

The Future of Chinese Nuclear Posture:  
Understanding China's Nuclear Vulnerabilities and Approach to Maintaining Deterrence.

Victoria Mae Hempstead  
Pardee School Undergraduate Honors Thesis  
Professor Joshua Shiffrinson  
1st of April 2020

## Introduction

The People's Republic of China (PRC) developed nuclear weapons for protective purposes in 1964. In a statement from the Chinese government, aiming to break the “nuclear monopoly” held by the United States and the Soviet Union and eliminating nuclear weapons were cited as two reasons for China's proliferation.<sup>1</sup> To support these goals and to avoid nuclear blackmail, China developed a small arsenal with a focus on missiles as their primary delivery system. This was despite internal discomfort with nuclear deterrence. These opposing ideas later developed into the lean and minimal posture China uses today. As Vipin Narang defines it, nuclear posture is the incorporation of nuclear weapons into a state's military structures, developing tools on how and when it might be used, and determining who has the authority to initiate use.<sup>2</sup>

China's unique nuclear posture has led many, including the United States, to question the credibility of China's nuclear deterrent. Since 2011, China was estimated to have between 200 and 300 nuclear warheads which were deployed primarily on land-based delivery systems; few are deployed with air or sea-based systems.<sup>3</sup> These factors contribute to vulnerability which lessens China's strategic stability and deterrent capabilities. Nuclear vulnerability refers to a situation in which a state can not protect its nuclear assets from being rendered useless. Despite this, China does not seek to reduce its vulnerabilities at this time. This paper explores China's nuclear posture over time, changes in its vulnerability, and factors contributing to its resolute minimal posture—despite shortfalls in arsenal size, doctrine, and readiness—in order to answer the question: Why have China's nuclear weapons remained vulnerable since they were acquired?

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<sup>1</sup> “Statement of the Government of the People's Republic of China,” October 16, 1964, History and Public Policy Program Digital Archive, PRC FMA 105-01262-01, 22-26.

<sup>2</sup> Vipin Narang, *Nuclear Strategy in the Modern Era : Regional Powers and International Conflict*, (Princeton: Princeton University Press, 2014), 4.

<sup>3</sup> Nuclear Threat Initiative, “China: Nuclear,” 2015.

I argue that China's nuclear vulnerability has remained constant. As China's deterrent developed over time, it increased the size of its nuclear arsenal and increased ambiguity about its capabilities and no first use doctrine. These changes should have decreased China's vulnerability, but political constraints prevented that. China's vulnerabilities came in the form of a small arsenal size that could be held at risk, a weak doctrine that limited growth of its arsenal, and slow response times to threats. This was a result of inefficient bureaucratic structures and political influence that resulted in a continuously vulnerable doctrine. Further analysis reveals that slow development of operational policy and command and control, in addition to influential political thought, may have contributed to these weaknesses.

Understanding how a nuclear armed nation like China develops its nuclear policy and capabilities has implications for understanding existing nuclear posture theory and tracking future proliferators' search for an effective deterrent. With China's economic, political, and technological rise, its nuclear posture has remained stagnant and seemingly underdeveloped. Understanding why provides important insight into China's nuclear program and potential future investments or developments. The United States' nuclear doctrine, alliance structure, and presence in the Asia-Pacific means a direct military confrontation between China and the United States "no longer seems as implausible as it once did, and the odds of such confrontations going nuclear are higher than most policymakers think."<sup>4</sup> As US-China relations become more tense, understanding trends in China's nuclear capabilities will help foresee potential conflict escalation scenarios. Understanding what China is capable of will be important in crafting effective policy in East Asia. In addition, China's current vulnerabilities will likely change over time. Understanding what

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<sup>4</sup> Caitlin Talmadge, "Beijing's Nuclear Option," *Foreign Affairs* 97, no. 6 (2018): 44-50.

guides these developments will help accurately predict future Chinese capabilities, in addition to shaping future United States policy.

To thoroughly address these questions, this paper conducts a literature review to understand the existing opinions and analyses of Chinese nuclear vulnerability. It then uses this foundation to define China's nuclear vulnerability as the inability to carry out a secure second strike after an adversary's attack. To measure this vulnerability, this paper assesses China's arsenal size, doctrine, and readiness from 1960 to the present day. This is done in a framework to determine what aspect of China's nuclear doctrine is the root of its vulnerability. This framework is further divided into three time periods. The first period spans from 1960 to 1976, which was the year of Mao Zedong's death. Then from 1977 to 1996, the year China signed the Comprehensive Test Ban Treaty (CTBT). The final time period covers the year 1997 to the present day. After organizing information into these categories, I analyze trends in China's vulnerabilities and the potential causes of those trends.

## Literature Review

### Introduction

Since 1964, the People's Republic of China has stressed nuclear nonproliferation, no first use, and a 'lean' and 'effective' nuclear doctrine.<sup>5</sup> This mentality led China to develop a nuclear arsenal defined by minimalism. However, this mentality appears to cause vulnerability to many who analyze the country's nuclear policy. The dominant view in nuclear politics is that small arsenals are inherently more vulnerable than larger ones due to a lack of parity. For states like China, vulnerability becomes a major issue because another nation could carry out a disarming first-strike that renders it vulnerable to destruction or coercion. This lack of parity, in conjunction with a weak doctrine, may result in China's nuclear weapons being vulnerable. However, ambiguity makes determining China's vulnerability to a first strike difficult. Some argue that China is no longer a vulnerable state, stating that most aspects of the Chinese military's modernization and development over time have created a stronger and more reliable deterrent force. Many also believe that as China and the United States strengthen relations and interdependence, the threat of a nuclear first-strike becomes less imminent.

The following section summarizes, analyzes, and discusses arguments that China's arsenal is vulnerable or invulnerable from the perspective of doctrine, development, and its relative relationship to other arsenals to better understand China's nuclear status and future trajectory.

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<sup>5</sup> Alastair Iain Johnston, "China's New 'Old Thinking': The Concept of Limited Deterrence," *International Security* 20, no. 3 (1995): 11. See also: Yao Yunzhu, "China's Perspective on Nuclear Deterrence," *Air & Space Power Journal* 24, no. 1 (2010): 27-30.

## Doctrine

Doctrine determines the role of nuclear weapons in a state and how they will be deployed in the event of a potential attack or in an offensive role. It can encompass many different aspects of nuclear posture such as command and control, deployment, funding, arsenal size and type, and more, which is why it is critical to understanding national vulnerability. A weak doctrine is destined to produce a weak nuclear state; a strong doctrine produces the opposite. Below are arguments assessing China's nuclear posture from the perspective of doctrine.

### *Arsenal Size, Type, and Operation*

Taylor Fravel explores China's nuclear strategy since 1964 in Chapter Eight of *Active Defense*. He argues that "China's nuclear strategy has not changed with each new strategic guideline" and, therefore, its doctrine remains static.<sup>6</sup> This suggests that China's nuclear doctrine functions almost exactly as it did in the late 1960s. This would leave China extremely vulnerable to another modern state. Fravel's statement also suggests command and control, organization, or operational capabilities have all been negatively impacted by this lack of innovative doctrine.<sup>7</sup>

This is not an unusual stance regarding nuclear doctrine. In her piece "China and Nuclear Weapons," Talmadge notes that nuclear weapons in China have historically played a minimal role in defense. This may have contributed to the smaller size and scope of China's weapons and overall doctrine. Similarly, Bao Zhang, in "US Missile Defense and China's Nuclear Posture: Changing Dynamics of an Offense--Defense Arms Race," argues that China's small arsenal size, and therefore vulnerability, is the result of a lack of "doctrinal incentives for entering an arms

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<sup>6</sup> Taylor Fravel, *Active Defense: China's Military Strategy since 1949*, (Princeton, NJ : Princeton University Press, 2019), 269.

<sup>7</sup> Ibid.

race” which has dissuaded rapid modernization or numerical development.<sup>8</sup> This argument aligns perfectly with Talmadge’s earlier statement which group size, modernization, and doctrine into one. Here, Zhang differs from Talmadge and Fravel with his statement that doctrine influencing size is the root of vulnerability, not one of many causes. Simply put, Zhang argues that nuclear parity is China’s sole weakness. However, similar to Fravel and Talmadge, Zhang examines the bureaucratic reasons for the lop-sided deployment of land based missiles over sea or air based systems, but does not cite these weaknesses as cause for overall vulnerability.<sup>9</sup>

This idea of vulnerability conflated with small size is countered in Bao Zhang’s 2009 piece, “American Nuclear Primacy or Mutually Assured Destruction: The Future of the US-China Strategic Balance of Power.” Zhang argues that China’s nuclear weapons are not vulnerable—or are close to becoming not vulnerable—especially in relation to the United States. Zhang argues that the United States’ nuclear primacy is a faulty measure for assessing Chinese vulnerability because China “places no value on achieving nuclear parity.”<sup>10</sup>

Fravel, Talmadge, and Zhang stress the stagnant aspects of China’s doctrine as the cause of its vulnerability, but they are not the only ones. Cunningham and Fravel agree when assessing China’s nuclear doctrine. They argue that China will not change its assured relation strategy in the near future.<sup>11</sup> In addition, in an article titled “China’s Search for Assured Retaliation: The Evolution of Chinese Nuclear Strategy and Force Structure,” Taylor Fravel and Evan Medeiros approach the question of China’s vulnerability by taking an in-depth look at China’s nuclear

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<sup>8</sup> Baohui Zhang, "US Missile Defence and China's Nuclear Posture: Changing Dynamics of an Offence—defence Arms Race." *International Affairs (Royal Institute of International Affairs 1944-)* 87, no. 3 (2011): 558.

<sup>9</sup> Ibid.

<sup>10</sup> Baohui Zhang, "American Nuclear Primacy Or Mutually Assured Destruction: The Future of the U.S.-China Strategic Balance of Power," in *Challenges to Chinese Foreign Policy*, ed. by Yufan Hao, C. X. George Wei and Lowell Dittmer, (University Press of Kentucky, 2009), 89.

<sup>11</sup> Fiona Cunningham and Taylor Fravel, “Why China Won’t Abandon Its Nuclear Strategy of Assured Retaliation,” Belfer Center, December 2015.

operations over time. The paper concludes, similar to Zhang, Narang, and Talmadge, that China's nuclear posture is best categorized as one of assured retaliation. The key argument of "China's Search for Assured Retaliation" is that over time China has "not substantially changed its nuclear strategy or force structure," even as fiscal and technical restraints have disappeared.<sup>12</sup> This, Zhang argues, is the root cause of vulnerability. This idea is supported in "China's New Old Thinking: The Concept of Limited Deterrence" by Alastair Iain Johnston, which argues that China "has been deeply influenced by a strategic tradition that stresses minimalism, ambiguity, flexibility, and patience."<sup>13</sup>

Yao Yuzhun, in "China's perspective on Nuclear Deterrence," agrees that China's doctrine has remained stable and unchanging, but she argues that the minimal nature of China's nuclear program allows it to provide effective and "pure" deterrence.<sup>14</sup> By implementing no first use, a ban on extended deterrence, and limitations on operational function, China's weapons function as "political instruments," or tools for deterrence only.<sup>15</sup> She notes that China has gradually increased its arsenal size and stressed developing survivability, but these changes are presented as ones supporting China's idea of nuclear function and not actual survivability in the event of an attack by an adversary such as the United States. Though Yao argues China is not vulnerable, she highlights that China is ambiguous about how it would respond to an attack from the United States, which could be interpreted as vulnerability. Counter to Yao, Talmadge notes that China is trying to

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<sup>12</sup> Taylor Fravel and Evan S. Medeiros, "China's Search for Assured Retaliation: The Evolution of Chinese Nuclear Strategy and Force Structure," Fall 2010, 86.

<sup>13</sup> Alastair Ian Johnston, "China's New 'Old Thinking': The Concept of Limited Deterrence," *International Security* 20, no. 3 (1995): 11.

<sup>14</sup> Yao, "China's Perspective on Nuclear Deterrence," 27-30.

<sup>15</sup> Ibid.



reduce vulnerabilities by increasing redundancies in command and control, missile mobility, and the use of multiple independently targetable reentry vehicles (MIRVs).<sup>16</sup>

However, the view that China's nuclear posture is static is not the only one in the literature. Vipin Narang argues that China is vulnerable, but that shifts and changes in nuclear doctrine are the cause, not stagnation. Specifically, he argues China is shifting its doctrine to a more aggressive and, therefore, more secure doctrine. However, until this is done, he argues that China will remain vulnerable. In *Nuclear Strategy in the Modern Era: Regional Powers and International Conflict*, Narang makes the argument that China's second-strike and assured retaliation policy leads to greater overall vulnerability.<sup>17</sup> Similar to Zhang, Narang believes that assured destruction is more effective at protecting a state from attack.

Unlike other authors, Narang pays attention to all conflicts—nuclear and conventional—that China has faced since it acquired nuclear weapons as a gauge of vulnerability. He notes that assured retaliation is not the most secure doctrine for a state to adopt, but that China has gone to great lengths to protect its arsenal through “ambiguity, concealment, deception, and increasing mobility.”<sup>18</sup> This attention to concealment, ambiguity, and mobility is cited in almost all works analyzing China's nuclear capabilities.<sup>19</sup> However, some believe that ambiguity may still raise the risk of nuclear escalation by increasing the likelihood of miscommunication or miscalculation.<sup>20</sup> This is most notable with submarines and cruise missiles.<sup>21</sup>

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<sup>16</sup> Caitlin Talmadge, “China and Nuclear Weapons,” September 2019.

<sup>17</sup> Vipin Narang, *Nuclear Strategy in the Modern Era : Regional Powers and International Conflict*.

<sup>18</sup> Ibid, 130.

<sup>19</sup> Ibid. Also see: Talmadge, “Beijing's Nuclear Option,” Caitlin Talmadge “Would China Go Nuclear? Assessing the Risk of Chinese Nuclear Escalation in a Conventional War with the United States,” Fravel and Medeiros, “China's Search for Assured Retaliation: The Evolution of Chinese Nuclear Strategy and Force Structure,” and Baohui, “US Missile Defence and China's Nuclear Posture: Changing Dynamics of an Offence—defence Arms Race.”

<sup>20</sup> Cunningham and Fravel, “Why China Won't Abandon Its Nuclear Strategy of Assured Retaliation.”

<sup>21</sup> Library of Congress Congressional, Research Service, *Chinese Nuclear Testing and Warhead Development*, 1997. Also Talmadge, “Beijing's Nuclear Option.”

In another of Narang's works, "What Does It Take to Deter? Regional Power Nuclear Posture and International Conflict," China is categorized as a state pursuing assured retaliation, unlike Fravel's long standing doctrine assessment. Fravel states that China's long standing strategy is also one of assured retaliation, meaning that China's focus is maintaining second-strike capabilities with a minimal number of warheads. He argues that this stance is static. Narang states that assured retaliation does not fail as often as other models, but that it still has "little net effect on opponents' decisions to initiate or escalate armed conflict."<sup>22</sup> As a result, assured retaliation should deter conventional conflict, but both Fravel and Narang see different results. Narang's research shows that conflict avoidance is tied to more factors than nuclear weapon possession.<sup>23</sup> Meanwhile Fravel sees static change and the maintenance of weak doctrine as key causes for vulnerability.<sup>24</sup>

This hypothesis suggests that the mere possession of nuclear weapons may not be enough to protect a state or its nuclear assets. Narang challenges many ideological foundations for China's nuclear doctrine put forward by Mao Zedong and supported by subsequent leaders. Put simply, Narang's articles argue that nuclear postures are changing and this matters when assessing vulnerability, but claims China's posture is still vulnerable regardless.<sup>25</sup>

### Development

Development is the ways and rate at which a state changes and makes improvements to its nuclear arsenal. Development, like doctrine, can change over time. The frequency, scale, and scope of investments put into building a nuclear arsenal can signal to the outside world the credibility of

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<sup>22</sup> Vipin Narang, "What does it Take to Deter? Regional Power Nuclear Postures and International Conflict," *Journal of Conflict Resolution* 57, no. 3 (2013): 501.

<sup>23</sup> Ibid, 490.

<sup>24</sup> Fravel and Medeiros, "China's Search for Assured Retaliation: The Evolution of Chinese Nuclear Strategy and Force Structure."

<sup>25</sup> Narang, "What does it Take to Deter? Regional Power Nuclear Postures and International Conflict," 503.

a state's declared posture and arsenal size. Development can range from size increases, to new missile technologies, to bureaucratic change, and is thus a broad category in determining the vulnerability of a state. Therefore, development has been cited in literature as a critical part of assessing China's current nuclear capabilities.<sup>26</sup>

Fravel explores technological developments that advanced missile accuracy, range, and payload in his 2019 book *Active Defense*. He notes that, during the establishment of the Second Artillery (which was the precursor to the modern People's Liberation Army Rocket Force (PLARF) and was responsible for the country's nuclear weapons), the focus was primarily on the construction of several missile bases and associated infrastructure, not operational doctrine.<sup>27</sup> However, the development of these processes was stunted. Talmadge agrees in her piece "China and Nuclear Weapons" by outlining recent developments in China's nuclear forces. She points to the lack of nuclear warfighting development, counterforce capabilities, and battlefield weapons as key vulnerabilities that will impact China moving forward.<sup>28</sup>

This analysis is further supported in a Belfer Center piece by Fiona Cunningham and Taylor Fravel. This piece assesses renewed threats to China from the United States' missile defense system and long range conventional strike capabilities, and the fact that China cannot innovate its way out of these threats.<sup>29</sup> These weaknesses, in addition to larger immobile missiles, are cited as key causes for Chinese vulnerability in many works.<sup>30</sup>

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<sup>26</sup> Library of Congress Congressional, Research Service, *Chinese Nuclear Testing and Warhead Development*. Also see: Fravel and Medeiros "China's Search for Assured Retaliation: The Evolution of Chinese Nuclear Strategy and Force Structure," and Fravel, *Active Defense: China's Military Strategy since 1949*.

<sup>27</sup> Fravel, *Active Defense: China's Military Strategy since 1949*.

<sup>28</sup> Ibid. Also see, Narang, *Nuclear Strategy in the Modern Era : Regional Powers and International Conflict*.

<sup>29</sup> Cunningham and Fravel, "Why China Won't Abandon Its Nuclear Strategy of Assured Retaliation."

<sup>30</sup> Hans Kristensen and Robert Norris, "Chinese Nuclear Forces, 2015," *Bulletin of the Atomic Scientists* 71, no. 4 (2015): 77-84. See also: Fravel and Medeiros, "China's Search for Assured Retaliation: The Evolution of Chinese Nuclear Strategy and Force Structure," 48-87.

However, Zhang also states that the rate of similar nuclear developments that have contributed to China's nuclear credibility is increasing, such as improvement to the yield-to-weight ratio in new warheads which in turns increases range, accuracy, and survivability across all modes of delivery.<sup>31</sup> Zhang continues by stating that, with new advancements already on the way, China will "achieve a secure second-strike capability" through new submarines and MIRVed missiles capable of striking the United States.<sup>32</sup> With these changes, Zhang argues that China will achieve invulnerability. Here it is important to note that Zhang's two pieces of writing are interesting because they use similar criteria for assessing China's vulnerability (Mobility, Size, Modernization), but reach different conclusions due to the crisis climate and US-China relations.

Yao also notes China's attention to increasing survivability and modernization. She states that China has been modernizing its weapon systems and that it is replacing old missile models with more effective and survivable ones.<sup>33</sup> In addition, new methods of co-location could possibly improve the survivability of older missiles.<sup>34</sup> As a result of this, these systems are unlikely to be targeted in non-nuclear conflict, even as nuclear technical advancements are made.

However, unlike Zhang and Yao, Talmadge argues that China does not have reliable second strike capabilities and is not close to achieving one. She points to co-location as a key vulnerability because a majority of Chinese nuclear weapons could be destroyed in a strike on conventional capabilities.<sup>35</sup> Co-location is the placement of nuclear and conventional missiles

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<sup>31</sup> Zhang, "American Nuclear Primacy Or Mutually Assured Destruction: The Future of the U.S.-China Strategic Balance of Power." See also: Library of Congress Congressional, Research Service, *Chinese Nuclear Testing and Warhead Development*.

<sup>32</sup> Zhang, "American Nuclear Primacy Or Mutually Assured Destruction: The Future of the U.S.-China Strategic Balance of Power," 73.

<sup>33</sup> Yao, "China's Perspective on Nuclear Deterrence," 27-30.

<sup>34</sup> Ibid.

<sup>35</sup> Ibid, also see Talmadge, "Beijing's Nuclear Option," and Talmadge, "Would China Go Nuclear? Assessing the Risk of Chinese Nuclear Escalation in a Conventional War with the United States."

alongside each other in an attempt to deter adversaries from attacking either.<sup>36</sup> Lastly, Talmadge's works focus on the United States' strong countervalue capability that could effectively disarm China, which she argues places China in a very vulnerable position.

### Strategic Stability

While the nuclear relationship between the United States and China is stable, the relative imbalance of their stockpile sizes and types is often cited as a source of vulnerability. Only measuring China's vulnerability against the United States' gives a limited understanding of China's vulnerability that may not be applicable to all cases.

In many of her articles, Catilin Talmadge agrees that China's strategic weapons are vulnerable. She focuses on vulnerabilities caused by the Chinese triad structure lacking sufficient diversity and numbers. In her article "Beijing's Nuclear Option," Talmadge explores questions of size, diversity, and deployment that all place China's strategic capabilities at risk in the event of a flashpoint war with the United States in Taiwan. Talmadge defines China's vulnerability through its relationship with the United States in the event of a conflict. This places much more emphasis on numerical superiority than command and control.

In her 2017 article, "Would China Go Nuclear?: Assessing the Risk of Chinese Nuclear Escalation in a Conventional War with the United States," Talmadge again discusses the risk of a nuclear confrontation between the United States and China emerging from a conventional conflict over Taiwan. She discusses the possibility of China escalating the conflict to the nuclear level and if China is even capable of such an escalation. In doing so, she notes potential weaknesses in China's peacetime operations that could make their arsenal even more vulnerable to a first strike as

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<sup>36</sup> Yao, "China's Perspective on Nuclear Deterrence," 27-30.

stated before by Yao.<sup>37</sup> In addition, she assesses China's ability to reach and maintain 'mutual deterrence' when facing new United States capabilities such as AirSea Battle.<sup>38</sup> In both "Beijing's Nuclear Option" and "Would China Go Nuclear?" Talmadge notes the importance of China's strategy of co-location.<sup>39</sup> Talmadge notes this intentional ambiguity as one of the main sources of Chinese vulnerability because it can lead to unintentional escalation or attacks on China's already small nuclear arsenal.<sup>40</sup>

This attention to escalation between the United States and China is explored further in Talmadge's 2019 article, "China and Nuclear Weapons." In this piece, Talmadge concludes that "nuclear competition between the United States and China is almost certain to intensify."<sup>41</sup> Similar to her other two pieces, "China and Nuclear Weapons" spends time assessing Taiwan as a flashpoint for Chinese nuclear use as well as a potential cause for swift modernization, even if this modernization does not appear to deviate from existing doctrine.<sup>42</sup>

Similar to Talmadge, Zhang notes that shifting Chinese perceptions of the United States' missile defense program is a "key driver" for new modernization efforts.<sup>43</sup> However, Zhang expands this idea further than Talmadge by explicitly noting that changes in China's relationship with the United States could lead to a tangible shift in China's doctrine from assured retaliation to

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<sup>37</sup> Talmadge, "Would China Go Nuclear? Assessing the Risk of Chinese Nuclear Escalation in a Conventional War with the United States." For perspective on Taiwan as a flashpoint see: Yao, "China's Perspective on Nuclear Deterrence." For perspective on peacetime operations see: Library of Congress Congressional, Research Service, *Chinese Nuclear Testing and Warhead Development*.

<sup>38</sup> Talmadge, "Would China Go Nuclear? Assessing the Risk of Chinese Nuclear Escalation in a Conventional War with the United States."

<sup>39</sup> Ibid. Also: Talmadge, "Beijing's Nuclear Option."

<sup>40</sup> Ibid. Also: Fravel, *Active Defense: China's Military Strategy since 1949*. Also: Fravel and Medeiros, "China's Search for Assured Retaliation: The Evolution of Chinese Nuclear Strategy and Force Structure," 69.

<sup>41</sup> Talmadge, "China and Nuclear Weapons."

<sup>42</sup> Talmadge, "China and Nuclear Weapons."

<sup>43</sup> Ibid. See also: Cunningham and Fravel, "Why China Won't Abandon Its Nuclear Strategy of Assured Retaliation."

assured destruction—a less vulnerable and more credible posture.<sup>44</sup> This suggests China is currently vulnerable and invulnerable, depending on the state of its relationship with the United States.

In Thomas Fingar and Fan Jishe's article, "Ties that Bind: Strategic Stability in the US-China Relationship," the authors argue that China's nuclear weapons are not vulnerable to attack from the United States because of increasing "mutual understanding."<sup>45</sup> Fingar and Jishe argue that China and the United States will be able to negotiate through disputes and collective security arrangements without escalating to conflict. This would reduce China's vulnerability by stabilizing China's strategic relationship with the United States. It posits that both the United States and China have concerns over the other's nuclear posture, but mutual interests, history, and increasing interdependence are contributing to a stable environment. Common interest has led to China's decrease in vulnerability. Furthermore, US-China relations have remained stable since the end of the Cold War, which points to continued cooperation and stability.<sup>46</sup> However, this argument conflates stability and vulnerability. This means that a sudden change in China's and the United States' relationship could lead to a sudden and extreme increase in vulnerability for China's nuclear arsenal. For example, even though Yao expresses confidence in China's nuclear standing, she concludes her article with a section discussing potential flashpoints (Taiwan, US missile-defense development, and new nuclear neighbors) that could cause China's nuclear weapons to become threatened in the future.

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<sup>44</sup> Zhang, "US Missile Defence and China's Nuclear Posture: Changing Dynamics of an Offence—defence Arms Race," 559.

<sup>45</sup> Thomas Fingar and Fan Jishe, "Ties that Bind: Strategic Stability in the U.S.-China Relationship" *The Washington Quarterly* 36, no. 4 (2013): 125-138.

<sup>46</sup> Ibid.

## Conclusion

Overall, the literature on China's nuclear vulnerability leans toward the assessment that China is vulnerable and is especially vulnerable to a strike from the United States. These arguments tend to assess vulnerability from one or two points of nuclear posture, not holistically. As a result, this paper will break nuclear posture into three categories—size, doctrine, and readiness—in order to assess all aspects of potential vulnerability. Lastly, the literature on China's nuclear vulnerability often does not link vulnerability to a consistent root cause. Therefore, this paper will look at China's nuclear program from before its inception to today in order to address all changes and consistencies which may be causing China's current vulnerable state.



## **Vulnerability Framework**

In order to measure the vulnerabilities of a nuclear program, it is important to first understand why nuclear weapons are important to states. Then, it is important to understand the structure and function of a state's nuclear posture. Without defining vulnerability, it becomes meaningless as a concept; this is a result of the fact that vulnerability is relative. A state is not vulnerable to a nuclear attack from a state without nuclear weapons, but it may be vulnerable to coercion by a state that does. Meanwhile a state with few weapons is only vulnerable to those with the capability to destroy those weapons. China may believe its nuclear program is completely insulated from threat and therefore lacks vulnerability, but this claim changes drastically when viewed from an American perspective. This section will ask why nuclear weapons are important for states looking to avoid coercion. It will then break nuclear posture down into three key aspects in order to define and organize vulnerabilities in nuclear posture. This section then explores and outlines minimum, medium, and maximum iterations of a nuclear policy in this framework. The next section will analyze China's nuclear policy through this framework.

### **Why Do States Want Nuclear Weapons?**

States want the ability to influence the international system. This requires coercive power to either change or maintain the status quo. But for coercion to be successful, states should make only compellent or deterrent demands that are credible.<sup>47</sup> Nuclear weapons are good for deterrence and compellence because of their sheer destructive capability and the fact that a single warhead striking its target is enough to do massive damage. It is this establishment of a credible threat and

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<sup>47</sup> Paul Davis, "Deterrence, Influence, Cyber Attack, and Cyberwar," *New York University Journal of International Law and Politics* 47, no. 2 (2015): 327-355.

the willingness to act that creates effective coercion.<sup>48</sup> The capability to wield such coercive power is why states want nuclear weapons.

Deterrent action refers to the idea that the threat of force is enough to prevent action from an adversary state. Nuclear deterrence is the ability for one state to influence the actions of another through the threat of using nuclear weapons which have a far greater destructive capacity than conventional weapons. Specifically, nuclear deterrence refers to maintaining the status quo by preventing actions from being taken by an adversary through the threat of nuclear retaliation.<sup>49</sup> Deterrence is a function of the generation of fear that allows a state to project its threatening and retaliatory capabilities.<sup>50</sup>

Effective deterrence requires “not only the threat to go to war if need be, but also the promise to remain at peace...”<sup>51</sup> Jervis elaborates on this idea by saying that war will be “unavoidable only if decision makers believe it to be unavoidable.”<sup>52</sup> As illustrated by this concept, deterrence is mainly the process of signaling to others what you are capable of and willing to do. Deterrence can also be offensive or defensive in nature.<sup>53</sup> Having an invulnerable and effective nuclear program is critical to having an effective deterrent force. All deterrent threats and actions must be credible through aggregate force, proximity, and power projection, and vulnerability undermines this.<sup>54</sup>

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<sup>48</sup> Nicholas D Anderson, Alexandre Debs, and Nuno P Monteiro, “General Nuclear Compellence,” *Strategic Studies Quarterly* 13, no. 3 (Fall 2019): 94.

<sup>49</sup> Jervis, “The Nuclear Revolution and the Common Defense.”

<sup>50</sup> Austin G Long *Deterrence: From Cold War to Long War, Lessons from Six Decades of Rand Deterrence Research*, (Santa Monica, CA : RAND Corp, 2008), 7.

<sup>51</sup> Jervis, “The Nuclear Revolution and the Common Defense,” 700.

<sup>52</sup> Ibid

<sup>53</sup> Long, *Deterrence: From Cold War to Long War*, 10.

<sup>54</sup> Ibid, 11.

It is clear that deterrence is not simply an offshoot of compellence. As stated in Austin Long's *Deterrence - From Cold War to Long War*, the mechanisms of deterrence and vulnerability avoidance are simple in principle, but "complex, expensive, and difficult to obtain" in practice.<sup>55</sup> Simply put, vulnerability leads to a lack of deterrence, which leads to a failed deterrent and ineffective nuclear posture. With vulnerability, a deterrent force is likely to fail to project a "credible threat of war" and will be ineffective.<sup>56</sup> Nuclear weapons have resulted in replacing brute force with "defense by deterrence."<sup>57</sup> Building up arms illustrates to adversaries your capability of inflicting damage, therefore, an effective nuclear force is critical to a nuclear defense strategy. But the concepts that lead to vulnerability are diverse and complex. Aspects like the size of a nuclear arsenal, official state doctrine, and a state's ability to respond to threats all impact the vulnerability of an arsenal. Deterrence is not always international, so looking at domestic factors helps reach the root cause of ineffective and vulnerable nuclear postures.<sup>58</sup>

### What is Vulnerability and Why Does It Matter?

In the nuclear age, states want to be capable of nuclear deterrence since it is an effective measure to avoid coercion or destruction from other states. If a state is not able to protect itself from coercion, it is considered vulnerable. Coercion and vulnerability can come in conventional forms. In the nuclear case, vulnerability is defined as the inability to protect nuclear assets, produce a first strike, or produce a promised second strike—this is what leaves a state open to nuclear coercion. To prevent vulnerability is not a simple task. Nuclear programs are inherently ambiguous and, as a result, vulnerability can arise in situations where both states are capable of

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<sup>55</sup> Long, *Deterrence: From Cold War to Long War*, 2

<sup>56</sup> Jervis, "The Nuclear Revolution and the Common Defense," 698.

<sup>57</sup> Ibid, 689.

<sup>58</sup> Long, *Deterrence : From Cold War to Long War* , 9

causing massive and unacceptable damage. The victorious state “will be in a position to issue orders to the loser and the loser will have to obey them or face complete chaos or extinction.”<sup>59</sup> To be vulnerable in this situation is to lose to the victorious states and become situated in a new or unwanted status quo.

When speaking about nuclear vulnerability and the balance of nuclear power, the concept “strategic stability” comes to the forefront. Strategic stability “refers to the existence of conditions that make war between major powers unlikely.”<sup>60</sup> In this situation, states both have credible enough nuclear postures to produce a credible deterrent. The size, speed, or policy behind the posture seems to another state enough to not risk going to war. This invulnerability arises from posture and the ambiguous nature of nuclear weapons produces “great security and enormous insecurity” since both sides must balance vulnerability to produce deterrence.<sup>61</sup> As a result, many factors that can produce security also have the opportunity to trigger a security spiral and expose either state’s vulnerability.

The following section will assess the issue of vulnerability by examining three axi: numerical size, doctrine, and readiness. When combined, these three factors compose what is commonly called “nuclear posture” and will inform the majority of a state’s nuclear behavior.

### *How Many Weapons?*

When states and organizations are assessing the relative power of different nuclear weapons programs, it must ask ‘How many weapons does each state have?’ Having a credible threat is key to nuclear exchange and deterrence, therefore many believe more weapons will result

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<sup>59</sup> Jervis, “The Nuclear Revolution and the Common Defense,” 689-692.

<sup>60</sup> Fingar and Jishe, “Ties that Bind: Strategic Stability in the U.S.-China Relationship,” 125-138.

<sup>61</sup> Jervis, “The Nuclear Revolution and the Common Defense,” 690.

in a less vulnerable arsenal.<sup>62</sup> Having nuclear parity seems the only way to invulnerability, but only a single warhead needs to land in order for massive unacceptable damage to occur. This makes nuclear parity pointless in theory. Strategic weapons can inflict punishment without the prerequisite of massive fire. Therefore, having more nuclear weapons is not required for nuclear security.

With this in mind, it can be argued that a state with a single massive weapon is secure since it would be enough to effectively generate fear for the sake of deterrence and coercion.<sup>63</sup> However, a state capable of producing a second strike can still be vulnerable. Having a single nuclear weapon is clearly a vulnerable position—regardless of magnitude—because a single weapon could be disarmed in a first strike. Numerical primacy can no longer be ignored; one weapon is simply not enough.

That said, numerical primacy does not automatically mean a state is free from vulnerability either. More important are the types of weapons a state holds.<sup>64</sup> Specific characteristics such as a weapons range, payload, targeting system, delivery systems, and more are much more critical to an effective and non-vulnerable nuclear posture.<sup>65</sup> For example, low yield to weight ratio on a missile, or a larger payload can make a missile more accurate and effective, but only having a single high yield missile is just as vulnerable as having a single low yield one. A vulnerable state will have few weapons even if those weapons are capable of large payloads or long range flights. Range, delivery, and targeting are all important aspects of the numerical aspect of posture, but are not effective at lessening vulnerability until a state reaches a specific number of warheads to prevent

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<sup>62</sup> Long, *Deterrence : From Cold War to Long War*, 8. See also: Jervis, "The Nuclear Revolution and the Common Defense" 693, and Davis, "Deterrence, Influence, Cyber Attack, and Cyberwar."

<sup>63</sup> Long, *Deterrence : From Cold War to Long War* 7.

<sup>64</sup> Jervis, "The Nuclear Revolution and the Common Defense," 701.

<sup>65</sup> Narang, Vipin. *Nuclear Strategy in the Modern Era : Regional Powers and International Conflict*. Course Book.. ed. Princeton, NJ; Princeton, New Jersey: Princeton, NJ : Princeton University Press. 4

basic vulnerability. Having more weapons is less vulnerable to a point. After that point, delivery systems, payload, and range become important in defining vulnerability. Therefore this paper will ask both 'how many weapons does China have' as well as 'Which weapons does China have?'

### *What is Doctrine?*

Official doctrine is the stated policy put forward by a state to promote its political, security, and international agenda. Nuclear doctrine is a summary of a state's official stances and values in regards to nuclear weapons and organization. Oftentimes, this portion of the nuclear posture is given the most attention by scholars who are focused on the systems and categorizations of existing and proliferating nuclear programs. But official and unofficial doctrine are equally important. In Narang's book, *Nuclear Strategy in the Modern Era*, he argues for the existence of three basic doctrines: catalytic, assured retaliation, and asymmetric escalation.<sup>66</sup> These categories are mirrored by the terms second strike, counterforce, and preemptive counterforce used in Long's book, *Deterrence: From Cold War to Long War*.<sup>67</sup> As a result, states tend to modernize and publish their doctrine in order to ensure credibility to others.<sup>68</sup> A state may choose one doctrine over another because of the added connotation granted by international perceptions even if they do not follow that doctrine in their numerical and organizational practices.

The next aspect of official doctrine is the language used in a document or statement. Nuclear conflicts and nuclear balance are nuanced. A single word can be interpreted in many different ways and the language a state uses to describe their nuclear program is critical to understanding the goals of a doctrine. The language put forward can provide insight into national

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<sup>66</sup> Narang, *Nuclear Strategy in the Modern Era : Regional Powers and International Conflict*, 14.

<sup>67</sup> Long, *Deterrence : From Cold War to Long War*, 37 and 63.

<sup>68</sup> Yao, "China's Perspective on Nuclear Deterrence," 29.

vulnerabilities as well as resolve to oppose or support the concept of nuclear deterrence.<sup>69</sup>

Therefore a strong clear doctrine is more conducive to an invulnerable arsenal since it will state in clear words a nuclear plan and therefore prevent security spirals or false starts.

China, in particular, repeats the same language over and over in each iteration of their published doctrine. This language reflects China's ideal nuclear systems instead of the reality of their arsenal. This "dependence on opaqueness to bring about greater deterrent value" affects both the language used as well as the organization of nuclear forces.<sup>70</sup> When utilized together they are partially effective, but a lack of alignment between these two systems could prevent or bring on action through a lack of credible information.

These categories and official doctrine overall are helpful for categorizing and understanding the broad strokes of a nuclear state but much is left undiscussed. Even though many easy terms for categorizing nuclear programs exist, it is important to remember that each program is different and an official doctrine is simply a statement of purpose and may not reflect reality. This disparity is unofficial doctrine.

As stated in the above section, a state must have more than one weapon to be secure and must develop organizational systems and bureaucracies to monitor, maintain, and deploy their nuclear assets. To do this effectively a state should separate its weapons from one another and diversify its delivery systems to increase the likelihood of survivability of multiple missiles in the event of an attack.<sup>71</sup> States like the United States seek a triad system which develops distinct naval, airborne, and missile based branches of a nuclear program.<sup>72</sup> In doing so a state can ensure that a

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<sup>69</sup> Yao, "China's Perspective on Nuclear Deterrence."

<sup>70</sup> Ibid, 29.

<sup>71</sup> Fravel and Medeiros, "China's Search for Assured Retaliation: The Evolution of Chinese Nuclear Strategy and Force Structure," 54.

<sup>72</sup> Ibid.

readied weapon will be more than likely to reach a target in the event of poor conditions, adversary attack, or malfunction.

The last part of the doctrine is command and control. Although this has less to do with the weapons themselves and more to do with bureaucracy and infrastructure, command and control is critical to a state's nuclear function and to power projection. Ineffective command and control can lead to false starts, slow launches, poor storage, and many other critical failures that could prevent a launch or second strike. Command and control is one of the first signals to other states of nuclear movement or change. In addition, command and control systems themselves can be targeted which makes them a point of vulnerability.<sup>73</sup> Changes in this area are rare, but any change to the command and control structure leads to new vulnerabilities or increased security.

### *What is Readiness?*

Readiness is a term used to describe a state's preparedness to launch at a given moment. It comprises speed to launch, storage, and location. Readiness is more focused on when a crisis has broken out since most states would ready weapons in this situation. It asks where and when are missiles pointing. Therefore, readiness is assessed by asking if nuclear warheads are coupled or decoupled. If missiles are pointing at the target, and how soon they can be launched.

First, the speed in which a warhead can be moved or readied is critical to that warhead's success in surviving a strike or launching on command. Road systems, silos, mated warheads, and many other details in a nuclear posture lead to quick and effective nuclear movement. In this regard, co-location is important since it heightens ambiguity if a state is seeking opaqueness. If missile location and speed is transparent they will be more easily destroyed in a first strike.

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<sup>73</sup>James M. Acton, "Escalation through Entanglement: How the Vulnerability of Command-and-Control Systems Raises the Risks of an Inadvertent Nuclear War," *International Security* 43, no. 1 (2018): 56-99.



Next is storage, which consists of the placement of peacetime warheads. Oftentimes, it is assumed that during conflict warheads will be mated and readied, but during peacetime there is much more ambiguity surrounding the location of nuclear warheads. Overly aggressive storage and organization can lead to more vulnerability because such an organizational pattern may lead to others' insecurity. Storage is important to vulnerability since it involves the physical location of many nuclear weapons. If the warheads are located together they are more vulnerable to a first strike. If they are separate from delivery systems, this increases time to launch and may leave a window for destruction by an adversary, leading to a failed second strike.

### Levels of Vulnerability

The framework described above can further be broken down into three grades of application which measures each aspect from Maxim (least vulnerable) to Minimum (most vulnerable). Countries can implement or try to mend these areas of vulnerability by applying minimum, medium, or maximum nuclear programs. The type of program that a country decides to take on will inform the trajectory of that program. Therefore, it is important to understand the degree of application a country previously utilized and currently boasts. In the section below, I will outline what minimum, medium, and maximum frameworks look like.

Figure 1: Summary of Vulnerability Framework

Posture	Size	Doctrine	Readiness	Overall
Minimum	As few weapons as possible to guarantee retaliation with a second strike	Stresses conventional defense and second strike	Unmated warheads Slow response times Countervalue targets	A state shrinks its nuclear program to the smallest and most streamlined system possible
Medium	More weapons than what is required for a secure second strike  Multiple delivery systems	More diverse and established doctrine  Larger redundant command and control structure that may provide security against unintentional or unauthorized launches	Faster deployment  Store warheads near missiles, but warheads are unlikely to be mated  Conventional colocation	More room to expand and influence using deterrent means  May or may not try to deter adversaries with a first strike threat
Maximum	As many weapons as possible  Multiple delivery systems	First strike  Aggressive language  Redundant command and control to ensure launch	Ready to deploy at any moment  Launch on warning or launch on launch scenarios	Most aggressive and least vulnerable, which leads to effective coercive abilities  Capable of first strike

### *Minimum*

In a minimal nuclear posture, a state shrinks its nuclear program to the smallest and most streamlined system possible.

### Numerical

In a minimum posture a state will have as few weapons as possible to guarantee retaliation with a second strike. Having few weapons may make a state appear as less of a threat to adversaries, but having few warheads leave the remaining weapons vulnerable to attack and total

destruction. Even if a state feels it has enough weapons to ensure a retaliatory strike, the risk of a disarming first strike is difficult to calculate. A single small miscalculation would be enough to not only destroy an arsenal, but also cause enough vulnerability to discredit any deterrent effect.

### Doctrine

A minimal posture state will likely boast a minimal doctrine, which may include more transparent location information, a no first use policy, or strong statements against the use of nuclear weapons and deterrence. This minimum doctrine will likely have a strong stance against nuclear weapons since it will be unlikely that nuclear weapons are the states only form of defense. Minimum states with minimum nuclear doctrines are likely to have more investment in conventional weapons since those are the weapons they are likely going to use in minor conflicts. In terms of vulnerability, a no first use policy automatically requires a second strike if any strike at all. This means that a state must have weapons that are survivable enough to last through a first strike and still be capable of retaliation. Therefore, a minimum posture will also likely stress conventional defense and second strike.

However, a minimum posture is most likely going to have a minimal number of warheads. This means that survivability will be in question and it is unlikely that just a few weapons would be able to survive an attack on a country such as the United States or Russia, since the nuclear imbalance is more extreme. In terms of transparency of location information, it is possible that the few weapons that a minimal state has will be easy to locate and less camouflaged than medium and maximum states. This vulnerability could be the result of a lack of financial support for nuclear weapons or a lack of investment in camouflage facilities.

The language used in a minimal doctrine will likely stress its minimal nature if a state wants to underrepresent its power, while it will use strong maximum language if the state is attempting to project a stronger deterrent power than it possesses. By stressing the minimal nature of a posture, a state will try to avoid drawing attention from other nuclear powers.

In a minimum posture, a state will have a moderate response time. With just enough weapons for a state to survive a first strike, the speed of deployment of surviving weapons need only be as long as an adversary has between strikes. This time will vary depending on the adversary and crisis climate. A state may choose to co-locate its few weapons as a means of protecting them from a first strike. Here, colocation means hosting a warhead alongside its delivery system, either mated or unmated. While this type of location and organization structure may help speed up response time to an attack or threat, it is more vulnerable than housing warheads and launching devices in separate facilities. In a single strike on an adversary could destroy multiple warheads and multiple missiles that are housed together. This is further exaggerated by the fact that a minimum state may have delivery systems that are limited to one or two branches, such as an airforce or navy, which allows for minimal funds and focused development. Similar to delivery systems, command and control is streamlined to one department or one head making decisions on nuclear weapons or potential launches. Once again, this could be a result of doctrine and command and control or it could be a result of a lack of funding or investment in nuclear arms since minimal doctrines are most likely heavily invested in conventional forces.

### Readiness

A minimum state might have slower response times to a threat since it is unlikely for a minimum state to pose an aggressive enough posture to constantly be targeting missiles at a potential enemy. Since minimum states want to avoid having aggressive postures keeping missiles and warheads mated is unlikely. A slow response time makes a state vulnerable since that state is now susceptible to not only a first strike, but potentially a second strike if an adversary state can respond fast enough. A state may choose countervalue targets in order to create the strongest deterrence for an adversary since they will only be producing a second strike and not a debilitating strike.

### *Medium*

Unlike a minimum posture, a medium posture has more room to expand and influence using deterrent means. A medium posture may or may not try to deter adversaries with a first strike threat.

### Numerical

A medium posture state will not have the most weapons out of its regional adversaries, but will likely have more weapons than what is required for a secure second strike. As stated earlier in this section, having multiple weapons is more secure and less vulnerable than having just a few since it means a state is more likely to survive a first strike and be able to produce a second strike of at least one warhead or more. By having more weapons a state is capable of threatening more damage in a retaliatory strike. However it does mean that a state will look more suspicious or like

more of a threat to an adversary which could result in an increase of tension between the two states.

A medium posture will likely be invested in multiple delivery systems to ensure a successful strike, but it is possible for a medium posture to be heavily invested in a single delivery method in order to be proficient in its deployment. Investing in multiple delivery systems means that a state is more likely to be able to have a second plan of action, which will allow a second strike, or even a first strike, to be more successful in the event of non-pristine conditions.

Furthermore, if a state's nuclear weapons are under attack, having multiple delivery systems means it is more likely that one system will survive and be capable of a second strike. However, being heavily invested in one delivery system does not allow for the same diversity and does not allow for the same survivability as having multiple or at least two strong systems. Geographical location may play a role in delivery system development as well since having submarines in a landlocked nation would be a waste of financial investment.

### Doctrine

A medium state's doctrine can look very different depending on its choices to reflect the reality of its nuclear program. This will depend on crisis climate, geography and inter state expectation. Being only partially vulnerable, as opposed to entirely vulnerable or invulnerable, can be presented in many different ways because just a single flaw in numerical doctrine or readiness could cause enough vulnerability to put the state at risk. Therefore, we expect doctrines to look very different and expect them to reflect what a country is aspiring. It is more likely here for his state to exaggerate in its official doctrine in order to appear more threatening and less vulnerable to other states. A state's doctrinal language will be contextual and vary widely.

Lastly, command and control in a medium deployment may be more complex than a minimum posture. With more missiles, locations, and deployment methods, more bureaucracy is needed to ensure weapons are only launched when they are ordered to. Having a larger command and control structure may provide security against unintentional or unauthorized launches as well as an attack trying to destroy command and control structure.

### Readiness

A medium posture will have faster deployment than a minimum posture and may or may not have the ability to guarantee an immediate second strike. Not being able to guarantee a first or a second strike is very vulnerable and ruins deterrence since the state can not make credible threats.

A medium posture is also likely to keep warheads near their missiles, but the warheads are unlikely to be mated. Some missiles are likely to be co-located with conventional missiles for deterrent purposes.

### *Maximum*

A maximum posture is the most aggressive and least vulnerable, which leads to effective coercive abilities. This type of posture ensures that nuclear weapons are survivable and also capable of a first strike. This posture invests heavily in its nuclear program so that doctrine, command and control, arsenal size, force type, and readiness are all able to respond to threats swiftly and without error.

### Numerical

A maximum posture is likely to have as many weapons as possible. This number is dependent on its adversaries, but a maximum state will likely pursue as many weapons as needed to surpass its neighboring adversaries. This may spiral into an arms race if the adversary state is made insecure by the arms build up and increases the size of its own nuclear arsenal.

### Doctrine

A maximum state will have a strong and aggressive stance that promotes its first strike and second strike capabilities. First strike capabilities are not as vulnerable as second strike since a missile or warhead does not need to survive an initial attack before use. It is possible for a state to understate its abilities in a doctrine, but this is less likely if a state feels its nuclear weapons and infrastructure are secure. Understating or implying a first strike doctrine does not present advantages in this case since a maximum state has the credibility to put forth a first strike threat.

As a result, the language used in a maximum doctrine will likely be unforgiving and support the idea of nuclear deterrence and coercion. By having aggressive language, and the appropriate capabilities, a state has the ability to reduce vulnerability through signaling to others the true strength and range of a posture.

### Readiness

A maximum posture will also likely have warheads ready to deploy at any moment. This means that the speed at which a nuclear weapon can be fired is far faster than with non-maximum states. A maximum state has invested in all forms of delivery systems and has likely developed a strong triad. Each leg of the triad is also likely to have its own bureaucratic command and control



to limit miscommunication and accidental launches, as well as to ensure that if one leg fails to launch another control system is untouched by the error.

### China Vulnerability Framework Application

In order to understand modern-day China's vulnerability, it is important to assess China's nuclear program's development over time. Using the framework described in the section prior, this section will examine China from 1960 to the modern day, make claims about China's level of vulnerability, and assess the root causes of such vulnerability.

To make the task of charting China's nuclear program more specific, this section is divided into three parts of China's nuclear history: 1960 to 1976, 1977 to 1997, and 1997 to present day. These dates were chosen for the following reasons: In 1960 China was on the cusp of nuclear proliferation and many formative organizational and doctrinal functions were decided. Mao Zedong died in 1976 and this year marked the beginning of the end of the era of Mao's foundational thought. The next period of time is 1977 to 1997. As stated above, Mao's death in 1976 marked a transition of power in China, which likely caused changes in nuclear posture. In 1997, China decided to sign the Comprehensive Test Ban Treaty (CTBT), effectively marking the end of China's testing era and signaling a major change in their foundational doctrine.<sup>74</sup> Prior to the signing of the CTBT, China refuted the idea of international governance in nuclear policy unless it was to outlaw nuclear weapons entirely.<sup>75</sup> Lastly, and by default, this framework looks at the period from 1997 to modern day. While these periods provide some structure for understanding changes in China's nuclear policy they are by no means exhaustive of all moments of major change. Each section will examine the numerical, doctrinal, and readiness of China's program to construct a comprehensive understanding of China's nuclear posture over time.

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<sup>74</sup> Fravel, M. T. and Evan S. Medeiros. 2010. "China's Search for Assured Retaliation: The Evolution of Chinese Nuclear Strategy and Force Structure." *International Security* 35 (2): 54.

<sup>75</sup> "Statement of the Government of the People's Republic of China," October 16, 1964, History and Public Policy Program Digital Archive, PRC FMA 105-01262-01, 22-26. Obtained by Nicola Leveringhaus.

## 1960 - 1976

*Numbers*

On October 1st 1964, China conducted its first successful nuclear test.<sup>76</sup> China's decision to detonate a nuclear bomb shook the international community since many did not expect China to be capable of such a technological feat for several more years.<sup>77</sup> In doing so, China both created massive security and insecurity since nuclear weapons create power to coerce and deter, but also create greater vulnerability by giving other states an incentive to neutralize them. By detonating a nuclear bomb, China told the internal community that it was capable of inflicting massive damage. Between the periods of 1968 in 1976, China detonated five bombs with successful tests of two to four megaton yields.<sup>78</sup> On May 11th, 1965, China conducted its first successful aerial test.<sup>79</sup> They continued their rapid nuclear proliferation in December 1966 when they detonated their first lithium uranium bomb.<sup>80</sup> In the first decade, China is likely to have had 75 nuclear warheads and 10 gravity bombs.<sup>81</sup> In 1967, China tested a three megaton "multistage thermonuclear bomb."<sup>82</sup> By 1976, China was expected to have 180 warheads.<sup>83</sup> The more nuclear weapons China possesses, the greater damage they can potentially inflict on another state, which may lead to an arms race or instability paradox. The attention was on the long term viability of missiles over other methods of deployment. This also suggests vulnerabilities since the weapons have fewer

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<sup>76</sup> Library of Congress Congressional, Research Service, *Chinese Nuclear Testing and Warhead Development*.

<sup>77</sup> "Letter from Zhou Enlai to Mao Zedong on the Nuclear Explosion," September 21, 1964, History and Public Policy Program Digital Archive, Dang de wenxian (Party Historical Documents), no. 3 (1994): 20. Translated by Neil Silver.

<sup>78</sup> Library of Congress Congressional, Research Service, *Chinese Nuclear Testing and Warhead Development*.

<sup>79</sup> Fravel, *Active Defense: China's Military Strategy Since 1949*.

<sup>80</sup> Library of Congress Congressional, Research Service, *Chinese Nuclear Testing and Warhead Development*.

<sup>81</sup> Fravel and Medeiros, "China's Search for Assured Retaliation: The Evolution of Chinese Nuclear Strategy and Force Structure," 54.

<sup>82</sup> Library of Congress Congressional, Research Service, *Chinese Nuclear Testing and Warhead Development*.

<sup>83</sup> Max Roser and Mohamed Nagdy, "Nuclear Weapons," *OurWorldInData.org*, 2020.

possibilities to launch in the event of an attack and, therefore, fewer opportunities to deploy for a second strike. Instead, China focused on developing a series of liquid fueled missiles of various ranges between 1965 and 1972.<sup>84</sup> Liquid fueling also presented China with vulnerability issues of its own since liquid fueling slows launching speeds and is dangerous to those fueling, both of which can lead to delays in launch time and a failed second strike.

China also believed nuclear weapons could not win wars.<sup>85</sup> This Maoist belief states that nuclear weapons are not necessary and cannot maintain the claims on land that a conventional force could—they were simply paper tigers.<sup>86</sup> As a result, China stood by a policy of having as few nuclear weapons as possible. Fewer weapons does not automatically mean weaker or more vulnerable weapons. However, as stated above, in China's early nuclear stage, a small number of weapons could tempt an adversary to destroy its arsenal before it was capable of growing and becoming a real threat.

In 1950, China also started developing submarines.<sup>87</sup> This hypothetically reduces China's nuclear vulnerability by diversifying deployment locations and launch type of nuclear missiles, but China's first submarines were loud and easy to locate which placed them at risk.

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<sup>84</sup> Fravel, *Active Defense: China's Military Strategy Since 1964*.

<sup>85</sup> "Statement of the Government of the People's Republic of China," October 16, 1964, History and Public Policy Program Digital Archive, PRC FMA 105-01262-01, 22-26. Obtained by Nicola Leveringhaus.

<sup>86</sup> Fravel and Medeiros, "China's Search for Assured Retaliation: The Evolution of Chinese Nuclear Strategy and Force Structure," 58.

<sup>87</sup> Fravel, *Active Defense: China's Military Strategy Since 1964*.

## *Doctrine*

At the beginning of China's nuclear program, the nation was heavily focused on deterring (威慑 Wei She) aggression from the USSR.<sup>88</sup> This means China has an anti-nuclear stance written within the context of not only their statement of why they developed nuclear weapons, but also in the founding documents of their nuclear posture. The most obvious and most famous of these statements is their dedication to no first use. A no first use declaration means that under no circumstances will China be the first to use nuclear weapons, but that China will use nuclear weapons in the event of an adversary first strike. This should hypothetically prevent adversaries from performing a nuclear first strike due to the risk of unacceptable retaliatory damage. This belief is described in the “Statement of Government of the People’s Republic of China” given by Mao in 1964: “The Chinese government hereby solemnly declares that China will never at any time and under any circumstance be the first to use nuclear weapons.” However, during this time period, China’s nuclear arsenal was small, slow, and centralized which may have meant that a first strike on China could be enough to prevent any retaliatory strike.<sup>89</sup> This statement remains relevant today and throughout this period China stood by their no first use declaration strongly.<sup>90</sup> This means that many of the no first use related vulnerabilities that China faced in 1964 still remain. In order to alleviate this vulnerability, China could have written a doctrine or preparedness that allowed them to carry out a first strike. However, because the second strike was China’s only

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<sup>88</sup> Fravel and Medeiros, "China’s Search for Assured Retaliation: The Evolution of Chinese Nuclear Strategy and Force Structure." 71.

<sup>89</sup> “Intelligence Note from Thomas L. Hughes to the Secretary, 'Will Communist China Assist Other Nations in Acquiring Nuclear Weapons?'," April 23, 1965, History and Public Policy Program Digital Archive, RG 59, Entry UD-UP 141, Bureau of Intelligence and Research, Reports Coordination and Review Staff, Intelligence Reports, 1961, 1963-67, box 1, Intelligence Notes (1965) April to May 3

<sup>90</sup> Fravel and Medeiros, "China’s Search for Assured Retaliation: The Evolution of Chinese Nuclear Strategy and Force Structure."

possibility, it left China vulnerable to a debilitating first strike from an adversary. The other method of alleviating this vulnerability would be to quickly build up nuclear arms, which at the time was not possible for China.

China also held strong to a 'no arms race mentality,' which means it refused to allow other states' buildups of nuclear arms impact on its own.<sup>91</sup> Specifically, China's nuclear doctrine "places no value on achieving nuclear parity with anyone" and that a "small nuclear force will be able to deter a large one if it targets the latter's population centers."<sup>92</sup> In other words, China tried to do things in its own time, at its own pace, and without the influence of either threats or allies. This can be seen in its refusal for nuclear umbrellas or extended nuclear deterrence.<sup>93</sup> Lacking alliances or a nuclear umbrella can improve nuclear security since external conflicts will not bring China's nuclear weapons into the fray. However, this also means China is limited to its own capabilities. Overall, during this period China's weapons were minimal and at risk. Lacking nuclear alliances may have placed the nation at a higher risk for nuclear attack or failed long term proliferation.

China's stated doctrine remained relatively consistent up until the late 1990s, China fluctuated in terms of its organization and application.

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<sup>91</sup> Zhang "American Nuclear Primacy Or Mutually Assured Destruction: The Future of the U.S.-China Strategic Balance of Power," 79.

<sup>92</sup> Ibid.

<sup>93</sup> Yao, "China's Perspective on Nuclear Deterrence," 27-30. See also: Thomas Fingar and Fan Jishe, "Ties that Bind: Strategic Stability in the U.S.-China Relationship," *The Washington Quarterly* 36, no. 4 (2013): 125-138.

## *Readiness*

China's first nuclear test took eight hours from initiation to launch. This is probably the slowest test that they've had that was successful. Their operational launch times during this time period were likely also not quick affairs.<sup>94</sup> A slower launch leaves China vulnerable to a first strike, or even a second strike, from adversaries. Therefore, at this time China's readiness was lacking and left China's missile overly vulnerable to destruction.

At the beginning of China's nuclear program, their readiness was lacking. It lacked the ability to quickly respond to threats. Specifically, China decoupled warheads from all its missiles and its stockpile was extremely small since the program was just developing. Once again, a smaller arsenal is more likely to be wiped out in a single strike from an adversary, leaving China vulnerable to a potential nuclear strike without any chance of retaliating.<sup>95</sup>

The missiles were targeted primarily at the USSR since China had had a rift with this former ally. This alignment ignored other threats in the area. This is particularly important to vulnerability because China's former alliance with the USSR means that China's missiles were based in part on USSR technology.<sup>96</sup>

In 1957, two centers for research into surface to surface and surface to air missiles opened and provided the information necessary to guide rocket creation. It was stated that "Peking will

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<sup>94</sup> Fravel and Medeiros, "China's Search for Assured Retaliation: The Evolution of Chinese Nuclear Strategy and Force Structure."

<sup>95</sup> Bates Gill and James Mulvenon, "China's Nuclear Agenda," Brookings, 7 September 2001.

<sup>96</sup> Mark O'Neill, "Nixon intervention saved China from Soviet nuclear attack," South China Morning Post, 12 May 2010.

produce some MRBM's and then place them on its border in 1967.”<sup>97</sup> These were targeted towards India and the USSR. They were also aimed at or near US bases in Asia and toward possible invasions near the Indian border. Placing missiles on the borders of other countries of course provokes those countries and may lead to an attack. China's decision to arm and place missiles on the border of India and the USSR is risky at the time when this action could potentially cause an attack. This unnecessary risk further placed China's nuclear arms in a vulnerable state. Furthermore, China's missiles were exposed to a potentially disarming first strike from 1964 until 1996.<sup>98</sup> During this time, China's missiles required “lengthy preparation before launching.”<sup>99</sup> This slow response was exacerbated by the fact that missiles were held in caves and required ample time to be “rolled out and erected” then filled with liquid fuel before launch.<sup>100</sup> Placing missiles on the border does not allow them the same camouflage and security that they would have in storage, which leaves them at risk of destruction by nuclear or conventional arms.<sup>101</sup>

### *Summary*

In the formative years of China's nuclear program, it was vulnerable because it lacked the number of weapons, sophisticated doctrine, and ability to secure a second strike in an unstable climate. China had no more than 180 warheads. The country tested a range of delivery systems which, with the proper doctrine, would have afforded it a stronger deterrent and the ability to

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<sup>97</sup>“Intelligence Note 13 from Thomas L. Hughes to the Secretary, 'The Chinese Nuclear Threat to NonCommunist Asia',” January 11, 1967, History and Public Policy Program Digital Archive, RG 59, Entry UD-UP 141, Bureau of Intelligence and Research, Reports Coordination and Review Staff, Intelligence Reports, 1961, 1963-67.

<sup>98</sup> Fravel and Medeiros, "China's Search for Assured Retaliation: The Evolution of Chinese Nuclear Strategy and Force Structure."

<sup>99</sup> Ibid.

<sup>100</sup> Ibid.

<sup>101</sup>“Intelligence Note 13 from Thomas L. Hughes to the Secretary, 'The Chinese Nuclear Threat to NonCommunist Asia',” January 11, 1967, History and Public Policy Program Digital Archive, RG 59, Entry UD-UP 141, Bureau of Intelligence and Research, Reports Coordination and Review Staff, Intelligence Reports, 1961, 1963-67



coerce other states. However, because of its doctrine, which did not call for a large arsenal or first strike capabilities, these weapons were not utilized to their full potential. China's poor readiness meant that it could not reliably strike adversary targets even though it pre-targeted its missiles. Its arsenal size, doctrine, and readiness were not at their greatest potential and could have been invested in more. These factors, when combined, place China well within the minimum, most vulnerable posture of the framework.

1977 - 1996

### *Numbers*

At the beginning of 1977, China was estimated to have around 180 nuclear warheads.<sup>102</sup> However, there were changes in the types of testing and the types of nuclear weapons China developed. China switched from a high yield and rapid testing model to a low yield testing model.<sup>103</sup> This change in yield implies the deployment of new warheads and technological improvements.<sup>104</sup> In terms of vulnerability, this means that China was developing multiple types of weapons for different purposes, therefore specifying what they could do with each weapon. In addition, an increasing diversification and numbers makes China's arsenal less likely to be completely destroyed in a first strike and more credibly threaten a second strike. This low 'yield to weight ratio' had most analysts anticipating "advances in missile accuracy, mobile ballistic missiles, and missile submarine forces," in addition to developing weapons with multiple warheads.<sup>105</sup> The 1992 through 1996 testing series was intended to develop small lightweight

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<sup>102</sup> Roser and Nagdy, "Nuclear Weapons."

<sup>103</sup> Library of Congress Congressional, Research Service, *Chinese Nuclear Testing and Warhead Development*.

<sup>104</sup> Ibid.

<sup>105</sup> Ibid.

warheads for new nuclear forces.<sup>106</sup> All these improvements decrease vulnerability since they make China's threat of unacceptable damage more credible, and therefore makes others less likely to attack China's nuclear forces. In addition, smaller and lighter weight warheads are best used for missiles and submarines which further diversifies China's arsenal.

However, China's rate of growth was still small, meaning their arsenal was not growing to a safe level fast enough to ensure survivability relative to its adversaries.<sup>107</sup> By about 1995, "China's ICBM force grew by only twenty missiles" and China only possessed four DF-5 missiles after its first in 1978.<sup>108</sup> As stated before, a small nuclear arsenal does not mean that a state is automatically vulnerable, but, in the case of ensuring a second strike, having more than enough nuclear weapons to survive first strike is critical to maintaining minimal vulnerability.

In July 1996, China held its last of 45 tests in its history before signing the CTBT. Regardless of the number, it is clear that China tested constantly and still performed far fewer tests when compared to other declared nuclear states. Since then, China has not needed another nuclear weapon test but has continued to develop its nuclear forces. By the end of 1997, it was believed that China had around 300 deployed strategic weapons and 150 tactical weapons.<sup>109</sup>

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<sup>106</sup> Library of Congress Congressional, Research Service, *Chinese Nuclear Testing and Warhead Development*.

<sup>107</sup> Roser and Nagdy, "Nuclear Weapons."

<sup>108</sup> Fravel and Medeiros, "China's Search for Assured Retaliation: The Evolution of Chinese Nuclear Strategy and Force Structure," 54.

<sup>109</sup> Library of Congress Congressional, Research Service, *Chinese Nuclear Testing and Warhead Development*. See also: Fravel and Medeiros, "China's Search for Assured Retaliation: The Evolution of Chinese Nuclear Strategy and Force Structure," 54.

*Doctrine*

In 1977, after Mao's death, the language of China's doctrine stayed consistent and focused on deterrent forces. The slight change though comes in the form of China's acceptance of deterrence in 1980 and the early 1990s. This means that China no longer disagreed with or pushed against the idea of deterrence as a form of military capability. This was critical in reducing China's nuclear vulnerabilities since not being able to use the word deterrence in public doctrines or statements prevented China from creating a doctrine that best described what they were trying to achieve. For example, China's inability to use the word deterrence in public doctrine could easily be skewed by adversary states as a refusal to publish China's true doctrine since the word deterrence is utilized by almost every nation.<sup>110</sup>

During this period China remained missile focused. In 1977 through 1996, missiles were stored in mountains in central regions of China. This was done to help with their slowly developing policy of colocation and camouflage. They believed that a more opaque system would allow for better survival of weapons and, by hosting them in mountains in the central region of China, it would be harder for adversaries to locate such missiles.<sup>111</sup>

In addition to remaining consistent with deterrent forces and a deterrent focused doctrine, China also continued its adherence to assured retaliation as its primary policy. This means that China remained vocal with its no first use stance. Once again, no first use stood to leave China vulnerable since it allowed a first strike on its nuclear weapons. At this point in time, China's

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<sup>110</sup> Fravel and Medeiros, "China's Search for Assured Retaliation: The Evolution of Chinese Nuclear Strategy and Force Structure."

<sup>111</sup> Kristensen and Norris, "Chinese Nuclear Forces, 2015."

weapons were slightly more survivable than when they initially started out in the 1960 and early 70s, but there were no guarantees in China arsenal size that a first strike would not fully disarm it.

In addition, China tried to remain consistent in their nonalignment policies. In 1980, China published its first operational regulations. Until then, China had not earnestly stated a nuclear strategy doctrine.<sup>112</sup> It left much up to interpretation by the international community and much to chance. The doctrine focused on “ensuring the stability of Chinese forces as a means of bolstering credibility” and it equated survival with force size and decoys.<sup>113</sup> This was a relatively large step for China, meaning that they made their internal thoughts public instead of their ideas and ideology guarding nuclear weapons. In the mid 1980s, China published *The Science of Second Artillery Campaign*, further solidifying their nuclear doctrine and creating a detailed explanation for their use. However, “survivability” and “unacceptable damage” remained undefined for decades.<sup>114</sup> Here we return to the idea of ambiguity. Without fully defining what survivability and unacceptable damage meant in their doctrine, it is likely other states may have interpreted this ambiguity as more threatening or more aggressive than China intended. Furthermore, having undefined ideas means that China's command and control structures may lack the ability to execute orders properly and consistently, further leading to vulnerability because it can lead to a false start or a failed second strike.

In 1978, China began to seek “enough missiles to survive a first strike so that it could launch a retaliatory strike.”<sup>115</sup> In 1981, this language switched to “striking after the enemy has

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<sup>112</sup> Fravel and Medeiros, "China's Search for Assured Retaliation: The Evolution of Chinese Nuclear Strategy and Force Structure."

<sup>113</sup> Ibid, 57.

<sup>114</sup> Ibid.

<sup>115</sup> Ibid, 64.

struck,” which would require a great reduction in launching speed and command and control communication.<sup>116</sup> In the early 1990s, China stated that it would play a deterrent role to “restrain the enemy from launching.”<sup>117</sup> China continued to flesh out this policy by stating that China’s weapons would be used to “prevent (□ □ e zhi) the escalation of conventional war to nuclear war and prevent the escalation of nuclear war.”<sup>118</sup> At first glance, this appears to contradict China’s earlier statements, but in reality it stresses China’s anti nuclear stance that values conventional conflict over any form of nuclear escalation.

However, in the early 1980s inter-service competition began between the command and control structures of China's nuclear forces. It was stated that “the Second Artillery was treated as a technical branch of the PLA tasked with managing China's nuclear forces,” not “developing strategic concepts or deterrent forces requirements.”<sup>119</sup> This was likely a cause of future issues in command and control. As a result, this lack of development changed China's organizational doctrine without documentation and without being reflected in their official doctrine. This means that, regardless of changes China made, both in the number of their nuclear weapons and in their official doctrine, the organizational structures of China's nuclear posture leaves much to be desired. Without sufficient command and control structures and without the guarantee of definitions and clear direction, China remains vulnerable to adversary misinterpretation as well as internal misinterpretation that could lead to an inadvertent launch or a failed second strike.

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<sup>116</sup> Fravel and Medeiros, "China's Search for Assured Retaliation: The Evolution of Chinese Nuclear Strategy and Force Structure," 76.

<sup>117</sup> Ibid, 69.

<sup>118</sup> Ibid.

<sup>119</sup> Ibid, 67.

### *Readiness*

Between the period of 1977 in 1996, China continued its trend of keeping its weapons decoupled as its primary threat transitioned from the USSR to the United States.<sup>120</sup> In the early 1980s, DF-5s were targeted at the United States and the USSR, but they eventually changed to target only US military bases.<sup>121</sup> The United States and the USSR have particularly aggressive nuclear policies. Therefore, placing nuclear weapons on alert aimed at the United States puts China in a particularly vulnerable situation because it is now a more immediate threat to the United States. Even though China has an official no first use stance, many states are wary to believe these types of policies and the United States might have felt that the best course of action was a preemptive strike on China's nuclear weapons. Had China not placed its nuclear weapons on alert, it would have had much longer launch times in the event it needed to carry out a second strike. Either way, the size of China's arsenal, in addition to command and control, made both options for China the vulnerable option.

China also experienced periods of confrontation with the Soviet Union. China's bombers were rarely placed on alert and were stored in unsheltered areas, making them prone to an attack.<sup>122</sup> In 1984, the CMC placed China's weapons on "alert status for the first time," signifying the establishment of a "rudimentary retaliatory capability."<sup>123</sup> While placing arms on alert is not always the best situation, routine exercises in which China would place weapons on alert then

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<sup>120</sup> Fravel, *Active Defense: China's Military Strategy Since 1964*.

<sup>121</sup> Fravel and Medeiros, "China's Search for Assured Retaliation: The Evolution of Chinese Nuclear Strategy and Force Structure."

<sup>122</sup> Ibid.

<sup>123</sup> Fravel, *Active Defense: China's Military Strategy Since 1949*, 266.

place them back in shelter would have helped prevent any aging or help fix any problems with China's nuclear structure well before China actually needed to place weapons on alert in a real situation.

### *Summary*

From 1977 to 1996, China attempted to build a stronger larger and more ready nuclear force, but was unable to greatly reduce vulnerability. A small size, minimal doctrine, and lack of readiness once again placed China's nuclear forces in a vulnerable and minimal posture structure. By the end of 1996, it was estimated China had around 300 warheads, which was nearly double their warheads in 1976. However, this increase in size did not alleviate China's vulnerability as this arsenal size was still small relative to other nuclear countries. During this period, China's rate of growth was significantly larger and more ambitious.

China also saw minimal changes in its nuclear doctrine during this time. For example, attention to no first use remained the focal point of their doctrine. In addition, China published its first nuclear military doctrines, such as *The Science of Second Artillery Campaign*. While these changes should have decreased China's overall vulnerability, they actually increased the potential for miscommunications both domestically and internationally since the bureaucracies surrounding the country's nuclear weapons were not fully established. New bureaucracies also created inter-service competition in China's nuclear forces.

Lastly, from 1977 to 1996, China's readiness began to change as the state began targeting the United States. During this time, however, China's nuclear weapons were not readied and

therefore had long response times to threats. As a result of this lengthy process to alert and ready weapons, China's missiles were once again lacking invulnerability.

#### 1997 - Present Day

##### *Numbers*

At the beginning of 1997, China was estimated to have 234 warheads. In 2015, that number grew to more than 260.<sup>124</sup> Some estimates suggest that China had 120 warheads as of 2010, more than 260 warheads as of 2015, and about 290 in its stockpiles as of 2019.<sup>125</sup> While these discussions of numbers do suggest that China is building up, it is not as significant as the build up between the period of 1976 and 1996. Simply looking at these numbers, it is easy to see the massive decrease in the rate at which China was developing its weapons and producing them for its stockpile. In the first couple decades of its program, China doubled its stockpile, but in the last decades of its program China only added around 20 warheads.<sup>126</sup> This is not unusual for a nuclear program that is focused less on numbers and more on survival, which is what we expect to see with China. China's numerical parity did not change much, but the nation instead focused on expanding, modernization, and strategic planning.<sup>127</sup> This does not make China secure, instead, once again, fewer numbers leave China vulnerable to a debilitating first strike due to their no first use policy.

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<sup>124</sup> Kristensen and Norris, "Chinese Nuclear Forces, 2015," 77-84. See also: Zhang "US Missile Defence and China's Nuclear Posture: Changing Dynamics of an Offence—defence Arms Race," 555-569.

<sup>125</sup> Kristensen and Norris, "Chinese Nuclear Forces, 2015." See also: Fravel and Medeiros, "China's Search for Assured Retaliation: The Evolution of Chinese Nuclear Strategy and Force Structure."

<sup>126</sup> Roser and Nagdy, "Nuclear Weapons."

<sup>127</sup> Fravel and Medeiros, "China's Search for Assured Retaliation: The Evolution of Chinese Nuclear Strategy and Force Structure."



These advancements are slightly offset by the lagging technology and missile warheads China still has in its arsenal as of 2015. First are the oldest missiles in China's arsenal: the DF-3A and DF-4. Each requires slow liquid fueling, are intermediate range, and boast a 3.3 megaton payload.<sup>128</sup> The second oldest, the DF-4, is also stored in mountain silos with roll out to launch capabilities.<sup>129</sup> To counter aging stockpiles, in 2009 China started to deploy a new generation of land based strategic nuclear missiles called the DF-31s."<sup>130</sup> These missiles are solid fuel, three stage, road mobile, and have a striking range of up to 12,000 km.<sup>131</sup> China may even attempt to replace all liquid fueled missiles with solid fueled ones to improve mobility and survivability.<sup>132</sup> These appear to be far more durable than others at China's disposal.<sup>133</sup>

This decrease in producing warheads and attention to MIRV's, air fleets, submarines, and other types of ballistic missiles makes it clear that China is looking at miniaturization, survival, and modernization. Overall, the pentagon reports that China is "deploying a new generation of land and sea based strategic weapon systems."<sup>134</sup>

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<sup>128</sup> Kristensen and Norris. "Chinese Nuclear Forces, 2015."

<sup>129</sup> Ibid.

<sup>130</sup> Zhang, "American Nuclear Primacy Or Mutually Assured Destruction: The Future of the U.S.-China Strategic Balance of Power." See also: Kristensen and Norris. "Chinese Nuclear Forces, 2015," and Fravel and Medeiros, "China's Search for Assured Retaliation: The Evolution of Chinese Nuclear Strategy and Force Structure."

<sup>131</sup> Zhang, "American Nuclear Primacy Or Mutually Assured Destruction: The Future of the U.S.-China Strategic Balance of Power," 75. See also: Zhang, "US Missile Defence and China's Nuclear Posture: Changing Dynamics of an Offence—defence Arms Race."

<sup>132</sup> Fravel and Medeiros, "China's Search for Assured Retaliation: The Evolution of Chinese Nuclear Strategy and Force Structure."

<sup>133</sup> Kristensen and Norris, "Chinese Nuclear Forces, 2015." See also: Zhang, "American Nuclear Primacy Or Mutually Assured Destruction: The Future of the U.S.-China Strategic Balance of Power."

<sup>134</sup> Zhang, "American Nuclear Primacy Or Mutually Assured Destruction: The Future of the U.S.-China Strategic Balance of Power," 71.

## Doctrine

After signing the CTBT, China continued to adhere to the ideas of minimal deterrent forces, even reusing the language used in public statements.<sup>135</sup> In addition, no first use remains the same with the language being consistent with prior documents. This “bare bones strategic force” acts as the foundation of China’s nuclear doctrine and may be an “easy target for a surprise attack” because China’s doctrine does not project in a powerful, coercive, or organized manner that guarantees unacceptable damage in a second strike.<sup>136</sup> However, there was a sudden shift over this: from using the term assured retaliation with the term assured destruction.<sup>137</sup> Specifically, China focused on “expanding offensive capabilities” in a way that has not been used prior.<sup>138</sup> The sudden shift is quite telling as it reflects the internal changes that China was making without changing their doctrine. The shift itself should improve China’s vulnerability since it will project a more aggressive and more capable arsenal, but because of inconsistencies in doctrine and doctrinal application, China now appears more unstable or unpredictable. Doctrine is no longer enough for adversary states to confidently assess China’s nuclear programs. This could lead them towards a miscalculation in which they launch a preemptive first strike. ‘Assured destruction’ also implies a sense of aggression which goes against their features from previous doctrines. For example, a PLA strategy suggested that nuclear deterrence “gives the advantage to the offensive side” which is a more aggressive idea than China’s no first use stance suggests.<sup>139</sup> In terms of their applications of

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<sup>135</sup> Zhang, "American Nuclear Primacy Or Mutually Assured Destruction: The Future of the U.S.-China Strategic Balance of Power," 71.

<sup>136</sup> Ibid, 72.

<sup>137</sup> Library of Congress Congressional, Research Service, *Chinese Nuclear Testing and Warhead Development*. See also: Fravel and Medeiros, "China’s Search for Assured Retaliation: The Evolution of Chinese Nuclear Strategy and Force Structure," 79.

<sup>138</sup> Zhang, "American Nuclear Primacy Or Mutually Assured Destruction: The Future of the U.S.-China Strategic Balance of Power," 71.

<sup>139</sup> Zhang, Baohui. 2009. "American Nuclear Primacy Or Mutually Assured Destruction: The Future of the U.S.-China Strategic Balance of Power," 72.

this doctrine, China continued to stress their new testing stance after 1996 and adhered to that. Between 1997 and today is when we see the most aggressive changes in China's organizational structures. It was obvious that China began to value a triad system, even if this was not stated in their doctrine. As a result, it developed more delivery systems and more infrastructure for weaponry. There were great improvements to China's SSBNs during this time period, going from no weapons deployed on submarines to having successful and usable submarines—The Xia/JL were retired in 2015 to make way for more advancements in China submarines. In addition to submarines, China also focuses on improving their MIRVs.<sup>140</sup>

China also stores its missiles along the coast or in “central facilities under control of the Central Military Commission,” this “differs from their previous decision to store missiles not along the coast and only in mountain regions.”<sup>141</sup> The co-location of nuclear and conventional arms is also a change in China's organization during this. Prior to this, China tried to not only focus on opaque concealment and ambiguity, but, starting in 2013, China decided that it would be more advantageous to their survival to provide nuclear weapons in colocation with conventional weapons to further negate a potential attack.<sup>142</sup> To further promote survival, China gave more attention to road mobility. It focuses on camouflage and mobility when moving missiles from one silo to another and they developed some of the it's mobile missiles in hardened facilities buried deep in the mountains mostly in the northern part of the country. As a result, China is now able to move missiles and organizational factors across their entire country. Overall, China has 25 brigade

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<sup>140</sup> Kristensen and Norris, "Chinese Nuclear Forces, 2015."

<sup>141</sup> Ibid.

<sup>142</sup> Talmadge, "Beijing's Nuclear Option,"

bases organized under 6 base headquarters each with a small number of nuclear warheads in regional storage sites.

China's focus is also on miniaturization, submarines, and the United States in Taiwan. It was written in Chinese doctrine in 2015 that "under current doctrine, China's Central Military Commission does not allow the military service to have warheads deployed on missiles under normal circumstances."<sup>143</sup> In addition, it was argued that China's evolving doctrine and public perception of the United States nuclear weapons have been "a key driver of [China's] nuclear modernization efforts."<sup>144</sup> The language "lean" and "effective" became prominent throughout all official doctrine published at the time.<sup>145</sup> China also stressed ambiguity through their co-location. Lastly, China continued its mentality of avoiding arms races and added to that by stressing that it did not want to achieve nuclear parity. Instead, it focuses on accuracy, precision and technological advances. China defined survival as concealment and mobility which is different from previous doctrines, but more in line with this doctrine itself. However, it is also argued that minimum deterrence still best describes China's doctrine, regardless of recent changes.<sup>146</sup>

### *Readiness*

Lastly, from 1997 to modern day, China also retained its strong preference for decoupled nuclear missiles. This decoupling increases China's time to launch significantly and may prevent a "launch on warning" type response, which is far less vulnerable than waiting for a first strike to hit.

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<sup>143</sup> Kristensen and Norris, "Chinese Nuclear Forces, 2015."

<sup>144</sup> Zhang, "US Missile Defence and China's Nuclear Posture: Changing Dynamics of an Offence—defence Arms Race," 556.

<sup>145</sup> Fravel, *Active Defense: China's Military Strategy Since 1949*. See also: Yao, "China's Perspective on Nuclear Deterrence," 27-30.

<sup>146</sup> Fravel and Medeiros, "China's Search for Assured Retaliation: The Evolution of Chinese Nuclear Strategy and Force Structure," 50.

This decoupling leaves China vulnerable to coercion in the time it takes to mate and arm warheads. In addition, as of 2015, China's ballistic missiles had never "sailed on a deterrent patrol" and, as a result, the People's Liberation Army Navy and the Central Military Commission are fundamentally without experience operating submarine forces.<sup>147</sup>

However, China has focused mainly on the Taiwan crisis primarily with conventional forces.<sup>148</sup> Specifically, "the Taiwan strait has become a potential flashpoint that might drag two nuclear states into a military conflict."<sup>149</sup> This citation from China's perspective in 2010 remains relevant today as the question of Taiwan and the United States involvement there continues to frustrate China. In 2015, China had "sixty long range missiles that could reach the United States, although only 45 of those can strike the continental United States."<sup>150</sup> This is an important flashpoint "should China come under nuclear threat and the weapons would be released."<sup>151</sup> It is possible China abandoned "its previous single-warhead development pattern to counter US missile defense" directly in the event of a scenario like this.<sup>152</sup>

However, rapid modernization may not be enough to protect China's nuclear forces moving forward, though it is important to note that China's "doctrinal development was linked only loosely to its security environment" and therefore remain free floating from the realities of readiness.<sup>153</sup> This means that China's nuclear doctrine remains separate from its readiness and that in the event of nuclear conflict, China's doctrine may function as intended and leave China

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<sup>147</sup> Kristensen and Norris, "Chinese Nuclear Forces, 2015."

<sup>148</sup> Fravel, *Active Defense : China's Military Strategy Since 1949*.

<sup>149</sup> Yao, "China's Perspective on Nuclear Deterrence," 27-30.

<sup>150</sup> Kristensen and Norris, "Chinese Nuclear Forces, 2015."

<sup>151</sup> Ibid.

<sup>152</sup> Zhang, "US Missile Defence and China's Nuclear Posture: Changing Dynamics of an Offence—defence Arms Race," 559.

<sup>153</sup> Fravel and Medeiros, "China's Search for Assured Retaliation: The Evolution of Chinese Nuclear Strategy and Force Structure," 57.

vulnerable to an attack, miscommunication, or other nuclear blunder resulting in coercion. Since the nation is applying a strategy of opaque ambiguity their “rapid modernizing and expanding of Chinese strategic nuclear forces will also allow China to move from merely assured retaliation to assured destruction.”<sup>154</sup> This transition will increase China’s readiness since it implies a decrease in China’s time to deployment and an increase in sensitivity to triggering events.

### *Summary*

China’s vulnerability from 1997 to modern day has remained constant due to the size, doctrine, and the readiness of its posture. During this time, China experienced very minimal changes to its nuclear posture and did not grow significantly. This lack of growth means that China’s arsenal is still one of the smallest nuclear arsenals. This small size means that China is still vulnerable to larger arsenals which could produce a disarming first strike.

In terms of doctrine, China’s nuclear vulnerability did not change from 1997 to the modern day. Many of China’s key ideals, such as no first use and a small arsenal size, remain in effect, but the decision to move to a more aggressive “assured destruction” doctrine could increase the odds of conflict and miscommunication with other nuclear states—increasing overall vulnerability.

China’s readiness makes it vulnerable as a result of a separation between doctrine and readiness. This separation means that in the event of a conflict, doctrine and readiness may not function as intended which could result in the destruction of nuclear arms.

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<sup>154</sup> Zhang, "US Missile Defence and China's Nuclear Posture: Changing Dynamics of an Offence—defence Arms Race," 559.

Overall, China's small size, lack of readiness, and minimal doctrine once again place the state within a minimal framework which means China is still a vulnerable state.

## Conclusion

Figure 2: China's Posture Over Time: Vulnerability Framework Application

Date	Size	Doctrine	Readiness	Overall Vulnerability
1960 – 1976	0 – 180 warheads  Liquid Fuel	No First Use  Small Arsenal Size  No Arms Race Mentality  'Assured Retaliation'	8 Hours for First Launch  Decoupled  Targeted USSR	<i>Extremely Vulnerable:</i>  During this time, China was vulnerable because it lacked the number of weapons, sophisticated doctrine, and ability to launch on warning in an unstable climate.
1977 – 1996	180 – ~234 warheads  Liquid Fuel  Last Test July 1996 (CTBT)	No First Use  Small Arsenal Size  <i>Science of the Second Artillery Campaign</i>  'Assured Retaliation'	Targeted USA  Decoupled	<i>Vulnerable:</i>  China attempted to build a stronger, larger, and more ready nuclear force but was unable to greatly reduce vulnerability because its size, doctrine, and readiness remained minimal.
1997 – Present Day	~234 – ~290 warheads  DF-31: Solid Fuel, Road Mobile	No First Use  Small Arsenal Size  'Assured Destruction'	No Recent Deployments  Decoupled	<i>Vulnerable:</i>  China's vulnerability has remained constant due to the size, doctrine, and the readiness of its posture. During this time, China experienced very minimal changes to its nuclear posture and did not grow significantly.

By applying the vulnerability framework to China's nuclear program, it is clear that China's posture stands out as overly minimal and excessively vulnerable when compared to other nations. This means that, from all aspects of the framework, China's nuclear arsenal is vulnerable to a disarming attack. When looking at size and readiness, it is also clear that changes have been made in an attempt to reduce China's vulnerability, but have failed to do so. China's arsenal size has grown over time, but continues to lack the necessary size and sophistication to guarantee a successful second strike. Its readiness has decreased as crises have become less nuclear and more conventional over time. Its doctrine has remained consistent and minimal compared to arsenal size and readiness, but all three sections also failed to produce a strong enough threat to lessen the potential for a nuclear crisis.<sup>155</sup>

Any changes to China's nuclear program's size, readiness, or doctrine would seem to fix vulnerabilities, but they do not lessen China's minimal status and overall mentality that a minimal arsenal is sufficient. As a result, size, doctrine, and readiness on their own are not the main cause for continued vulnerability. Instead, political influence and constraints overlaying these three aspects since 1964 are the root cause of consistent vulnerability.

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<sup>155</sup>Narang, *Nuclear Strategy in the Modern Era : Regional Powers and International Conflict*.



## **Analysis of Ideological and Political Influences on China's Nuclear Vulnerability**

China's nuclear policy did not change between 1964 and 2010. Since then it has only changed slightly under Xi Jinping. Since arsenal size, doctrine, and readiness have remained constant during this time, additional factors must have impacted China's nuclear posture and led to vulnerability. When looking across size, doctrine, and readiness, political and ideological influence stand out as a possible factor. Political constraints in particular have caused vulnerabilities in China's doctrine, size, and ability to launch. Political and ideological constraints refer to the idea that leadership has a strong influence on nuclear posture and this influence leads to changes in posture. Political constraints have played a major role in the official policy and application of China's nuclear posture. For example, Lewis in *Paper Tigers: China's Nuclear Posture* cites "political struggle" and highly ideological thinking as causes for the disparity between China's nuclear technology development and nuclear bureaucracies' development.<sup>156</sup> As a result, political and ideological constraints on size, readiness, and doctrine have exacerbated China's nuclear vulnerability.

This section will look at political constraint from the perspective of size, doctrine, and readiness to establish a link between political constraints at the beginning of China's nuclear program and China's continuous vulnerability. To establish this link, this section looks at statements made by leaders of the PRC and their effect on China's nuclear posture.

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<sup>156</sup> Jeffrey Lewis, *Paper Tigers: China's Nuclear Posture*. (Abingdon, Oxon: Routledge, 2014), 23.

## Doctrine

### *Opposition to Deterrence*

A large part of China's doctrine was affected by the political ideology that deterrence was not a suitable word to describe China's nuclear program. The Mandarin word for deterrence, 威慑 Wei She, can be translated as "to cower by military force," which has a much more aggressive and coercive tones than its English counterpart. Because of this, Chinese leadership did not want to use the term in writing.<sup>157</sup> As a result, strong political ideology pushed the word out of use and the concept of deterrence itself was not embraced or written into doctrine until 1996.

This anti- 'deterrence' mentality can be seen as early as 1956 in Mao's Paper Tiger Speech.<sup>158</sup> In this speech, Mao spoke on the purpose of nuclear weapons and the uselessness of nuclear deterrence. Mao focused on resisting and preventing nuclear coercion by asserting that nuclear weapons are simply 'paper tigers.'<sup>159</sup> This statement, made well before the proliferation of China's nuclear forces, set the ideology surrounding nuclear deterrence. He stressed that China "would not be intimidated by such destructive weapons possessed by China's opponents."<sup>160</sup> Mao's words on deterrence and nuclear weapons were intended to comfort the Chinese public, but the negative nuclear sentiment in this statement put limits on China's nuclear investments and

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<sup>157</sup> Pleco Dictionary, s.v. "威慑 (weishe)," accessed March 18, 2020. See also: Eric Heginbotham, et. al., *China's Evolving Nuclear Deterrent: Major Drivers and Issues for the United States*, (Santa Monica California: RAND Corporation, 2017), 24.

<sup>158</sup> Fravel, *Active Defense: China's Military Strategy Since 1949*. See also: "Statement of the Government of the People's Republic of China," October 16, 1964, History and Public Policy Program Digital Archive, PRC FMA 105-01262-01, 22-26. Obtained by Nicola Leveringhaus.

<sup>159</sup> Ibid. See also: Fravel and Medeiros, "China's Search for Assured Retaliation: The Evolution of Chinese Nuclear Strategy and Force Structure."

<sup>160</sup> Fravel, *Active Defense: China's Military Strategy Since 1949*.

growth.<sup>161</sup> This negative sentiment can also be seen in the fact that the Second Artillery did not publish its first document until 1985.<sup>162</sup>

This inherent opposition to deterrence is a vulnerable foundation to build a nuclear doctrine upon because it prematurely limits the value of nuclear weapons relative to conventional weapons. Mao's statements themselves imply that nuclear deterrence is not to be feared due to inferiority to China's conventional status, and as an extension imply nuclear weapons are not useful. As stated in sections prior, adding value and investing in nuclear size, structure, and preparation is critical in building an invulnerable arsenal since these factors have added to China's minimal and vulnerable state. Mao's statement argues that these investments are not necessary to build nuclear warheads and as a result China's nuclear program is devalued before it even begins.

Well after Mao's death, in 1983, Deng Xiaoping began to reintroduce the idea of deterrence. He stated that China has consistently wanted to force the superpowers not to dare to use nuclear weapons and that to have "even only a few weapons after all is a kind of resistance force (□ □ □ □ Zhiyue Liliang)." <sup>163</sup> 'Resistance force' serves as a placeholder for deterrence, and acts as a bridge to reintroduce deterrence to China's nuclear doctrine. Here, Deng begins to lean into the idea of deterrence, but only slightly, since an anti-deterrence mentality was already well established. After Deng's statement, the concept of a minimal 'resistance force' became ingrained in the doctrine of China's nuclear posture. For example, a few years later in 1985, the Second Artillery published its first edition of the *Science of the Second Artillery Campaign* which speaks

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<sup>161</sup> Fravel, *Active Defense: China's Military Strategy Since 1949*.

<sup>162</sup> Ibid.

<sup>163</sup> Fravel and Medeiros, "China's Search for Assured Retaliation: The Evolution of Chinese Nuclear Strategy and Force Structure," 63.

about the Second Artillery's policies of minimal deterrence. It stated that "if a great power nuclear war were to start, it was unclear whether China would strike."<sup>164</sup> At this point, the ban on using the term 'deterrence' was not quite lifted, but the Second Artillery was able to address the concept in part due to the more relaxed policies of Deng Xiaoping.<sup>165</sup> As a result, this period of time saw a small reduction in China's vulnerability as it is able to better express and formulate a doctrine with the concept of deterrence. This attention and leniency with the term deterrence continued into the mid 1980s. China began to slowly allow the term, and therefore the concept, to be used in its posture.

By 1987, China began using the term 'deterrence' outright. *Zhanglue Xue*, a book by the PLA on military strategy, began to change the policy perception of deterrence further by stating that in peacetime "the strategic task is to play a deterrent role, restraining the enemy from launching a nuclear weapon against us."<sup>166</sup> Here, the use of deterrence is public and more established than in previous iterations, and, as a result, the policy put forward shows a more intact concept of nuclear deterrence which will better protect China's nuclear weapons. This change to doctrine embraces the idea of deterrence by stating that China will "prevent" (防止 e zhi) escalation by another state.

Today, China is much more embracing of nuclear deterrence, even acknowledging that nuclear deterrence is stronger than conventional deterrence. But as China attempts to grow its nuclear forces, the state is moving away from assured retaliation and towards a more aggressive

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<sup>164</sup> Fravel, *Active Defense: China's Military Strategy Since 1949*.

<sup>165</sup> Fravel and Medeiros, "China's Search for Assured Retaliation: The Evolution of Chinese Nuclear Strategy and Force Structure," 72.

<sup>166</sup> Ibid, 69.

assured destruction posture.<sup>167</sup> With the creation of the PLA Strategic Support Force (PLASSF), China's definition and integration of deterrence is becoming more broad and encompasses both space and cyberspace.<sup>168</sup> This impacts vulnerability because China will need to change doctrine to reflect new ideas and, during that time, China's command and control infrastructure may see breaks between what doctrine puts forward and what is actually implemented.

Overall, China's opposition to deterrence as a term lead to the opposition and poor execution of deterrence as a concept. This impacted China's vulnerability by affecting how China constructs its doctrine and implements command and control bureaucracies. Since anti-deterrence sentiment was established before China's proliferation, it is hard-wired into its doctrine. As a result, China's doctrine will remain vulnerable until all anti-deterrence sentiment is removed from the ideology that informs the doctrine.

### *Command and Control*

China's political constraints also led to flaws in its command and control doctrine. Specifically, the formation of the Second Artillery and other PLA nuclear structures were heavily influenced by political ideology and constraints. For example, China's research on nuclear strategy and doctrine "did not begin in earnest until the mid-1980s," more than a decade after its proliferation.<sup>169</sup> This delay in developing the necessary bureaucracies for a nuclear structure was the result of political struggle among factions, including a struggle for the control of the armed

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<sup>167</sup> Heginbotham, et. al., *China's Evolving Nuclear Deterrent: Major Drivers and Issues for the United States*, 22.

<sup>168</sup> Heginbotham, et. al., *China's Evolving Nuclear Deterrent: Major Drivers and Issues for the United States*, 22.

<sup>169</sup> Fravel and Medeiros, "China's Search for Assured Retaliation: The Evolution of Chinese Nuclear Strategy and Force Structure," 56.

forces.<sup>170</sup> This prevented “any efforts to develop a plausible nuclear strategy or operational concepts.”<sup>171</sup> Not having command and control structures in place left China in a vulnerable situation in the event of a threat or attack because it would not be able to respond in an organized, cohesive, or effective way.

The Second Artillery did not begin to draft operational doctrine until the late 1970s.<sup>172</sup> This was coupled with a “lack of professional military education and isolation of China’s nuclear strategists [which] slowed the development of strategy.”<sup>173</sup> This foundational lack of investment in China’s nuclear command and control structures was later emphasized in 1990 and 1991 when Jiang Zemin stated that China would maintain “a necessary deterrent capability,” but would focus on conventional, not nuclear, forces.<sup>174</sup> In this statement we see both the push against nuclear weapons and the lack of definition in command and control structures that China experienced. Furthermore, this statement illustrates the attention and funding priority for conventional weapons over nuclear ones. Because China was underinvesting in its nuclear forces, command and control structures were not able to develop, which left China vulnerable to miscommunications and interservice competition.

In 2016, the Second Artillery was renamed the PLARF by Xi Jinping and became its own branch of the PLA.<sup>175</sup> When speaking on the also new PLASSF, Xi stated that the branch is a “new type of combat force.”<sup>176</sup> He asserted that this will improve integration of the PLA support

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<sup>170</sup> Lewis, *Paper Tigers: China's Nuclear Posture*, 23.

<sup>171</sup> Lewis, *Paper Tigers: China's Nuclear Posture*, 23.

<sup>172</sup> Fravel and Medeiros, “China’s Search for Assured Retaliation: The Evolution of Chinese Nuclear Strategy and Force Structure,” 86.

<sup>173</sup> Ibid, 67.

<sup>174</sup> Ibid, 65.

<sup>175</sup> Zhao Lei and Li Xiaokun, “3 New Military Branches Created in Key PLA Reform.” *China Daily*, 2 January 2016.

<sup>176</sup> Lei and Xiaokun, “3 New Military Branches Created in Key PLA Reform.” *China Daily*, 2 January 2016.

systems. This is the first instance of new integration and divergent thinking from Mao's original command and control structures. However, this integration is still undefined and has not resulted in changes to policy or strategy. As a result, this change brings more attention to China's nuclear forces, but does not yet address underlying vulnerabilities in command and control—China is still vulnerable in this aspect.

### Size

The political decision to pursue nuclear weapons only to the extent that China had reliable resources for determined the foundational size of its nuclear forces. The decision to move forward with the nuclear program was held off until China secured a source of uranium, which was discovered in 1955.<sup>177</sup> Similar to how Mao's paper tigers speech influenced the foundation of China's doctrine, the effects of this decision are long lasting. Since China has maintained slow growth in the size of its arsenal and a relatively minimal nuclear force, it has remained vulnerable to a first strike since 1964. In 1967, Mao expressed China's desires for a small arsenal when he stated, "when I have six bombs, no one can bomb my cities."<sup>178</sup> The impacts of this statement can be seen in the early years of China's program when less than 100 warheads were developed.<sup>179</sup> The small size of the arsenal was therefore a decision made by the higher-ups of China's political leadership.<sup>180</sup> Their statements and decisions in the late 1960s established the ideology of China's nuclear posture regarding size. Small arsenals are more vulnerable to an attack from others and,

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<sup>177</sup> Fravel, *Active Defense: China's Military Strategy Since 1949*.

<sup>178</sup> Fravel and Medeiros, "China's Search for Assured Retaliation: The Evolution of Chinese Nuclear Strategy and Force Structure," 65.

<sup>179</sup> Roser and Nagdy, "Nuclear Weapons."

<sup>180</sup> Johnston, "China's New 'Old Thinking': The Concept of Limited Deterrence."

while Mao's statements may not have intended to have long lasting effects, they solidified the idea that small arsenals are preferable.

In 1970, Zhou Enlai stated that China does not need "many weapons."<sup>181</sup> This political thought further engrained the idea that a minimal arsenal is all that China needed. However, it ignored the reality that having few nuclear weapons leaves China vulnerable to attack or coercion from another nuclear armed state.<sup>182</sup> Zhou attempted to mitigate this by continuing "[China] will build a certain number of a certain quality and a certain variety."<sup>183</sup> While this addendum adds some intention for possibly building up arms, its ambiguity suggests that China was less certain about what kind of arsenal it wanted. This ambiguity, combined with a minimum arsenal size, further exaggerated China's vulnerability because it reinforced Mao's already existing ideology about the superiority of small arsenal sizes at the beginning of the 1970s.

Later, in 1978, Deng Xiaoping distilled this idea even further with the public statement that China wants "few but capable (少而精 shao er jing)" weapons.<sup>184</sup> This statement coincided with the Second Artillery's second and third Operational Application Research Meetings. Since Deng's statement and the meetings occurred around the same time, one could assume that he expressed the same views in the meetings as he did in his statement. He later elaborated on his public statements by explaining that China's "weapons should be updated (更新 gengxin)" and that they should still be "few but capable. Few meaning numbers and capable should increase with each generation."

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<sup>181</sup> Fravel and Medeiros, "China's Search for Assured Retaliation: The Evolution of Chinese Nuclear Strategy and Force Structure," 64.

<sup>182</sup> Ibid.

<sup>183</sup> Ibid.

<sup>184</sup> Ibid.



Here it is clear that numerical vulnerability and nuclear capability were concerns of China's, but maybe not urgent ones. Deng's ambiguous statements did not allow for expeditious growth in arsenal size.<sup>185</sup> In 1978, China had only 190 nuclear weapons, which is still a small amount that could be destroyed in a first strike.<sup>186</sup> In 1981, General Zhang, who was an army and corps level commander in the PLA, stated that China's nuclear posture was not concerned with "numerical comparisons with the enemy."<sup>187</sup> His statement shows how the minimal ideology that Mao and Deng expressed in their statements above were still influencing military leaders at the end of the decade.

The political ideology of a small lightweight force resurfaced again in the period of 1992-1996. During this time, China had a testing sequence to develop new weapons and, in 1996, China tested its last weapon before signing the CTBT.<sup>188</sup> The decision to sign the CTBT is was very interesting for China to make at this time because, in years prior, it had disregarded the idea of international intervention in nuclear spaces.<sup>189</sup> However, China's last testing sequence, which focused on miniaturization, showed that it had shifted away from a development mentality to a maintenance mentality.<sup>190</sup> This testing developed small, light-weight warheads capable of travelling long distances which made their weapons reliable to be able to give up testing altogether.<sup>191</sup> Relinquishing the right to test left China vulnerable because it was no longer able to test major advancements in warhead technology. This mentality was later cited in a 2006 white

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<sup>185</sup> Hans M. Kristensen, "DIA Estimates For Chinese Nuclear Warheads," Federation of American Scientists, 31 May 2019.

<sup>186</sup> Roser and Nagdy, "Nuclear Weapons."

<sup>187</sup> Fravel and Medeiros, "China's Search for Assured Retaliation: The Evolution of Chinese Nuclear Strategy and Force Structure," 64.

<sup>188</sup> Library of Congress Congressional, Research Service, *Chinese Nuclear Testing and Warhead Development*.

<sup>189</sup> Seth Faison, "China Sets Off Nuclear Test, Then Announces Moratorium," *New York Times*, 30 July 1996.

<sup>190</sup> Library of Congress Congressional, Research Service, *Chinese Nuclear Testing and Warhead Development*.

<sup>191</sup> Ibid.

paper, “China’s National Defense,” which was the first to ever articulate China’s official nuclear strategy publicly.<sup>192</sup> Signing the CTBT fundamentally changed how China could interact with its nuclear weapons.

### Readiness

China declared its no first use policy on the day of its first nuclear detonation in October 1964.<sup>193</sup> In the Chinese context, no first use has been seen as “ideological statement about the nature of nuclear weapons.”<sup>194</sup> Since this declaration, China has had to maintain a slower warning to launch time. Since no first use requires a first strike on China to trigger a response, much of China’s nuclear infrastructure has been developed for the purpose of waiting until after a strike to launch.<sup>195</sup> In the time it takes from warning to launch, a first strike may wipe out the country’s nuclear weapons.

### Implications

Political and ideological constraints have exacerbated China’s nuclear vulnerability. They have done so by affecting the country’s doctrine, arsenal size, and readiness. Specifically, political

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<sup>192</sup> Fravel and Medeiros, “China’s Search for Assured Retaliation: The Evolution of Chinese Nuclear Strategy and Force Structure,” 77.

<sup>193</sup> “Statement of the Government of the People’s Republic of China,” October 16, 1964, History and Public Policy Program Digital Archive, PRC FMA 105-01262-01, 22-26. Obtained by Nicola Leveringhaus.

<sup>194</sup> Lewis, *Paper Tigers: China’s Nuclear Posture*, 30.

<sup>195</sup> Li Bin, “China and nuclear transparency,” in *Transparency in Nuclear Warheads and Materials: The Political and Technical Dimensions*, ed. by Nicholas Zarimpas, (New York: Oxford University Press, 2009), 51-52.

constraints have stunted the development of China's nuclear posture by slowing down changes and improvements that would make its weapons more secure. For those like the United States who are trying to understand China's nuclear vulnerability, this argument states that the key factor to remember is consistency. Because the political ideology established by China's leaders at the beginning of its nuclear program has only experienced minimal changes, China's nuclear posture has vulnerability ingrained in it. Since its program has remained vulnerable for so long, and vulnerability seems to be written into its posture, it is unlikely that China will be able to quickly and effectively switch to a maximum or even medium posture. If it could do so, it would have a larger arsenal with a quicker response time governed by a more significant command and control structure. To better understand China's nuclear program, understanding the political and ideological thought of its leadership throughout the foundational two decades will provide insight into areas of weakness and future development.

However, it is important to note that just because China has remained vulnerable due to political constraints since the 1960s, that does not mean that China will not attempt to rapidly shift to a less vulnerable posture in the future. For example, Xi Jinping's stepping up of the PLARF can be viewed as a first step to changing the political ideology around nuclear weapons and mending the country's nuclear weaknesses. In 2012, Xi also "broke new ground in Chinese nuclear weapon policy" by speaking publicly on China's nuclear forces for the first time.<sup>196</sup> This, combined with his more open use of the term 'deterrence,' marks the beginning of a change in the country's nuclear policy. Xi will be the next leader whose political ideology will govern China's nuclear

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<sup>196</sup> Lei and Xiaokun, "3 New Military Branches Created in Key PLA Reform." China Daily, 2 January 2016.

program and looking at his actions and statements will help predict any long term changes to China's nuclear vulnerability.

## Conclusion

Since 1964, China's nuclear arsenal has remained vulnerable, especially to adversaries like the United States. This vulnerability can be understood through the definitions and functions of deterrence, vulnerability, size, readiness, and doctrine. By analyzing changes in China's nuclear program over time, it becomes apparent that this vulnerability is the result of political constraints impairing the state's ability to optimize size, doctrine, and readiness. These political constraints come in the form of internal ideology and statements by PLA leaders and China's heads of state. This manifests itself in the country's maintenance of a small arsenal, a static doctrine, and the limited role of nuclear weapons in the PLARF.

The overall vulnerability of China is critical to understanding its relative international nuclear vulnerability to other countries. Many states and analysts believe the reason that China is vulnerable and has remained vulnerable is because it made the choice to maintain a small sized arsenal. This is a simplistic view. China is vulnerable in many ways other than the size of its arsenal, such as in its doctrine and readiness. These vulnerabilities stem from ideologically informed decisions made by China's leaders. This reveals that China's vulnerability is rooted in political constraint, not the size or structure of its arsenal. In terms of policy, this changes the way that states should think of the Chinese arsenal's vulnerability, since they can no longer look at the arsenal itself for the sources and trends of vulnerability. In addition to impacting policy making, understanding this perspective on Chinese vulnerability may shift how academics categorize the country in terms of its doctrine.

It could be argued that China is simply vulnerable because it has a small arsenal and it has remained vulnerable because it has maintained it at that size. However, even though China has maintained a small arsenal, the decision to do so was and continues to be a political decision

informed by ideology. In addition, China's small arsenal size is not its only source of vulnerability. They also suffer from a weak doctrine and poor readiness, which are also contributing factors to the vulnerability of a state. Others might argue that China suffers from nuclear vulnerability due to poor organization and bureaucratic structures. In reality, political constraints have led to failed starts and poor foundations in their nuclear bureaucracy. Even though the above arguments are partially correct, neither of them address the root cause of China's vulnerability. They both address an issue that is the result of political ideology guiding nuclear decision making, which is the true root cause.

Another and distinct argument, as noted in the literature review, is that many believe China is not vulnerable. While vulnerability is measured relative to other nations and China may appear less vulnerable than others, vulnerability can be measured absolutely when broken down into discrete aspects. This paper determined China's nuclear weapons to be vulnerable after looking at the country's doctrine, readiness, and the size of its arsenal since 1964. Each of these aspects had flaws and shortcomings that, when combined, heightened the level of vulnerability China experiences.

As stated at the end of the previous section, Xi Jinping is making changes to the underlying foundations of China's nuclear program. Moving forward, to better understand China's vulnerability and its fluctuations over time, looking into Xi Jinping's statements and public remarks specifically will provide great insight into the future vulnerability of China's arsenal. To better understand the nuances of how political decision making impacts nuclear vulnerability, the past statements and writings of Chinese leadership should be analyzed in more granular detail than they are here. This will reveal how political thought impacts vulnerability on a more micro scale.

Regardless, when analyzing China's stockpile and assessing its vulnerability, it is important to keep in mind political influences—especially those at the foundation of China's nuclear system.

Understanding how a nuclear armed nation like China modernizes its existing nuclear posture is important for understanding its capabilities relative to others. It also helps prevent nuclear conflict or flashpoints from developing. This is because a state's vulnerability can be perceived in a way that could egg on another state or create a false sense of security for a rival. These misunderstandings may lead to miscalculation. Furthermore, despite China's economic, political, and technological rise, its nuclear policy has remained relatively stagnant because it remained rooted in the political ideologies of the 1960s and 1970s. Understanding how political constraints have influenced nuclear posture will give states, policymakers, and academics better understanding of political ideas will influence China's vulnerability moving forward.

## Bibliography

- Acton, James M. "Escalation through Entanglement: How the Vulnerability of Command-and-Control Systems Raises the Risks of an Inadvertent Nuclear War." *International Security* 43, no. 1 (2018): 56-99.
- Andersen, Nicholas D, Alexandre Debs, and Nuno P Monteiro. "General Nuclear Compellence." *Strategic Studies Quarterly* 13, no. 3 (Fall 2019): 93-121.
- Bin, Li. "China and nuclear transparency." In *Transparency in Nuclear Warheads and Materials: The Political and Technical Dimensions*. Edited by Nicholas Zarimpas. New York: Oxford University Press, 2009: 50-57.  
<https://www.sipri.org/sites/default/files/files/books/SIPRI03Zarimpas/SIPRI03Zarimpas.pdf#page=70>.
- Cunningham, Fiona and Taylor Fravel. "Why China Won't Abandon Its Nuclear Strategy of Assured Retaliation." Harvard Kennedy School Belfer Center. December 2015.  
<https://www.belfercenter.org/publication/why-china-wont-abandon-its-nuclear-strategy-assured-retaliation>.
- Davis, Paul. "Deterrence, Influence, Cyber Attack, and Cyberwar." *New York University Journal of International Law and Politics* 47, no. 2 (2015): 327-355.
- Faison, Seth. "China Sets Off Nuclear Test, Then Announces Moratorium." *New York Times*. 30 July 1996. <https://www.nytimes.com/1996/07/30/world/china-sets-off-nuclear-test-then-announces-moratorium.html>.
- Fingar, Thomas and Fan Jishe. "Ties that Bind: Strategic Stability in the U.S.-China Relationship." *The Washington Quarterly* 36, no. 4 (2013): 125-138. doi:10.1080/0163660X.2013.861718.
- Fravel, M. T. *Active Defense : China's Military Strategy Since 1949*. Princeton, NJ: Princeton University Press, 2019.
- Fravel, M. T. and Evan S. Medeiros. "China's Search for Assured Retaliation: The Evolution of Chinese Nuclear Strategy and Force Structure." *International Security* 35, no. 2 (2010): 48-87.
- Gill, Bates and James Mulvenon. "China's Nuclear Agenda." Brookings. 7 September 2001.  
<https://www.brookings.edu/opinions/chinas-nuclear-agenda/>.
- Heginbotham, Eric, Michael S. Chase, Jacob L. Heim, Bonny Lin, Mark R. Cozad, Lyle J. Morris, Christopher P. Twomey, Forrest E. Morgan, Michael Nixon, Cristina L. Garafola, Samuel K. Berkowitz. *China's Evolving Nuclear Deterrent: Major Drivers and Issues for the United States*. Santa Monica, California: RAND Corporation, 2017.  
[https://www.rand.org/content/dam/rand/pubs/research\\_reports/RR1600/RR1628/RAND\\_RR1628.pdf](https://www.rand.org/content/dam/rand/pubs/research_reports/RR1600/RR1628/RAND_RR1628.pdf).



- “Intelligence Note from Thomas L. Hughes to the Secretary, 'Will Communist China Assist Other Nations in Acquiring Nuclear Weapons?,'” April 23, 1965, History and Public Policy Program Digital Archive, RG 59, Entry UD-UP 141, Bureau of Intelligence and Research, Reports Coordination and Review Staff, Intelligence Reports, 1961, 1963-67, box 1, Intelligence Notes (1965) April to May 3.  
<http://digitalarchive.wilsoncenter.org/document/134056>.
- “Intelligence Note 13 from Thomas L. Hughes to the Secretary, 'The Chinese Nuclear Threat to NonCommunist Asia,'” January 11, 1967, History and Public Policy Program Digital Archive, RG 59, Entry UD-UP 141, Bureau of Intelligence and Research, Reports Coordination and Review Staff, Intelligence Reports, 1961, 1963-67, box 7, Chron/Jan. 1967 INs <http://digitalarchive.wilsoncenter.org/document/134065>.
- Jervis, Robert. "The Nuclear Revolution and the Common Defense." *Political Science Quarterly* 101 (1986): 689.
- Johnston, Alastair Iain. "China's New "Old Thinking": The Concept of Limited Deterrence." *International Security* 20, no. 3 (1995): 5-42. doi:10.2307/2539138.
- Kristensen, Hans M., and Robert S. Norris. "Chinese Nuclear Forces, 2015." *Bulletin of the Atomic Scientists* 71, no. 4 (2015): 77-84. <https://doi.org/10.1177%2F0096340215591247>
- Kristensen, Hans M. “DIA Estimates For Chinese Nuclear Warheads.” Federation of American Scientists. 31 May 2019. <https://fas.org/blogs/security/2019/05/chinese-nuclear-stockpile/>.
- Kulacki, Gregory. “Is Xi Jinping Changing Chinese Nuclear Weapons Policy?” Union of Concerned Scientists. 8 December 2012. <https://allthingsnuclear.org/gkulacki/is-xi-jinping-changing-chinese-nuclear-weapons-policy>.
- Lei, Zhao, Li Xiaokun. “3 New Military Branches Created in Key PLA Reform” China Daily. 2 January 2016. [https://www.chinadailyasia.com/nation/2016-01/02/content\\_15366591.html](https://www.chinadailyasia.com/nation/2016-01/02/content_15366591.html)
- “Letter from Zhou Enlai to Mao Zedong on the Nuclear Explosion,” September 21, 1964, History and Public Policy Program Digital Archive, Dang de wenxian (Party Historical Documents), no. 3 (1994): 20. Translated by Neil Silver.  
<https://digitalarchive.wilsoncenter.org/document/114356>.
- Lewis, Jeffrey. *Paper Tigers : China's Nuclear Posture*. Abingdon, United Kingdom: Routledge, 2014.
- Library of Congress Congressional, Research Service. *Chinese Nuclear Testing and Warhead Development*. S.I: s.n. 1997.
- Long, Austin G. *Deterrence : From Cold War to Long War : Lessons from Six Decades of Rand Deterrence Research*. Santa Monica, CA: RAND Corporation, 2008.

- Narang, Vipin. *Nuclear Strategy in the Modern Era : Regional Powers and International Conflict*. Princeton, NJ : Princeton University Press, 2014.
- Narang, Vipin. "Strategies of Nuclear Proliferation: How States Pursue the Bomb." *International Security* 41, no. 3 (2017): 110-150. doi:10.1162/ISEC\_a\_00268.
- Narang, Vipin. "What does it Take to Deter? Regional Power Nuclear Postures and International Conflict." *Journal of Conflict Resolution* 57, no. 3 (2013): 478-508. doi:10.1177/0022002712448909.
- Nuclear Threat Initiative. "China: Nuclear." Last updated April, 2015 Nuclear Threat Initiative. <https://www.nti.org/learn/countries/china/nuclear/>.
- O'Neill, Mark. "Nixon intervention saved China from Soviet nuclear attack." South China Morning Post. 12 May 2010. <https://www.scmp.com/article/714064/nixon-intervention-saved-china-soviet-nuclear-attack>.
- Pleco Dictionary, s.v. "□ □ (ezhi)" accessed March 20, 2020.
- Pleco Dictionary, s.v. "□ 悞 (weishe)" accessed March 18, 2020.
- Roser, Max and Mohamed Nagdy. "Nuclear Weapons." Our World in Data. 2020. <https://ourworldindata.org/nuclear-weapons>.
- "Statement of the Government of the People's Republic of China," October 16, 1964, History and Public Policy Program Digital Archive, PRC FMA 105-01262-01, 22-26. Obtained by Nicola Leveringhaus. <https://digitalarchive.wilsoncenter.org/document/134359>.
- Talmadge, Caitlin. "Beijing's Nuclear Option." *Foreign Affairs* 97, no. 6 (November/December 2018): 44-50. <https://www.foreignaffairs.com/articles/china/2018-10-15/beijings-nuclear-option>.
- Talmadge, Caitlin. "China and Nuclear Weapons." Brookings. September 2019. [https://www.brookings.edu/wp-content/uploads/2019/09/FP\\_20190930\\_china\\_nuclear\\_weapons\\_talmadge-1.pdf](https://www.brookings.edu/wp-content/uploads/2019/09/FP_20190930_china_nuclear_weapons_talmadge-1.pdf).
- Talmadge, Caitlin. "Would China Go Nuclear? Assessing the Risk of Chinese Nuclear Escalation in a Conventional War with the United States." *International Security* 41, no. 4 (2017): 50-92. doi:10.1162/ISEC\_a\_00274.
- Yao, Yunzhu. "China's Perspective on Nuclear Deterrence." *Air & Space Power Journal* 24, no. 1 (2010): 27-30.

Zhang, Baohui. "American Nuclear Primacy Or Mutually Assured Destruction: The Future of the U.S.-China Strategic Balance of Power." In *Challenges to Chinese Foreign Policy*. Edited by Yufan Hao, C. X. George Wei, and Lowell Dittmer. 1st ed: 71-84. University Press of Kentucky, 2009. <http://www.jstor.org.ezproxy.bu.edu/stable/j.ctt130jk2t.7>.

Zhang, Baohui. "US Missile Defence and China's Nuclear Posture: Changing Dynamics of an Offence—defence Arms Race." *International Affairs (Royal Institute of International Affairs 1944-)* 87, no. 3(2011): 555-569. doi:10.1111/j.1468-2346.2011.00990.x.