offence is much more sophisticated than that of its nuclear defence; on the other hand, in terms of economics, the deterree's investment in ballistic missile offensive asset is at least two times smaller than that of the commensurate missile defensive asset requiring the deterrer to intercept it (Czajkowski, 2017).

Therefore, the asymmetry between the nuclear offence and nuclear defence has little changed since Bernard Brodie's era (Brodie, 1959: 221), which leads to the latter merely playing a modifier's role in adjusting the former's effectiveness rather than a dominant element in measuring a state's nuclear deterrence credibility (The U.S. Department of Defence 2022). As a consequence, this research does put more stress on the nuclear offensive capability regarding Japan and its deterrees.

Further, a logical inference can be drawn from the above discussions that the deterrer's credibility of nuclear deterrence is the level of its psychological dissuasion towards the deterree's nuclear offence intention, which is mainly found upon its nuclear offensive capability partially adjusted by its nuclear defensive capability. Hence, in this research regarding Japan's case, to clarify the optimal choice between Japan's two nuclear strategies, it is necessary to compare the changes in its nuclear deterrence credibility by either strategy, which requires us to comprehend the changes in the nuclear offensive capabilities between Japan and its deterrees in the analytic processes.

Furthermore, for achieving a clear conclusion, in contrast to the complex deterrence theorists who advocate the multiple domains/full domain deterrence method, this research adheres to the classical (or simply logical) deterrence approach (Kahn, 1969) and the evaluation of Japan's two strategic options' nuclear deterrence credibility changes are placed in an extreme scenario that Japan is under a coercive attack which necessitates a nuclear usage to protect its sovereignty.

As well as clarifying this nuclear necessity for Japan, it is necessary to mention the relationship between nuclear deterrence and conventional deterrence when we analyse the roles of the U.S. extended nuclear deterrence and the so-called "nuclear hedging" strategy (i.e. Japan's own latent nuclear weaponisation capability preservation/build-up) in Japan's security policy. In a simplistic form, the researchers' argument on this relationship are two: 1) without nuclear deterrence credibility against the nuclear deterree the deterrer's conventional deterrence is in vain (i.e. if the conventional military balance is in favour of the non-nuclear-armed deterrer state, the deterree state can use its nuclear weapons to overcome its deficit in the conflict against the former); 2) under a more or less equal nuclear offence balance, a conventional

limited war is possible taking place between the two parties (e.g. Japan under the U.S. umbrella will be on an equal footing against China, and hence it can conduct a limited conventional war with China without worrying the latter's nuclear option), and there will be constant competition in the balance of resolve along with the dynamics in the conventional warfare during the conflict process.[12] Therefore, nuclear deterrence is the prerequisite of conventional deterrence; only the former will enable the latter to become a means for the deterrer states to defend their national survival.

Hence, the key criterion here to finding out the optimal nuclear security approach through comparing the two nuclear options for Japan is ipso facto to compare how much either of them changes the Japanese nuclear deterrence credibility respectively — the one that brings more deterrence premiums to dissuade its potential nuclear adversary is a better option for Japan's national interests. Furthermore, as Robert Powell opines in his nuclear deterrence studies (Powell, 2003) that the actual nuclear deterrence effects vary widely with the conditions in which the deterrer state is situated. For Japan, there are three conditions/geopolitical factors — the proximity to the strong nuclear adversary, the "smallness" of territory, and the lack of nuclear weaponization experience – that are significantly affecting Japan's nuclear deterrence credibility against its nuclear deterrees, in case it approaches the nuclear autonomy strategy option. This is caused by the negative changes in the balance of nuclear conflict costs, the balance of nuclear power regarding the nuclear offensive capabilities, and the balance of resolve between Japan and its deterrees. The following analyses of the three geopolitical factors will revolve around the unique criterion question of how they change Japan's nuclear deterrence credibility by the respective imbalances given rise by Japan's nuclear autonomy option.

a) The "Smallness" of Japan's Territory

The Japanese government's 1968/70 Internal Report argued that the overconcentration of the Japanese population in a few metropolitan areas is providing its potential nuclear adversaries (i.e. mainly designated to China) a great nuclear advantage during the nuclear warfare between them. In contrast with those scholars' views aligning with the 1968/70 report (Samuels & Schoff, 2015), some voices are expressing the opposite position as well. For example, Samuels R. and Schoff J. argue that since the United Kingdom (the UK) and Israel both have developed and been maintaining their nuclear arsenal, Japan should not refrain from using the nuclear weapon to enhance its survival capability provided that it has a similar geodemography and lack of strategic depth as the aforementioned states.[13]

However, the counter-evidences of this view are problematic; for the UK, the nuclear threat from the USSR was via the potential general war between the latter and NATO. Different from the situation between Japan and the U.S., which is a unilateral protection relationship, NATO's nuclear policy is not a nuclear second use to deter the potential nuclear attack but a nuclear first use to deter the potential conventional attack on its member states[14] which the UK has committed to this collective defence. Therefore, to have a nuclear capability is not just a compensation measure for the UK's national security during its fast-shrinking conventional capability in the dissolution of its global colonial empire (e.g. the scaled-down level in the Royal Naval after WWII is astonishing). The UK's nuclear armament project is thus beyond its national defence but served as a part of NATO's security policy en bloc — this is why the UK's nuclear armament is so deeply fused into the U.S. nuclear development.

On the contrary, in Israel's case, on the one hand, it possesses no nuclear guarantee from the U.S. as the latter confers to Japan forces it to engage in self-help by developing the nuclear deterrence capability. On the other hand, it does not have any nuclear adversary to deter in its region which is also making its situation different from Japan in Northeast Asia. Therefore, Dayan's "the Third Temple" for Jerusalem/Tel Aviv is beyond merely a last resort as it was during the Yom Kippur War; rather it served as a strategic means to dominate the regional military arena.

Additionally, even though the asymmetric conflict costs between Japan and its nuclear adversaries like China have been revealed by numerous scholars (Kase, 2001: 59, 63) there is one aspect they have missed in terms of jeopardising Japan's nuclear deterrence credibility — the political factor. Due to the fact that China's or North Korea's totalitarian political systems are different from democratic polities, their accountability to their subject is much lower than the democratic government to their citizens, which lowers their political costs compared to democratic adversaries' domestic costs in a nuclear conflict. In a democracy, it is unthinkable for the head of its executive branch to allow even 10% of its constituency to fall due to its nuclear policy, whereas it is totally acceptable for a totalitarian ruler to sacrifice half of his subjects to obtain his foreign conflict victory.[15]

In short, as the 1968/70 Internal Reports had discussed regarding Japan's nuclear vulnerability, the "smallness" factor determines the costs will be much higher for Japan than its deterrees during a nuclear conflict. In contrast, under the U.S. extended nuclear deterrence protection, Japan will stand on an equal footing with its deterrees in terms of nuclear conflict costs. Hence, due to this asymmetry of nuclear conflict costs, choosing to approach nuclear autonomy will decrease Japan's nuclear deterrence credibility in comparison with the

option that it remains in the U.S. nuclear umbrella. Because if a conflict is much more harmful to a state than its adversary, its adversary will definitely doubt whether that state will dare to take on it in a nuclear conflict, as it declares. In sum, the declining nuclear deterrence credibility due to the imbalance of nuclear conflict costs between Japan and its deterrees in the absence of the U.S. extended nuclear deterrence protection invalidates its nuclear autonomy approach.

B) The Proximity between Japan and Its Nuclear Threat States

Just like the things common in geopolitics, the connectivity or geographical distance between two countries is proportionally determining the intensity of their interactions, due to the fact that they can harm or benefit each other easier through various means. It is the same in nuclear security — the closer distance from a nuclear arm adversary, the more nuclear projection methods can be adopted by the adversary to inflict catastrophic harm.

In the Cold War, if the Soviet Union wanted to initiate a nuclear strike on the U.S. homeland, it must rely on its ballistic missile (BM) as its major delivery system, whereas for China or North Korea, due to the short distance between them and Japan, most of delivery platforms are feasible for the nuclear strike: warplane, missile submarine, warships, short-range ballistic missile (SRBM), or in an extreme scenario that if North Korea's military force could reach the position similar to the Korean War in the year 1950, then its nuclear warhead can even be carried by the artillery rocket system to attack Japan homeland's Chugoku region. This geographical proximity's negative effects on Japan's nuclear deterrence credibility are mainly from four reasons.

The first reason is that the short distance (i.e. approximately 500 km range) between Japan and these nuclear rivalry states limits Japan's BMD system intercept effectiveness. Given as of now, the BMD effectiveness per se remains highly qualitatively unreliable (i.e. due to technological reasons) and quantitatively limited (i.e. due to economic reasons), having a sufficient time window for the BMD to process its intercept function is vital to increase its intercept success rate. Because even the Single-Shot Probability of Kill (SSPK) of the U.S. Theater High-Altitude Area Defense (THAAD) system can really reach its boastful quality of 0.8 (Czajkowski, 2017: 230); however, the quantitative disproportion between the Chinese/Russian ballistic missiles and the Japanese interceptors per se makes the idea of "denial strategy" highly unrealistic (Czajkowski, 2017: 230).

For instance, unlike ballistic missiles, which are designed to hit U.S. soil from the same original states like North Korea or China, the former has around 270 seconds to intercept them (Sankaran & Fetter, 2021); due to the proximity to these states, Japan's BMD system will not be able to enjoy such a luxury

time window but must intercept the incoming missile in merely around 70 seconds reacting time (i.e. in case of the rival's BM launch platform is closing to 300 km from Japan) (Lindsay J. M. and O'Hanlon, 2001: 34). If we marry this proximity difficulty with the rather small amount of the BMD units scatteredly deployed in Japan,[16] then the time window left for Japan's BMD system will be further shortened because each BMD unit must conduct more intercept missions when China starts a nuclear saturation attack against Japan or a salvo of missiles coming from North Korea.

The second reason why this proximity weakens Japan's nuclear deterrence credibility is that it allows its nuclear adversary to have more options in conducting its nuclear attack on Japan. The potential variety of its nuclear rivals' nuclear offensive methods determined by this proximity are listed below:

- The 54 Japanese nuclear reactors can be treated as a sort of "dirty bombs" placed within the Japanese territory (the 54 reactors' locations see: Appendix 02, which allows us to intuitively understand how high the density of the Japanese nuclear plants is relative to its small territory) and thus they can be ignited by various conventional attack methods (albeit there will be only 17 reactors on operation till the 2023 summer) (World Nuclear Association, 2023);
- As mentioned above, besides the SRBM, the short distance allows China or North Korea to use the artillery rocket system as well as the airborne (e.g. for the Chinese PLA Air Force besides the H-6 series, its JH-7, Su-30, and Su-35 after possible modification are all potential nuclear delivery platforms), cruise missile or the newest hypersonic missile to deliver the nuclear package and have a bigger room to manipulate the nuclear risks;
- Because the rival's nuclear attack method is multiplied, the total potential number of its nuclear attack units is multiplied as well. In other words, it exacerbates the problem revealed in the first reason, where Japan's BMD system's effectiveness is not just weakened by the short distance between the deterree's nuclear launch platforms and the Japanese homeland, but its reaction time is further squeezed by the multiplied incoming potential nuclear projectors (i.e. some of them play the role as decoys that only carry conventional warheads, and the Japanese BMD system has to intercept them all indiscriminately due to uncertainty nevertheless).

The third reason why the "proximity" weakens Japan's nuclear deterrence credibility is coming from the deterrer's decision-making process. The short distance limits the Japanese policymakers' reaction time on a possible nuclear attack (i.e. 7–10 minutes at most), even if it possesses a retaliation nuclear arsenal in the future. Because nuclear deterrence per se largely depends upon the deterrer's second strike capability that dissuades the deterree not to

initiate the nuclear attack by potentially inflicting an unbearable cost in the former's nuclear retaliation, this means the deterree only possesses the damage limitation capability against the deterrer. Such a damage limitation capability mainly comes from two dimensions:

1) the deterrer's nuclear arsenal is big enough vis-à-vis the deterree's nuclear offensive capacity or mediocre size but well covered and sparsely scattered throughout its vast soil or international territories (e.g. in case the state has nuclear missile submarine fleets or aircraft-carrier task force) which enable some of its nuclear weapons can survive the deterree's first strike and be used in the following retaliation;

2) the deterrer has enough time to conduct its nuclear counterattack after detecting the deterree's nuclear attack[17] and is thus able to preserve most of its nuclear arsenal, which turns the deterree's surprise attack into a full nuclear exchange. In this scenario, the time window is crucial. For example, in case Russia, China or North Korea initiate a nuclear attack on the U.S., their ICBM needs 35–40 minutes before reaching U.S. soil, and by and large, this 35–40 minutes "time window" is one of the key elements to constitute the indispensable part of the U.S. second strike MAD deterrence credibility, besides the vast number of its nuclear weapons.

Apparently, Japan falls short of both dimensions' requirements to downgrade its deterrees' nuclear advantage from splendid first strike capability to damage limitation capability. First, it doesn't even have a nascent nuclear arsenal, and second, the proximity between Japan and its deterrees (i.e. China, North Korea, and Russia) leads to the latter's ballistic missiles only taking 7–10 minutes before hitting the Japanese homeland, thereby intensifying the Japanese government's decision-making process and actually turning it into mission impossible.

The fourth reason for this proximity against Japan's credibility of its nuclear deterrence is directly interconnecting with the previous third reason. Namely, it is a "Perimeter" System-esque devolution design[18] used as an effective tool for resolving the decision-making inefficiency revealed in the analysis of the 3rd reason. From an organisational point of view, the devolution reform can improve a decision-making procedure by devolving the authority of decision-making to the lower-level officer/commander in a hierarchic institution. Therefore, it is a very attractive option for nuclear security, by which, according to the pre-delegated policy the reaction time to a nuclear raid could be largely shortened, whereby, the state's deterrence credibility can be enhanced.

In spite of such a merit of devolution, this "Perimeter" System-esque option is not suited for Japan's nuclear security. The reason is that the devolution of a nuclear counterattack decision-making authority to the

nuclear unit's commander could generate additional risks: shortening the chain of command does make the decision-making quicker, yet without the civilian government's political consideration of an error judgement from the narrowed military aspect thinking could bring an irretrievable disaster for Japan's survival. The errors originating from the military delegation's decision to initiate a nuclear counterattack are of two types:

- Technical errors, such as the military commander misjudging the incoming missile with a conventional warhead as a nuclear-armed missile and thus overreacting by initiating a counter nuclear second strike;
- Strategic errors, such as the incoming missile wasn't targeting Japan's strategic facility (e.g. the state's nuclear arsenal, military high command or political headquarters area, etc.) or a big city but merely intended to have a nuclear escalation strategy effect instead of initiating a general nuclear war. Yet the delegated military commander reacts with a nuclear counterattack.

The first type of error can be expected to be overcome by developing more advanced surveillance techniques and careful planning/monitoring, whereas to fix the second type of error, civil leadership decision-making must be involved because the decision falls into the political domain. However, the close distance between Japan and its nuclear deterrees makes the difficulties that arise from these two types of errors much harder to resolve than that for the U.S. or France due to the much shorter time window left for its decision-making to react.

To sum up this part's discussion, the factor of "proximity" creates an asymmetry in the balance of nuclear power between Japan and its deterrees, whereby the latter can have a nuclear advantage in the nuclear offensive capability. Japan's impotence to weaken the deterree's nuclear advantage down to damage limitation capability under its nuclear autonomy option will severely lower its nuclear deterrence credibility that turns the first nuclear usage become a military feasible option for its deterrees. Whereas under the U.S.'s extended nuclear deterrence, the offshore U.S. nuclear arsenals' retaliation guarantee for Japan offsets this negative imbalance of nuclear power caused by the "proximity" factor.

C) The Lack of Nuclear Weaponisation Experience

Far removed from the nuclear deterrence among the great powers whose credibility of their nuclear deterrence mainly achieved the balance of resolve between them and their nuclear opponent regarding the psychological 'contest of nerves' (Schelling, 1980: 187-204), without external protection, a small state like Japan can only pin its deterrence credibility on the possession of the second strike capability in case of being nuclear attacked by its adversary

(Achen & Snidal, 1989).

The essential theoretical discrepancy here between the two types of nuclear deterrence situations is that in the first type, there is a more or less symmetry between the conflictual parties' nuclear capability, which means even if there is uncertainty regarding the MAD balance in a potential nuclear exchange between these great powers, none of the conflictual parties can ensure their first strike will 100% take out the adversary's nuclear arsenal.[19] As a result, in the first type, the conflictual parties cannot free themselves from each other's second-strike retaliation. This is key to maintaining the nuclear power balance among them and transforms the nuclear confrontation from an objective military calculation into a subjective chicken game model between surrender and suicide regarding the competition of resolve between the conflictual parties. However, in the second type for Japan, because its potential adversaries' nuclear strength is far above damage limitation capability against Japan (i.e. there is unerring confidence in holding a splendid first strike capability against Japan in its adversary's perception), hence the question entailed by this nuclear asymmetry is an objective question that whether Japan can develop a nuclear armament which can survive its adversary's nuclear first strike and thus dissuade the latter from initiating a nuclear offence through Japan's potential nuclear retaliation force inflicting an unbearable cost on the deterree.

Therefore, in the absence of having protection from a third party's extended nuclear deterrence, a state's credibility of its nuclear deterrence under such a circumstance is comprised of two parts: 1) its resolve to use its nuclear arsenal, and 2) its nuclear arsenal's effectiveness. The 2) is the prerequisite of the 1) because without an effective nuclear arsenal, a state is not eligible for engaging in nuclear brinkmanship — it will have neither confidence in using it during its nuclear conflict nor the credibility to deter its nuclear-armed deterree no matter how strong a resolve it can raise. A weapon system's effectiveness is only able to be proven by testing – only through successful testing can a weapon system gain its effectiveness, whereby its owner can claim the credibility of its threat as well. There is no difference in nuclear weapon systems; it must be tested to ensure it can inflict its designed damage upon the deterree; thus, its owner can enjoy the deterrence credibility derived from it during the nuclear confrontation.

For instance, one of the undertone reasons that was not mentioned in the FY2005 and FY2006 Congressional Research Service Report when the U.S. Congress vetoed the nuclear bunker buster project, the Robust Nuclear Earth Penetrator project (RNEP) (The U.S. Congress, 2004) is that it requires testing to ensure the weapon's component can stay intact after it penetrates the deep soil and thus be able to ignite the nuclear explosion which will violate the 1996 Comprehensive Nuclear-Test-Ban Treaty (CTBT) the United States has

signed. In this case, the U.S. undoubtedly possesses both nuclear warhead and conventional bunker buster projector/bomb techniques; however, when it wants to combine these two mature weapon systems into a new combination weapon, it still needs to be tested. Otherwise, without successful test evidence, it will not have confidence in such a weapon in future warfare, and without confidence, the one will give rise to its adversary's speculation on its deterrence credibility based upon the nuclear capability, which eventually weakens its deterrence regarding such a weapon.

Japan has yet to have such nuclear deterrence credibility because it has neither nuclear production nor testing experience. Indeed, there is little doubt that present-day Japan possesses the technique as well as the materials to produce nuclear weapons (Akiyama & Horio, 2013); however, as the predictions go, even the optimal timeline for Japan to develop a sophisticated nuclear weapon is still 1-2 years.[20] It must be considered that in a nuclear crisis, the adversary will not sit quietly to allow Japan to build up its nuclear armament (Neumann, 1956); meanwhile, if there is a scenario in which Japan does manage to get through its nuclear weaponisation process, its nascent nuclear arsenal will not bring it an advantage in deterrence. On the contrary, it will place Japan in an even more dangerous position because its adversary still has the splendid first-strike capability to completely disarm Japan's nuclear arsenal, and its stake and incentive to have first use of its nuclear weapon has become much bigger because Japan's small nuclear arsenal can severely harm it — because like Albert Wohlstetter puts 'an invulnerable strategic offensive force can be a deterrent, and a vulnerable strategic offensive force is an invitation. In a crisis where alternatives look desperate to an adversary, it might be an urgent invitation' (Mearsheimer, 2019).

One might argue that the technological difficulties incurred by Japan can be overcome by a simple risk maximisation approach — to build a dumb and mega nuclear bomb without any delivery system but powerful enough to inflict major damage to the whole planet, then Japan just leaves the 'last clear chance' (Schelling, 1966) to its deterree, namely, to build a doomsday machine ((Kahn & Jones, 1961: 144-153) which can be triggered by its deterree (i.e. actually it would be ipso facto Armageddon of whole mankind not just merely MAD between Japan and its adversary). Indeed, such an approach is cheap, with no uncertainty, and technologically much easier to attain; however, it is politically infeasible. Because it is not just hindered by ethical inquiries like 'How much more hostile will the environment be? Will it be so hostile that we or our descendants would prefer being dead than alive?' (Kahn & Jones, 1961: 144-153), but also by a very pragmatic international politics issue that if there is already such a serious doubt on the U.S. government's commitment that

whether it will risk its national survival to use its nuclear weapons for salvaging Japan in a scenario that the latter is being nuclear attacked, then how can anyone assume Washington will allow its national survival surely be destroyed in the same scenario due to its protectee is heading to a Dr. Strangelove fancy? Apparently, it is extremely unwise for Tokyo to work in such a radical way, making both China and the U.S. enemies just for deterring the former.

Therefore, due to the factor of 'lack of nuclear weaponisation experience', if Japan approaches its nuclear autonomy and tries to build up its nuclear armament, then it will tilt the balance of resolve towards its nuclear deterrees' favour because the stake of preventing their survival being jeopardised by Japan's upcoming nuclear weaponisation will considerably increase; meanwhile, the costs for them to initiate a nuclear first strike to cripple Japan's nuclear weaponisation development remains military risk-free. On the contrary, under the protection of the U.S. extended nuclear deterrence, if Japan tries to develop its own nuclear armament, the stake for Japan's deterrees will not increase much (i.e. because the U.S. nuclear capability has already ensured it will be a MAD between Japan's deterees and the American-led alliance, a few more Japanese nuclear weapon change little of this outcome). Meanwhile, their nuclear attack against Japan's cost is invariably unbearable for them. Therefore, this imbalance of resolve resulting from Japan's nuclear autonomy approach determines it is a self-defeating move for Japan.

Conclusion

From a nuclear deterrence perspective, this research explains why it is not in Japan's national interests to approach nuclear autonomy and abandon its seven decades' strategy of being a client state under the U.S. extended nuclear deterrence protection. This is not to say a state with a nascent nuclear arsenal cannot have enough credibility to deter its nuclear deterree's coercion; however, as the authors showed, the implications of nuclear deterrence theory vary with the conditions in which it is applied.

In this research, three conditions/geopolitical factors lead to Japan incurring three negative imbalances in a nuclear conflict against its deterrees if it approaches the nuclear autonomy strategy: the imbalance of conflict costs by its 'smallness', the imbalance of nuclear power in terms of nuclear offensive capability by its 'proximity', and the imbalance of resolve by its 'lack of nuclear weaponisation experience'. The outcomes from these three imbalances are jeopardising its nuclear deterrence credibility, which makes the nuclear autonomy option inferior to the one of residence under the U.S. extended

nuclear deterrence.

Few remedies can be adopted by Tokyo if it is determined to walk down a self-reliant path to approach its nuclear security. For instance, to overcome the 'smallness' factor, along with developing the nuclear arsenal, Japan can try to build up nuclear missile submarine fleets or even an aircraft-carrier task force as an alternative delivery system to the land-based ballistic missile in its homeland, which might largely enhance its second strike capability, thereby increasing its nuclear deterrence credibility. However, as Kenneth Waltz has pointed out, it requires a quantitative advantage in case of the possession of an effective sea-borne nuclear delivery system because, during the Cold War, the UK and France both possessed nuclear missile submarines; however, their number was small in comparison to the USSR's fleets. In addition, they were easily tracible and could be destroyed (i.e. each nuclear missile submarine had to be escorted by attack submarine(s). In the context of the present day, this turns the military issue into an economic issue, where the numbers matter, and Japan has become a shrinking middle power due to its ageing demographic structure and stagnant economy since the 1990s; it just cannot have the wherewithal to compete against a great power like China in the submarine armed race in the absence of U.S. aid).

Furthermore, the three geopolitical factors used in this article are widely shared by most small states like Lithuania and other Eastern European countries. For the sake of enhancing the nuclear security studies among these countries, it is reasonable to incorporate these factors into an empirical model and to conduct a further deductive study on other small states' cases.

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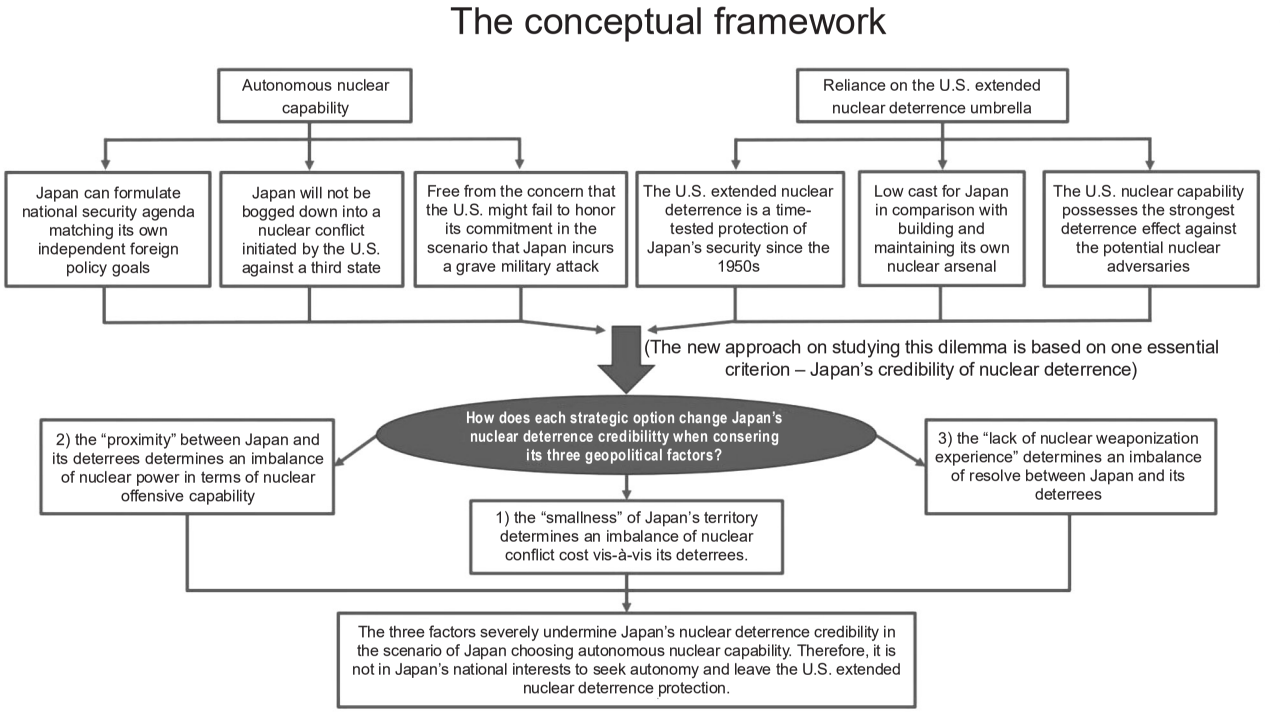
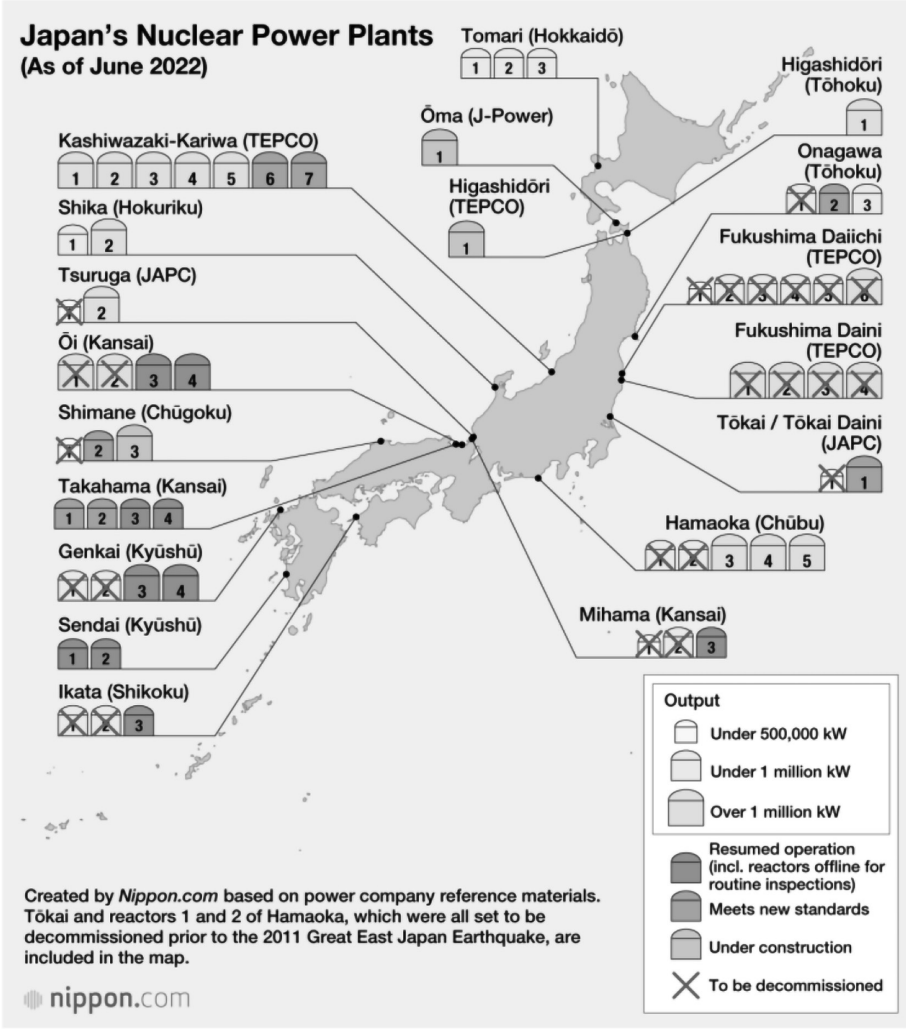
Appendix

Appendix 01: The research conceptual framework:



Appendix 02: Japan's Nuclear Power Plants (as of June 2022):



Source: Nippon.com, address: https://www.nippon.com/en/japan-data/h01365/.

Notes

1 "And our aim in the recital of the facts will be, not so much to deprecate censure, as to show by evidence with what sort of city you will be involved in war if you are not well advised. <…> the largest number of ships, the shrewdest general, and the most unfaltering zeal." – Thucydides (1956). *History of The Peloponnesian War, Book I & II*. William Heinemann Ltd. (Translated from Ancient Greek into English by Charles Forster Smith), 123-125.

2 Albeit in Sun Tzu's context, his argument contains some of the compellence elements rather than mere a deterrence means; however, it remains an exemplar case to reflect how the deterrence concept has affected security studies throughout the human history, see: Sun Tzu (2017). *The Art of War. Erya Publisher. Chapter III Offensive Stratagem.*

3 It is necessary to point out that different from the situation of NATO, the U.S. – Japan security framework is not a mutual collective defence mechanism; instead, it is a unilateral military aid to Japan on the part of the U.S., which, in accordance with the Treaty of Mutual Cooperation and Security between Japan and the United States of America's Article V, that Japan is only obligated to use its military on defending the U.S. interest in the event that the third party's military attack takes place within its territories, whereas NATO demonstrated in the aftermath of the 911 terrorist attack that the European Allies are mandated to conduct collective defence according to the NATO Article 5th. Regarding the U.S. – Japan treaty, see: Treaty of Mutual Cooperation and Security between Japan and the United States of America (1960, January 19). Ministry of Foreign Affairs of Japan, Article V. https://www.mofa.go.jp/mofaj/area/usa/hosho/jyoyaku.html.

4 In this article the researchers do not analyse the hybrid option of a nuclear-armed Japan in the current U.S. Japan security framework which relates to the second decision-making center issue, the reason see the elaboration further in the article.

5 The term "small state" used by the researchers to describe Japan's features in this article is defined in a purely geographical sense. That a state is "small" denotes its territorial size which is small in relation to its nuclear adversary's nuclear offensive capability (or, its ecumenes are highly concentrated in a few metropolitan areas). In this context, a state's economic or population size is not relevant for its categorization as "small".

6 It is considered the most comprehensive elaboration regarding Japan's nuclearisation in recent years, albeit there are some technical issues in the book. For example, the author argues that Japan can produce 1,400 nuclear weapons (i.e. 8 kg each) with its 11 tonnes "reactor-grade" plutonium storage, and this prediction was based upon the United States' 1962 test. However, this test result has been seriously doubted due to changing definitions of what is "reactor-grade plutonium". The old definition provided in 1962 by the Department of Energy's (DOE) required Pu-240 content higher than 7%, whereas the new DOE's definition since the 1970s requires more than 18%. This means the number of nuclear weapons that can be produced by these 11 tonnes of "reactor-grade" plutonium will be lower based on the newer definition, if the requirement of producing the plutonium-based nuclear weapon is indeed required the "fuel-grade" plutonium. See: Fitzpatrick, M. (2017). Asia's Latent Nuclear Powers. Taylor & Francis; Kristensen, H. M. (2016, February 8). The Basics of Nuclear Weapons: Physics, Fuel Cycles, Effects and Arsenals. James Martin Center for Nonproliferation Studies. https://uploads.fas.org/2014/05/Brief2016_CNP-MIIS_.pdf ; The U.S. Department of

Energy (DOE) (2023, January 26). Additional Information Concerning Underground Nuclear Weapon Test of Reactor-Grade Plutonium. https://www.osti.gov/opennet/forms?formurl=document/press/pc29.html.

7 For instance, former Prime Minister Nobusuke Kishi (1957 –1960) held an opinion that acquiring nuclear weapons would not be anti-constitutional. For example, during the parliamentary discussion of May 7, 1957 Nobusuke Kishi stated 'I believe that it is not correct to say that all nuclear weapons are in violation of the Constitution. <...> I do not think that any weapon that has "nuclear" in its name is prohibited right away'. (The 26th session of the House of Councilors, Budget Committee, No. 24, May 7, Showa 32, in Japanese: 第26回国会　参議院　予算委員会　第24号　昭和32年5月7日, https://kokkai.ndl.go.jp/#/detail?minId=102615261X02419570507&current=182). In fact, before Shinzo Abe, there were two other Japanese PMs - Takeo Fukuda in 1978 and Junichiro Koizumi in 2002 who had also declared that nuclear arms are not unconstitutional for Japan.

8 For instance, in 2017 the total number of nuclear warheads in the U.S. stockpile is merely 3,822 which have reduced by 85% from the peak of the Cold War, and the last land-based nuclear weapon also has been removed in 1991. See: The U.S. Department of Defence (2019, April 1). U.S. Nuclear Weapons: Claims and Responses. https://media.defense.gov/2019/Apr/01/2002108036/-1/-1/1/U.S.-NUCLEAR-WEAPONS-CLAIMS-AND-RESPONSES.PDF.

9 There is a strong incentive for Japan's nuclear adversary like China to initiate a nuclear first strike to take off Japan's nuclear arsenal because it knows the high stake will prompt Japan to use them, meanwhile, the relatively small nuclear arsenal of Japan will be surely destroyed in a nuclear saturation attack by the former. Of course, in turn, Japan understands such a logic from its adversary, and thus makes it even more likely to use its nuclear weapon in the first place — and this makes the conventional conflict between Japan and China to become much easier to escalate into nuclear war in comparison with the same scenario where Japan is not developing its nuclear weapons.

10 The "national interests" are defined here according to Kenneth Waltz's structural realism. Namely, a state's national interests is a sort of security requirement that is to prevent "the survival of the state be in jeopardy" by carefully planned diplomatic and military moves. See: Waltz, K. N. (1979). *Theory of International Politics.* Addison-Wesley Publishing Company. Chapter 7, p.134.

11 "Nuclear deterrence applies only at the upper end of the spectrum of violence." Air Force Institute for National Security Studies and the USAF Strategic Plans and Policies Division (A5XP) (2011). Workshop Report "Extended Deterrence and Northeast Asia". SAIC Conference Center, p. 9.

12 Some studies regarding this relationship between two types deterrences (i.e. the dichotomous ideas from both the integration view and the separation view advocators), see: Wirtz, J. J. (2018). How Does Nuclear Deterrence Differ from Conventional Deterrence? *Strategic Studies Quarterly*, Vol. 12, no. 4, p. 58-75; Peters, R., Anderson, J., & Menke, H. (2018). Deterrence in the 21st Century: Integrating Nuclear and Conventional Force. *Strategic Studies Quarterly*, Vol. 12, No. 4, p. 15-43; Anderson, J., & McCue, J. R. (2021). Deterring, Countering, and Defeating Conventional-Nuclear Integration. *Strategic Studies Quarterly*, Vol. 15, no. 1, p. 28-60; Narang, V. (2013). What Does It Take to Deter? Regional Power Nuclear Postures and International Conflict. *The Journal of Conflict Resolution*, Vol. 57, no. 3, p. 478-508; a significant case that demonstrates how the geopolitical factor – the size of deterrer's territory and population can affect its nuclear deterrence: Goldstein, L. J. (2003). Do Nascent WMD Arsenals Deter? The Sino-Soviet Crisis of 1969. *Political Science Quarterly*, Vol. 118, no. 1, pp. 53-80.

13 And there are many other security experts who opine the similar idea that Japan will (or, Japan should) act more independently in its security affairs which includes the nuclear domain. See: Waltz, K. (1993). The Emerging Structure of International Politics. *International Security*, Vol.18, no.2, p.44–79; Layne, C. (1993). The Unipolar Illusion. International Security, Vol.17, no.4, p.5–51; Friedberg, A. (1993). Ripe for Rivalry: Prospects for Peace in a Multipolar Asia. International Security, Vol.18, no.3, p.5–33; Waltz, K. (2000). Structural Realism after the Cold War. *International Security*, Vol.25, no.1, p. 34–35; Emmott, B. (2004). Japan's English Lessons. *Foreign Policy*, no. 140, p. 50-56; Ofek, R. (2018). Is Japan Considering Joining the Nuclear Arms Race? The BESA Center for Strategic Studies, No. 771.

14 "In the event of aggression they (i.e. USSR) will be subjected immediately to devastating counter-attack employing atomic weapons." – NATO (1954, November 18). North Atlantic Military Committee Decision on M.C. 48: Report by The Military Committee to The North Atlantic Council on The Most Effective Pattern of NATO Military Strength for The Next Few Years. https://www.nato.int/docu/stratdoc/eng/a541122a.pdf ; later the finalization of such principle reflecting in the NATO M.C. 14/2, see: NATO (1957, May 23). Final Decision on MC 14/2 (Revised): A Report by the Military Committee on Overall Strategic Concept for the Defense of the North Atlantic Treaty Organization Area. https://www.nato.int/docu/stratdoc/eng/a570523a.pdf. This principle is remain *de jure* in the NATO's official document, albeit in the practice or *de facto* its application varies according to the urgency in different situations, because even in the peak of the Cold War that during the simulation war game directed by Schelling in 1961 spring to seek out the resolution on the USSR's blockade in the West Berlin, none of the NATO delegates participants (i.e., from the three countries: the United States, the UK, and France) had the willing to adopt the 4th option – to use the tactical nuclear weapon on the USSR troops who were blockading in the Helmstedt.

15 "We have 600 million people in China, in case half of them were killed by the atomic bomb, there will be 300 million people remaining, and it only takes 20 or 30 years to get recovery." - Mao Zedong. Interview with the delegation of Yugoslav journalists (Chinese: 接见南斯拉夫新闻工作者代表团时的谈话). Long live Mao Zedong Thought, Wuhan edition, 1968. p. 89. & "We will prepare ourselves for the destruction of all of the cities east of Xi'an. Of course, the Americans will have to be prepared that hundred, or two hundred, or even more cities will be razed to the ground by the Chinese." - Zhu Chenghu the CCP's 1st generation leadership Marshal Zhu De's grandson, a red prince's statement at a briefing hosted by the Hong Kong Foundation For A Better Tomorrow and co-organized by the Chinese government on July 14th, 2005. The Liberty Times. *The People's Liberation Army declares it dares nuclear attack, vexing the United States.* 16/07/2005. Found at: https://news.ltn.com.tw/news/focus/paper/25313; last accessed: 01/02/2023.

16 "In 1998, JASDF began receiving twenty-four PAC-2 fire units. Six battalions were organized with four fire units each and assigned to the JASDF's six air defense missile groups. The PAC-2 fire units' mission is to protect military installations and urban areas throughout Japan." – Allen, K. W., East, J. R., Finkelstein, D. M., et al. (2000). Theater Missile Defense for Japan. Stimson Center, p. 62. And Japan's BMD research was rather late which was beginning in 1999 by joint technical research with the U.S. on a Navy Theatre Wide defence system. See: Kanehara, N. 3. Missile defence: Japan's perspective. *Whitehall Papers. 2003. Vol 60:1, p. 13.*

17 Here we refer to the confirmation from the deterrer's own ballistic missile early warning system, the nuclear raid by airborne or nuclear missile submarine is easier to be detected and allow the deterrer's policy maker to have relatively sufficient time to react.

18 The "Perimeter" System was an enhancement system for the preservation of the USSR's second strike capability during the Cold War and later continuously used by the present Russian Federation, its details are largely remaining unknown, but the basic mechanism according to David Hoffman is the following: "<...> the 'higher authority' would flip the switch if they feared they were under nuclear attack. This was to give the 'permission sanction.' Duty officers would rush to their deep underground bunkers, the hardened concrete globes, the shariki. If the permission sanction were given ahead of time, if there were seismic evidence of nuclear strikes hitting the ground, and if all communications were lost, then the duty officers in the bunker could launch the command rockets. If so ordered, the command rockets would zoom across the country, broadcasting the signal 'launch' to the intercontinental ballistic missiles. The big missiles would then fly and carry out their retaliatory mission." – Hoffman, D. E. (2009). *The Dead Hand: The Untold Story of the Cold War Arms Race and its Dangerous Legacy.* Doubleday, p. 422.

19 Because for achieving such a goal, it requires huge effort not just in the economic sense but also in the technological dimension. Take the precision criterion for the ballistic missile as an example. To destroy the adversary's economy and population is not much of a requirement for the delivering system like BM – it only requires an "approximate hit", in other words, a few hundred meters or a few kilometres circular error probability (CEP) does not make much difference in its damage effects. However, if the goal is to take out the adversary's retaliation capability, then the offender's ballistic missile's CEP must be very precise and have the sufficient capability to target adversary's nuclear weapon location (i.e. apart from aiming at those deep underground facilities which are used by the adversary to preserve its nuclear warheads, it is especially difficult to locate them in case the target state's nuclear weapons are stored in constantly manoeuvring platforms like the road-mobile ICBM (e.g., Russia's SS-27 series, etc.), much less the more disguised or high mobility delivery platforms like nuclear missile submarine or aircraft-strike task force which is outside the target state's territory). The result from the 1946 Bikini Atoll test shows that it is an easy task for using the nuclear weapon to level a city, but expecting it to eradicate the adversary's "hard-core" nuclear platforms like warship requires much more prerequisites like a highly precise guidance system, uninterrupted target acquisition update, or even terminal phase flight adjustment for the ballistic missile. As well, for the more "ordinary targets" such as the U.S. Minuteman ICBM's hardened silos, the destruction of them requires a half-megaton TNT equivalent nuclear weapon detonated ground burst within 300 meters radius of the silo in order to generate above 2,000 psi overpressure to overcome the Minuteman silo's defence capacity. Further, for the strategic bombers that in case the nuclear adversary constructs the same standard bomb shelter as the U.S. did at the height of Cold War that can resist 200 psi's nuclear burst, then in order to destroy them Japan must use a half-megaton TNT nuclear weapon which is able to strike within a CEP of around 650 meters (i.e., ground burst). The Enhanced-Radiation Weapon (ERW) can lower the precision criterion, however, due to the short distance/proximity between Japan and its nuclear adversaries, even the bomber crews suffered fatal dose radiation they still can complete their attack on Japan before the sickness begins. See: Bunn M. and Tsipis K. The Uncertainties of a Preemptive Nuclear Attack. *Scientific American*, 1983. Vol. 249, no. 5. pp. 38-39. & Brown, 1959, Op. Cit. p. 3.

20 Albeit the Japanese government's studies in 1970 and 2006 both concluded that it will take Japan around 5 years to develop its first nuclear weapon, there are some extreme predictions like 6 months that Japan can develop its nuclear weapon. Here, the researchers follow Mark Fitzpatrick's argument who opines the optimal time-line for Japan's nuclear weaponization is approximately 1-2 years.