

The Fallacy of Nuclear Primacy

Bruce G. Blair and Chen Yali

In their disturbing analysis of the growing strength of U.S. nuclear forces, professors Keir A. Lieber and Daryl G. Press predict a deterioration of the global security environment in spite of this seemingly positive trend.¹ By their calculations, the American nuclear juggernaut now confers absolute nuclear superiority over Russia and China as well as lesser nuclear powers. The imbalance, they contend, has become so lop-sided that the United States today could mount a surprise nuclear attack that would completely destroy Russian or Chinese nuclear retaliatory forces – a first-strike capacity that dramatically overturns a long history of nuclear stalemate. But in an ironic twist of fate, the weakness of America’s adversaries only undermines U.S. and global security. The reason is that American nuclear supremacy removes the root source of

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stability from the nuclear equation: mutual vulnerability. The cornerstone of stable deterrence and political caution during the Cold War – mutual assured destruction (MAD), has crumbled. The professors anticipate a consequent fraying of great power relations, and an increase in the likelihood of nuclear war.

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Primacy is a double-edged sword that may confer advantage and court disaster at the same time. In some circumstances the United States may use it to advantage, gaining coercive leverage over its adversaries in a confrontation (how much, if any, leverage is conferred by nuclear supremacy is a key open question in the professors' minds). In

others, the coercive impulse may backfire; the risks may outweigh the benefits if American pressure triggers reactive nuclear alerting and escalation in a crisis – increasing the danger of accidental, unauthorized, or hastily ordered nuclear attacks. Overwhelming U.S. nuclear superiority, whether intentionally exploited or not, will also exert pressure on America's nuclear rivals to invest heavily in modernizing their forces in order to reduce their vulnerability and restore a semblance of nuclear balance. U.S. superiority and its efforts to preserve it in the face of countervailing Russian and Chinese nuclear modernization thus threaten to ignite a nuclear arms race, one that could last for a very long time in light of the wide and widening American lead. Given the decrepit state of the Russian strategic forces and the small size and acute vulnerability of the Chinese strategic arsenal, and the plethora of ongoing U.S. improvements to its arsenal, the professors estimate that a decisive U.S. advantage could endure for a decade or more. The strategic capabilities 'gap' is too wide to be closed anytime soon.

The professors' thesis approaches the height of controversy when it suggests that the United States has deliberately sought the capability to disarm its nuclear rivals and has long designed its strategic arsenal for a nuclear first-strike against Russia and China. Citing the steady improvement in U.S. strategic weapons over decades of modernization – particularly the striking gains in missile accuracy and stealth bomber technology, combined with intensive efforts to track Soviet strategic submarines, the professors conclude that the United States has long been deliberately pursuing a first-strike strategy.

Their thesis reaches the zenith of its provocation when it suggests that nuclear primacy will embolden the United States to press its nuclear advantage in possibly unthinkable ways. U.S. leaders might try to exploit its nuclear superiority not only by trying to extract concessions during a crisis, but also by actually launching a cold-blooded nuclear attack against its nuclear rival in the midst of an intense crisis. The professors discount significantly the power of the nuclear taboo to restrain U.S. leaders from crossing the fateful threshold. If crisis circumstances grow dire enough, the temptation to try to disarm their nuclear adversaries through a nuclear first-strike may be too strong to resist, they argue.

In projecting a turbulent decade ahead in relations among the major nuclear rivals, the professors anticipate specifically that nuclear dynamics will grow more dangerous as weak adversaries take desperate steps to reverse their growing vulnerability and as the strong power weighs newfound opportunities to exploit its advantage. The weak may be driven to preemption for survival, and the strong tempted to initiate a preventive nuclear strike. The professors predict escalatory updrafts in both peacetime and crisis interactions that are at best partially moderated by the nuclear taboo, the end of the Cold War, and risk aversion. All sides may be willing to take cosmic risks. The United States, now endowed with ostensible first-strike capacity, will not be automatically dissuaded from nuclear aggression by recognizing that there would be no guarantee of complete success in disarming the opposing side. The professors find no supporting historical evidence, and ample disconfirming evidence, for the oft-claimed dampening effect of so-called existential deterrence – the notion that the mere possibility, or even just the conceivability, of retaliation by an inferior opponent would serve to deter the superior side. The irreducible risk that a first strike might fail in unexpected ways and result in retaliation that inflicts severe damage to the United States is not, in the professors' view, sufficient cause by itself to inhibit U.S. leaders from rolling the dice.

Pentagon's Rebuttal

The professors' arguments elicited an avalanche of criticism from wide-ranging quarters including the Pentagon.² The assistant defense secretary for international security policy took particular aim at the contention that the United States is pursuing a first-strike strategy.³ Calling this contention "an erroneous inference," the official cited recent trends toward major strategic

forces reductions as inconsistent with such a strategy. He asserted, moreover, that presidential statements and authoritative posture reviews endorse the traditional policy of second-strike deterrence. Noting a longstanding policy of not relying on the ability to conduct a nuclear first strike to ensure the survival of the United States, this official claims that the U.S. force posture is designed only to ensure that U.S. forces could retaliate to an enemy attack with such devastating force that any aggressor could not stand to gain. In short, the Pentagon invoked the classic formulation of deterrence based on massive retaliation as the bedrock of past and present American nuclear policy.

In a similar vein, another fierce critic of the professors' first-strike thesis labeled it "a gross mischaracterization of U.S. policy."⁴ This critic – a defense intellectual and former senior defense official in the Bush administration, and a defense contractor, tried to debunk the first-strike claim largely by citing formerly secret documents and authoritative public statements that indicate the United States has long relinquished any aspiration of first-strike supremacy. Far from harboring such ambition today, the architects of U.S. nuclear policy abandoned the notion of winning a nuclear war and adopted the principle of mutual deterrence by the early- to mid-1960s, and proceeded to design a retaliatory strategic posture accordingly. The reduced size and much of the reconfiguration of the U.S. strategic arsenal over the past decade – particularly the retirement of the silo-busting Peacekeeper missiles – as well as the virtual absence of active and passive defenses for protecting the United States from enemy nuclear attacks, point to a conscious U.S. rejection of a first-strike war-winning strategy.

Professors' Rejoinder

The professors' rejoinder to these critics emphasizes the increasing lethality of U.S. strategic forces despite their reduced numbers.⁵ Upgrades to the U.S. arsenal have resulted in a stunning increase in its counterforce deadliness beyond anything necessary to maintain simple deterrence, suggesting to the professors a strong U.S. desire for nuclear primacy and an intentional effort to achieve it throughout the Cold War period and to this day. Only nuclear primacy would justify the extensive upgrades to the U.S. capability for attacking and destroying Russia's arsenal, they believe. Furthermore, recently declassified documents provide what constitutes, in the professors' judgment, overwhelming evidence of preemptive war planning as late as 1969, including

a number of explicitly preemptive options that war planners even contemplated might be exercised in a bolt-from-the-blue surprise attack against the Soviet Union. They believe that further declassification of documents will reveal a continuation of this preemptive thinking by Pentagon strategists in the 1970s and 1980s, and even later as it appears to them that the United States has never abandoned plans for preemptive nuclear war.

First-Strike Intentions

Both the professors and their critics failed to adduce some key points that would have illuminated the question of America's first-strike intentions and plans. One key to resolving their disagreement over true intentions concerns the high level of destruction that U.S. strategic forces were required to inflict on Soviet targets in wartime. Throughout the Cold War and later, the Pentagon architects of U.S. nuclear strategy instructed U.S. strategic commanders to ensure that U.S. forces could destroy no less than 70 to 90 percent of the Soviet targets in each of four categories – nuclear forces, conventional forces, war-supporting industry, and leadership.⁶ The normal peacetime and crisis alert postures of the U.S. arsenal were thus configured to permit the rapid destruction of a quite large portion of the Soviet arsenal. U.S. nuclear planning strove to meet an average of 80 percent so-called 'damage expectancy', sometimes resulting in the assigning of dozens of U.S. nuclear weapons to strike the same target to ensure its destruction. For example, as recently as 1991 the U.S. strategic war plan aimed 69 nuclear warheads at the Pushkino battle management radar north of Moscow, which controlled the anti-ballistic missile interceptors protecting the city as well as the radar itself, in order to meet the high 'damage expectancy' requirement against this single target that U.S. planners credited with high blast resistance and active, effective self-defense using its own interceptors.⁷

Holding at risk such a high fraction of the Soviet target base is quite aggressive and from a certain angle could appear to approach the 100 percent destruction that a committed first-strike policy would seek. And if Soviet (or Russian) forces that normally enjoyed a high degree of invulnerability because of their dispersion and mobility fell into disrepair and became confined to their home bases and ports where they became vulnerable to sudden attack, then the United States could approach 100 percent 'damage expectancy' effortlessly. A lack of Russian diligence in operational terms could by default

boost U.S. attack capabilities into the first-strike league. But this was not the original intent of the U.S. planners. Regarding a first-strike capability as beyond realistic aspiration, they generally set their sights lower than 100 percent. And generally the level of damage expectancy that U.S. forces could realistically achieve was well below 100 percent, leaving Russia with at least a small survivable force capable of inflicting unacceptable damage to the United States. Whether or not the current Russian force poses such a minimal deterrent threat to the United States, or is acutely vulnerable to a disarming

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U.S. first strike today, the historical record strongly indicates that the United States has not consciously pursued a first-strike strategy as an act of deliberate national policy.

Future history is of course still being written, and we may yet witness the United States embarking on a new path with absolute nuclear superiority over Russia (and

China) as its goal. But few signs indicate an American quest for nuclear primacy vis-à-vis Russia or China. By contrast, there are ample indications that the United States seeks nuclear superiority over many other states and actors, including Iran, North Korea, and other potential proliferant states and non-state actors including terrorist organizations. Establishing and maintaining a nuclear first strike capability against these states and groups may reasonably be construed to be an aim of current U.S. national security policy.

Preemption versus First-Strike

Both the professors and their critics also muddy the waters by often conflating preemption and first strike. Thus the debate at times revolves around whether or when the United States added or removed preemptive options to or from its nuclear war plan, as though their presence would prove the existence of a first-strike strategy. The professors are right about the fact that the U.S. war plan featured these options well past the 1960s. Designated preemptive options existed long after that (through at least the late 1980s), and at any rate the immediate launch readiness of modern strategic missiles created an inherent capability to strike quickly and first. But while delivering the first blow is essential to any strategy that seeks to completely decimate

an adversary's nuclear arsenal, it may also be essential to go first in order to destroy only a fraction of that arsenal. As it turns out, U.S. strategic forces for practically the entire Cold War period could not meet their damage expectancy requirements if they absorbed a Soviet attack before retaliation. The U.S. nuclear war machine could not afford to ride out an attack if it sought to achieve its war aim of destroying a major fraction – but by no means all – of the Soviet nuclear arsenal. To wipe out 70-90 percent of the Soviet target base, additional U.S. forces needed to be put on combat alert, and virtually all of the alert forces had to be unleashed before Soviet forces could hit them.⁸

Under these pressures, the United States either must have initiated the war with a preemptive attack, or launched its strategic forces quickly on tactical warning of a Soviet missile salvo ('launch-on-warning') before incoming Soviet warheads could strike U.S. missile silos and bomber bases. If it waited too long and suffered losses on the ground, the U.S. retaliatory forces could not perform their assigned mission. If U.S. leaders waited too long to order the launch of U.S. forces, and the Soviets concentrated their nuclear firepower on the U.S. command system, then the United States might not have been able to retaliate at all. Preemption, or launch-on-warning, provided the only reliable wartime options for partially disarming the Soviet Union.

Launch on Warning Negates First-Strike Strategy

As both sides acquired in the 1970s and 1980s credible options to launch on warning (firing forces almost immediately upon receiving reports of enemy missile launches from ground- and space-based warning sensors), the utility of a first strike declined greatly. Initiating a sudden strike using intercontinental rockets capable of destroying hard targets such as missile silos could not catch opposing forces on the ground. The opposing side could detect an incoming salvo of enemy warheads and launch its hair-trigger retaliatory forces during the 25-30 minute flight time of the incoming warheads. Submarine rockets positioned off the coasts of enemy territory could reach their targets much faster but they lacked the accuracy and yield needed to destroy hardened targets. (Their flight time from forward locations is 15 minutes or somewhat less, which is nearly the same as the launch-on-warning timeline.)

These hair-trigger postures on both sides greatly diminished if not negated the utility of first-strike options in the U.S. and Soviet war plans. The options

underwent a sharp devaluation, just as retaliation after ride-out had much earlier been deemed an unreliable option due to vulnerabilities of missile silos and command systems. Both sides' plans gravitated to the middle ground between going first and retaliating after ride-out. Launch on warning became the predominant and preferred option in their strategic war plans.

LOW Dangers and Impracticalities

This shift created enormous pressure on the decision process. Allowing only minutes to detect and assess an apparent attack, only minutes to consider how to respond, and only minutes to carry out a retaliatory option, launch on warning all but eliminated the opportunity for deliberate rational decision-making and leadership.⁹ It reduced cosmic choices to rote decision-making by checklists in what amounted to enacting a prepared script. And it introduced frightful risks that human error and technical malfunction would cause an accidental nuclear war.

Launch on warning quickly lost its viability in the Russian nuclear posture, however.¹⁰ The United States began in 1992 deploying accurate high-yield submarine missiles capable of destroying hardened targets, and thereby severely degraded Russia's ability to launch its strategic missiles before they were destroyed on the ground. Russian forces within range of Trident D-5 missiles in the Atlantic and Pacific could no longer beat the clock to launch in time for them to survive. All targets in Russia could be struck by deadly submarine rockets with pinpoint accuracy in less time than it took for Russia to launch on warning, even if the Russian early warning network performed well and provided reliable timely reports of incoming Trident warheads.

In addition, as the professors correctly note, the Russian early warning system of satellite infra-red and ground radar sensors has deteriorated sharply over the past decade.¹¹ As a result, there are some gaping holes in Russian coverage of Trident submarine missile corridors, particularly in the Pacific region. This decline further eroded any Russian margin for reliable launch on warning, but as noted above that margin previously evaporated with the advent of Trident silo-busting missiles with flight times that are shorter than Russian nuclear decision cycles. This double-whammy – unreliable Russian warning and Trident missiles outracing Russian speed of response – all but ruled out launch on warning by Russia as a practical matter, even though it remains the cornerstone of Russian strategy to this day.

The professors' assumption in their model that Russia would be forced to absorb the brunt of a U.S. preemptive or preventive strike before it could retaliate is thus a reasonable one. It withstands the scrutiny and criticism of a leading Russian scholar based at Stanford who challenges the professors' characterization of Russian early warning on the grounds that "...Russia would gain very little were its early warning system to be deployed to the fullest extent. Adding the capability to detect SLBM launches would not dramatically increase the time available to the Russian leadership for assessing attacks."¹² We would agree with these statements in that a full-scale U.S. first strike would doubtless entail so many launches by so many different delivery vehicles from so many directions that in all likelihood the Russian early warning system would sound the alarm early and loudly despite its hobbled condition. And Russia would gain little in any case inasmuch as its forces still could not launch in time to escape destruction on the ground. The Russian critic is right, but it does not invalidate the professors' assumption of Russia's inability to launch on warning.

Existential LOW

It would be foolhardy for U.S. leaders to adopt the professors' assumption, however. On the contrary, conservative planners would assume that Russia could exercise launch on warning during an opening salvo before its early warning system sustained massive damage from nuclear strikes on Russian territory. Russia has built and extensively exercised a hair-trigger command and early warning system that is thoroughly geared to launch on warning. It is an ingenious apparatus that allows for the direct launching of far-flung nuclear missiles by the Moscow-based General Staff and various alternate command centers through a streamlined redundant communications network.¹³ And although the competing timelines pitting U.S. missiles and Russian quick-launch in a race against time slightly favor the United States, the margin is too slim for comfort. The time difference is measured in seconds to at most a few minutes. No conservative planner on either side could confidently predict which side would cross the finish line first. In this vein, it should be emphasized that the difference in launch timing among preemption, launch on warning, and retaliation after ride-out is also measured in minutes, not hours. All of about 30 minutes bracket the temporal differences among these three timing options.

Residual Instabilities

The professors' assessment of the potential instability of these nuclear dynamics is mostly convincing. Certainly for the canonical case of U.S.-Russian nuclear tension and confrontation, their projection conforms to classical theory of arms race and crisis instability. (The China case does not conform for reasons discussed later.) If their model's results showing the United States destroying all of Russia's and China's long-range nuclear forces in a first strike are valid, then in theory the acute vulnerability of these forces would indeed trigger destabilizing steps to reduce it by means of readying and dispersing sea- and land-based mobile forces. Theoretically, intense pressures and incentives would exist for Russia and China to ratchet up the alert readiness of their forces, and even to consider seriously a preemptive attack during a severely threatening crisis. Russia's preemptive impulse presumably has strengthened since U.S. Trident boats stripped Russia of its option for launch on warning.

Similarly, a crisis in theory could trigger a U.S. preventive attack if it truly believed that Russia had lost its ability to launch on warning, and that no Russian strategic forces would survive a U.S. first strike. U.S. leaders' preemptive impulse would theoretically grow stronger if Russia appeared on the verge of dispersing its mobile forces to ensure their survival, a process that would ruin America's chance to disarm Russia. (A massive barrage attack by U.S. nuclear warheads against the operating area of dispersed mobile forces would

not be practical or effective.) In addition to this dangerous dynamic, safeguards against accidental and unauthorized launches would weaken as the two sides prepared for nuclear war. Even greater instability and risks would theoretically exist in U.S.-China crisis interactions.

Although the professors are properly concerned with the turbulence associated with nuclear crises under the postulated conditions of acute Russian and Chinese vulnerability, they characterize all of the

steps taken during a crisis as *destabilizing*. This characterization is wrong. For instance, if Russia dispersed its mobile forces to protect them, and managed to do so without triggering U.S. preemption, the crisis would be somewhat

Timelines pitting U.S. missiles and Russian quick-launch in a race against time slightly favor the former, but the margin is too slim for comfort.

stabilized because Russia would have generated a survivable minimal nuclear deterrent. Admittedly, this transition would be dangerous, but it could lead to a more stable balance than the initial one. The professors mistakenly, or better myopically, view all crisis interactions as destabilizing, even those that restore mutual vulnerability.

Exploiting Primacy

The underlying crisis scenarios for their model are too vaguely outlined to grasp these transitions and their bad and good effects on stability. While the professors raise many questions about the implications of nuclear primacy for coercive diplomacy and escalation dominance during a crisis, the calculations invoked as evidence of nuclear primacy are based on a sudden first strike by the United States before Russia would disperse any strategic forces in order to protect them.

It simply strains credulity to imagine the United States strong-arming Russia during a crisis by dint of its first-strike threat when Russia could easily remove this threat by mobilizing some of its nuclear forces according to pre-programmed alert procedures. Russia historically has planned to do exactly that during a crisis. During the Cold War, it kept only 15-25 percent of its submarine forces at sea under normal peacetime conditions, for instance, with a view to surging the remainder of its submarine fleet to sea during a crisis.¹⁴ Today even fewer Russian submarines are on patrol under normal circumstances, and only small numbers of Russian mobile intercontinental rockets leave garrison on patrol in peacetime. But the low operating tempo, while partially caused by training and equipment readiness problems, mainly reflects the Russian planning premise that an American bolt-out-of-the-blue surprise nuclear attack in peacetime is completely implausible, and that serious U.S. threats made during a real crisis could be answered by surging subs and dispersing land rockets, and by projecting a plausible readiness to preempt or launch on warning if necessary.

The professors argue that these protective steps may be ineffectual in the *future* as a consequence of U.S. breakthroughs in surveillance, reconnaissance, and tracking that could expose the location of hidden strategic forces and render them vulnerable to destruction by U.S. forces. In fact, the professors assume such U.S. capabilities already exist. But this assumption is a very weak reed for their model to lean on. The Russians certainly have cause for con-

cern about the technological prowess of the United States, but U.S. progress in making the forests transparent to expose hidden Russian rockets is not that impressive, if the public record is any indication. And the defense still has the advantage over the offense. Simple protective countermeasures can be devised to offset new U.S. capabilities. At any rate, this is a large topic that is beyond the scope of any analysis that the professors have presented so far. It is also beyond the scope of this review.

A Shaky Model of Nuclear War

Concerning the *current* state of Russian vulnerability, the professors' analysis contains some flaws that cast their central thesis into serious doubt. The data used in their model are simply not reliable enough to support their sweeping generalization about America's ability to destroy all of Russia's strategic forces in a nuclear first strike.

Their assessment of the strategic imbalance rests on fairly solid empirical data on the characteristics of the Russian and U.S. nuclear arsenals, particularly their numbers, explosive yields, and ranges. But high confidence in their estimates of U.S. missile accuracy is unwarranted. Such estimates of missile inaccuracy (circular error probable) found in the public domain vary widely (by 30 percent or more), and their estimates lie on the optimistic end of the spectrum. (The real data are classified and so it is next to impossible to validate any model's estimates.) Actual accuracy achieved in wartime may also diverge from accuracy demonstrated in peacetime missile tests. The professors assume that accuracy could decline by as much as 20 percent in wartime, but what if their un-degraded peacetime estimate was too optimistic and the 20 percent wartime degradation came on top of it, resulting in a cumulative deviation of, say 40-50 percent from their baseline accuracy figure? The professors' sensitivity analysis of the effects of degraded accuracy on target destruction is thus too circumscribed, and they do not adequately inform the reader that the probabilities of destroying Russian hard targets such as missile silos would plummet if U.S. missiles missed their targets by a considerably greater distance than assumed by their model.

Other flawed assumptions further skew their model's results much too far in the direction of the total annihilation of Russian forces. The questionable assumptions primarily concern the alert status of both U.S. and Russian forces. First, the model assumes that the United States could covertly gener-

ate its off-alert strategic bomber force to combat-ready alert, and secretly undertake other large-scale preparations for a sneak attack. In the real world in peacetime, all bombers and their crews are kept at a low level of readiness. They are unarmed; all nuclear armaments (gravity bombs and cruise missiles) are kept in storage at their bombers' home bases. In this world, the alerting and arming of this force would take a minimum of 12 hours for the first bombers to reach combat ready status, with the rest of the bombers coming on line over the next 48 hours (72 hours total to generate the bulk of the force).¹⁵ It is a large-scale, 'noisy', and readily detectable process.

In the model, however, the majority of the bombers are uploaded with nuclear arms and readied for combat missions so surreptitiously as to remain undetected by any adversary. All of the supporting operations for the bomber force, ranging from readying and pre-deploying refueling tankers (most refueling occurs over Canada or the oceans mid-way to the targets) to assembling aircrews to activating command-control-communications links, also proceed so stealthily as to preserve the element of surprise. Submarine alerting and positioning for a surprise attack also go undetected. In short, very extensive nuclear attack preparations across the board of the U.S. strategic system fail to alert the adversary of the possibility of an impending attack.

This complete intelligence failure is not plausible. It is especially far-fetched in any context of U.S.-Russian crisis that would presumably motivate the U.S. nuclear alerting in the first place, but would also intensify intelligence gathering by the Russians. No sober U.S. political leader or military commander would count on achieving such complete surprise in the run-up to launching a full-scale strategic attack on a supposedly unsuspecting Russia in the midst of a crisis. No analyst of the strategic balance should treat such a prospect as anything but an excursion into the realm of remote possibility.

Second, the model overstates the peacetime vulnerability of Russian mobile missiles. It assumes that all 291 SS-25 intercontinental mobile missiles are either confined like sitting ducks to their 40 garrisons where they would be readily destroyed wholesale by a small number of U.S. nuclear warheads, or alternatively that nine or so out of the 291 would be out of garrison in the

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field but visible to U.S. surveillance satellites and thus vulnerable to complete obliteration by U.S. nuclear strikes. The trouble with this assumption is that it is not well documented and, in our estimation, is wrong.

Reality Testing

In our own research in this area, knowledgeable experts with access to intelligence sources disclosed that at least one and often two regiments of SS-25s typically operated in the field at any one time, and sometimes (though rarely) three regiments.¹⁶ We would not rule out the possibility that all of Russia's SS-25 missiles are occasionally confined to garrison for a period of time, though no public evidence substantiates such occurrences. If they did happen to be all clustered in garrison on a given day, however, it seems highly doubtful in the extreme that the United States would be waiting for just such a moment to mount a surprise nuclear attack. Such opportunism, devoid of any political context, is an artifact of mathematical modeling of nuclear exchanges, and cannot be taken seriously.

The same point applies to the model's alternative assumption about mobile missiles – that those in the field have been located by U.S. satellites, and thus also become sitting ducks. We agree with the professors and others, including Russian military analysts, that these mobile missiles may have detectable sig-

Alerting and arming of the U.S. strategic bomber force takes a minimum of 12 hours and is a 'noisy', and readily detectable process.

natures that compromise their location, but how often, for how long, and for how many of the missiles from the one, two, or three regiments in the field are open questions.¹⁷ Without stronger evidence than the professors provide, writing off this key Russian force is pre-mature and indefensible.

To a lesser degree, the same criticism applies to the model's dismissive treatment of Russian strategic submarines. These

boats completed three patrols in 2005, for an uncertain period of time in each case (the combat patrols lasted 78-days typically during the 1980s).¹⁸ While tracking Russian submarines on patrol is presumably much easier today than it was during the Cold War, writing them off as casualties of U.S. anti-submarine operations undertaken in concert with a first strike is not adequately supported by evidence and analysis.

The combination of these flawed or unsubstantiated assumptions – that the United States could generate practically its full nuclear armada undetected, and then strike opportunistically to destroy swiftly and completely all Russian sea- and land-based mobile strategic forces in garrison, in port, at sea, and hidden in the field – severely undermines the professors’ projection of total first-strike effectiveness. A completely disarming attack is simply not plausible. Absent solid corroborating evidence, their calculation of zero surviving Russian retaliatory forces should be adjusted upwards to between a handful and tens of surviving mobile strategic forces.

Together with other questionable assumptions – overly optimistic estimates of U.S. missile accuracy, overly pessimistic assessment of Russia’s ability to launch on warning, a static vulnerable Russian alert posture regardless of peacetime or crisis circumstances – their calculations further strain credulity and warrant further upward adjustment. Enough Russian nuclear firepower would survive to constitute at least a minimal deterrent force capable of inflicting such grave harm in retaliation that U.S. leaders would surely absolutely refrain from initiating an unprovoked preventive attack, and would reasonably consider launching a preemptive strike during a severe crisis only if they came to believe that a nuclear attack by Russia was imminent and unavoidable.

Longstanding Achilles Heel

The only first-strike attack scenario that could plausibly neutralize the ability of Russia to strike back in retaliation is one that the professors’ model consciously omits – the rapid suppression of the Russian command system. Decapitating the command hierarchy and severing communications links in order to prevent the issuance and dissemination of orders to launch Russian forces would stand a better chance of disarming Russia. The result of an optimal U.S. attack on the central nervous system of Russia’s nuclear arsenal could be stark: zero useable Russian retaliatory forces.¹⁹

The professors acknowledge this scenario and correctly emphasize that it only reinforces their characterization of the overpowering strength of U.S. offensive nuclear forces. However, the fact that Russian (and Soviet) command vulnerability is a longstanding weakness and potential source of crisis instability points to a glaring and fatal flaw in the professors’ argument: the stunning shift in the strategic nuclear balance actually occurred a long time ago.

Nuclear History Revisionism

The professors' contention that the era of mutual assured destruction has just ended with the rise of total U.S. superiority ignores the fact that MAD never existed as an operational policy on either the Russian or U.S. side. (It more closely approximates the Chinese stance.) Readers may remember that MAD is a two-sided version of assured destruction (AD), a cornerstone of deterrence logic that required an ability to absorb an opponent's maximum attack and strike back with devastating force in retaliation. Contrary to the Pentagon's assertion noted earlier that second-strike retaliation best describes U.S. nuclear policy, it has actually been a very long time since either Russia or the United States possessed any real confidence in their ability to retaliate after riding out a massive attack, because of the vulnerability of their individual forces but mainly because of the vulnerability of their command systems.²⁰

Both regarded AD as an infeasible operational concept, and long ago geared themselves for launch on warning or preemption. And hence in this crucial respect MAD has long been defunct, and thus the professors' warning that the era of MAD is ending is divorced from historical reality.

With respect to the acute vulnerability of individual Russian forces, the professors' argument also misses the historical mark by more than a decade. The collapse of the Russian strategic forces and the gross deterioration of its early warning network occurred when the Soviet Union broke apart in 1991. That is when Russia drastically curtailed submarine and mobile land

missile patrols, and when Russian missile silos became acutely vulnerable to a first strike by U.S. Peacekeeper (MX) missiles and soon after by Trident D-5 submarine missiles armed with W-88 warheads.²¹

Russia's strategic nuclear forces as well as its nuclear command and early warning system has declined somewhat more since the bottom fell out in the early 1990s, but the decline in recent years has occurred on

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the margins. Margins do count, but not enough in this case to support the professors' claim. Consider that over a decade ago the Russian submarine force was struggling to keep a single submarine on patrol at any given time. Typically a Delta IV in the Atlantic rotated off and on patrol with a Delta III

in the Pacific. The professors may be correct in their model's assumption that the United States could track and sink a solitary Russian submarine at sea today, but if so the United States could have performed this same feat over a decade ago. The public literature offers scant evidence of any recent breakthrough in the science and art of submarine trailing. By the same token, the Russian SS-25 force was struggling to keep one or two regiments out of garrison in the field at any time over a decade ago. Again, we have found no body of evidence to suggest any breakthrough in the ability of U.S. satellites to locate them in the field. If these missiles could be tracked and destroyed today, then they were no more survivable 10 years ago either. A nuclear barrage attack designed to saturate their operating areas, furthermore, was more feasible 10 years ago than today because of the larger U.S. arsenal then. Similarly, Russia's silo-based missile force stood no more chance of surviving a U.S. counterforce strike over a decade ago than it does today, and Russia's prospects of launch on warning were also no better then than now.

History Refutes the Primacy Predictions

If the Russian strategic nuclear forces were acutely vulnerable 10-15 years ago, then we do not have to wait to test the professors' dire predictions of the future. We can go back to a past future to test them.

The professors' predictions and hypotheses about the adverse implications of nuclear primacy in the future – fraying of nuclear relations, re-kindling of a nuclear arms race, heightened instability during a crisis, and increased risk of nuclear war – lend themselves to testing in the crucible of history. What actually happened after Russia's strategic collapse over a decade ago? Nothing remotely reminiscent of the theoretically predicted upheaval. Contrary to the professors' expectations, deterrence did not unravel; the imbalance did not lead to growing nuclear tensions or to a nuclear arms race and did not induce Russia or China to take destabilizing steps. The United States did not contemplate a preventive nuclear strike against Russia or China, nor did Russia or China become more poised than before to preempt in a crisis with America.

All sides all but ignored the theoretical first strike capability of the United States during the past 15 years (and much longer in the case of China). This history is not a perfect crucible for testing all of the professors' hypotheses, but the preponderance of evidence so far refutes their argument.

What this recent history really seems to be suggesting is that U.S. nuclear

primacy is an academic artifice that was and is practically useless for understanding America's relations with other nuclear powers. Nuclear primacy in modern times offers no exploitable political leverage. Russia and China appear quite confident in their deterrent arsenals in spite of the lopsided U.S. advantage estimated by models of nuclear war.

China Repudiates the Primacy Concept

The deficiencies of standard nuclear calculations of the sort performed by the professors are abundantly evident in the case of China. The Chinese nuclear story cannot be explained in Western theoretical terms, and requires a radically different interpretation. Compared to the Russian case, the history of nuclear relations between China and the United States shows a much starker imbalance favoring the United States (in narrow technical respects and in Western theoretical terms) over a much longer period of time. And yet virtually none of the destabilizing effects postulated by Western stability theory materialized during or after the Cold War. (Such effects did materialize in the case of Sino-Soviet nuclear relations, which were also marked by a stark imbalance favoring Russia.)

On the contrary, as discussed next, China never wavered from its no-first-use (NFU) doctrine and its belief that a small arsenal would suffice to prevent nuclear blackmail by the superpowers.²²

China's nuclear strategy is composed of primarily two parts: no-first-use²³ and "houfazhiren"²⁴ or the second-strike operation. The latter is a delayed, limited retaliatory nuclear attack to destroy an enemy's soft targets after China absorbs an enemy's first nuclear attack. This defensive strategy does not aim to build an arsenal to dominate, but instead to defend and to deter. China built the bomb to preclude nuclear blackmail and coercion.²⁵ This policy places no value on achieving nuclear parity with anyone. If we examine the history, the gap between China and the United States in terms of nuclear force was intentionally designed and maintained for four decades. China did not revamp its arsenal or NFU policy and the self-defense principle of its nuclear strategy for reasons particular to its historical environment and its own view of the utility of nuclear weapons. Many have argued that it was China's deliberate choice from the outset to absorb a possible first nuclear strike by its enemies, to build a rather small strategic force and not to pursue a launch on warning capability.²⁶ China's nuclear doctrine also was and is still based on strong moral

considerations that even more strictly confined the role of nuclear weapons to second-strike deterrence (as opposed to the United States and Russia who have both considered using them for a first strike).

The belief Mao Zedong possessed was that China will not invade other countries, and that no other countries could conquer China with or without nuclear weapons because of its vast territorial expanse and challenging terrain. Mao believed that nuclear weapons would not prevent China's eventual victory in a war fought on Chinese soil.

The logic of China's nuclear doctrine thus regarded the use of nuclear weapons against China as ineffective, and therefore so improbable as to be virtually impossible, and therefore insignificant as a source of strategic advantage. China's calculus for "unbearable loss" and China's capacity to absorb a first nuclear strike differed completely from that of the United States²⁷ "The second strike capability" China marshals reassures it that other strategic powers cannot convert their nuclear superiority into real coercive power. In the view of Chinese leaders, superiority is not convertible. At best, any advantage gained would be small and virtually inconsequential.

China not only completely discounts the utility of nuclear primacy, but also believes that other nuclear powers share its view in spite of the lip service those powers pay to the importance of nuclear weapons. China simply does not believe others truly believe nuclear primacy can serve utilitarian purposes.²⁸

China's experiences in dealing with U.S. nuclear threats have only strengthened its conviction that nuclear primacy has negligible utility. The United States considered using nuclear weapons against China in 1953 during the Korean War, in 1954-1955 during the cross-strait crises, and in 1964 before China carried out its first nuclear test. These cases in which U.S. leaders clearly thought about using nuclear weapons against China but ultimately decided against it reveal a multitude of reasons for counseling against their use. A nuclear taboo was ascendant at the time. Allies of the United States would oppose their use. Attacking China would create a vacuum for an even more hostile adversary, the Soviet Union, to occupy. Attacking China could not guarantee the destruction of China's fledgling nuclear program, due to sketchy information on the location of facilities in China's nuclear infrastructure. Without the ability to achieve total victory and

MAD never existed as an operational policy.

occupy China, the United States could not prevent China from rebuilding any destroyed facilities and revitalizing its nuclear program. The United States had better choices, especially given China's flexibility in negotiating and compromising in resolving conflicts with the United States.²⁹

The professors ignore Cold War history in arguing that the nuclear primacy the United States allegedly enjoys will drive China toward a rapid build-up of its nuclear force that risks precipitating a nuclear arms race and aggravating tensions between them. Throughout the Cold War era, even when China was threatened repeatedly by both the United States and the Soviet Union with nuclear weapons and possibility of military confrontation, both of whom held absolute nuclear superiority over China, China did not accelerate its nuclear program to close the gap. An unflinching China chose to cap its nuclear arsenal at a low level instead of launching a crash program to compete numerically with either of the nuclear superpowers that threatened it. This decision may have been partially based on the realization that China lacked the resources

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needed to compete and would lose an arms race with its adversaries. But the deeper rationale for China's restraint was its belief that primacy lacked any real utility. China maintained and still maintains a stark indifference toward nuclear primacy.

China's real concern about threats to its nuclear deterrent capability stems not from nuclear primacy, as the two professors argue, but from U.S. conventional primacy. The increasing accuracy and lethality of the American conventional strike capability is tipping the strategic balance and eroding China's deterrent force.³⁰ China's past assumption that its second-strike deterrent against U.S. blackmail can only be eviscerated by a U.S. nuclear strike is rapidly crumbling. A U.S. strike by its conventional precision-guided cruise missiles and gravity bombs delivered by strategic submarines and bombers, and in the future by ICBMs, against China's small nuclear force would circumvent the nuclear taboo. Conventional strikes that destroy China's nuclear deterrent capability are regarded by the Chinese as far more practical and less risky for the United States than a nuclear strike would be. And the effectiveness of such conventional strikes could be high. The United States is on the verge of posing a disarming first strike conventional threat against all of China's strategic nuclear forces. It is this prospect, and not nuclear primacy, that appears to be putting some real pressure on Chinese strategists

to revoke China's longstanding commitment to NFU.

Two additional risks that China's nuclear force is facing include the possible perfection of the U.S. missile defense system and emerging new nuclear states in China's neighborhood.³¹ Missile defense represents a potential risk because, although most experts seriously doubt it will ever succeed technically, it circumvents the nuclear taboo in the same way that conventional offensive forces do. Therefore U.S. missile defense counts seriously as a strategic factor in the deterrent equation. As for regional proliferation dangers to China, the scenario of immediate concern is that North Korea's nuclear test will drive Japan to develop a nuclear force, or worse a Japanese nuclear force that surpasses China's planned force. This would exert domestic political pressure on China's nuclear program and strategy, fueled by nationalistic impulses and energized by the "face factor" that Chinese will not allow Japan to get ahead in a nuclear build-up. A vigorous nuclear competition between China and Japan could occur even while the U.S. and Russian arsenals are shrinking.

These risks are not illuminated by the primacy model, which also neglects a key feature of China's decision process: a headstrong determination to preserve its national unity even if doing so runs nuclear risks that a rationally calculating player would avoid.

Some Chinese scholars have argued that because there is an imbalance of interest for Chinese and Americans in Taiwan, the United States would be more inclined to back away from a nuclear confrontation.³² China thus might believe that the nuclear taboo would restrain the United States more than China. Rationally calculating players might apply such logic in their nuclear gamesmanship, but there is not only high risk of miscalculating the other side's degree of commitment. There is also an element of sheer craziness or stubbornness that defies calculation in the case of a Sino-American showdown over Taiwan. The rational primacy framework at least appears to vastly overrate America's coercive leverage over China in such a showdown.

In all calculations of nuclear primacy and deterrence, the players are assumed to be rational. However, rational actors might lapse into irrational behavior in readily imaginable ways that are completely obtuse to the nuclear primacy framework. The obvious scenario in this regard concerns the defeat of China's military force in a potential Taiwan conflict. The Taiwan issue has been a core national interest of China, one that arouses such fervent emotions throughout the country that irrational behavior in its use of nuclear weapons

cannot be ruled out.

It is a consensus among Chinese military and civilian analysts that China needs to modernize its nuclear force to increase its survivability and penetration capability. There are debates over whether China should pursue a more symmetrical build-up of nuclear force to counter challenges mentioned above by increasing the number of nuclear weapons and nuclear bases. But the NFU commitment remains solid. Very few analysts advocate any revision of the doctrine that would make it conditional. After the controversy generated by Maj. Gen. Zhu Chenghu in 2005, who allegedly invoked the specter of Chinese first use of nuclear weapons in the event of United States intervention in a hypothetical Taiwan conflict, a considerable number of Chinese nuclear strategists and senior military officers stepped forward to disavow Zhu's scenario and reiterate strongly the unconditional nature of China's NFU nuclear policy. This policy may not be immutable. No doubt future internal debate will grapple with the challenges to China's strategic force and its nuclear doctrine posed by missile defense systems and conventional weapons advances. But the Zhu incident only renewed and revalidated the old consensus and policy against changing China's nuclear doctrine. NFU will not be dislodged any time soon, if ever. It is virtually a canon of Chinese nuclear orthodoxy.

Conclusion

The nuclear primacy thesis and analysis have served as useful reminders that obsolete Cold War nuclear dynamics remain in play. The United States and Russia in particular still operate their nuclear forces as though they must be constantly prepared to fight a large-scale nuclear war with each other on a moment's notice. There is no political context to explain this continuing deterrent operation, but the two previous nuclear rivals remain trapped in their habitual practices from the Cold War era.

The primacy argument, however, does not withstand close scrutiny for three major reasons. First, the contention that the era of mutual assured destruction has ended with the emergence of a unipolar nuclear hegemon misses the fact that MAD never existed as an operational policy on either side. Second, the claim that a stunning shift in the strategic balance has just now occurred misses the fact that the tectonic moment actually occurred 15 years ago when the Soviet Union collapsed and sapped its nuclear strength in the process. Third, Russia's sudden nuclear decline did not result in the kind

and intensity of instability that the professors' theory predicts should have occurred, and therefore the theory is not valid.

The professors' thesis does not come to grips with the evident truth that nuclear security is more a state of mind than a physical condition, and that through their mental prisms Russian and Chinese nuclear strategists have come to believe that deterring the United States is easy to achieve with very small numbers of nuclear weapons that have some conceivable prospect of surviving an attack. And Russia and China are not alone. Countries like North Korea and Iran also appear to share this belief – that all it takes are a few

***The primacy framework
vastly overrates
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hidden nuclear bombs to offset the U.S. nuclear juggernaut. U.S. strategists themselves appear to belong to this school of thought. The United States is easily deterred by any nuclear armed state, even by the most primitive and diminutive of nuclear arsenals. That is why the United States goes to such extraordinary lengths to prevent adversaries from acquiring even one solitary bomb in the first place. Once acquired, the deterrence game is fundamentally altered at the expense of U.S. military options and political leverage.

In short, the marginal utility of nuclear weapons is high for low numbers and low for high numbers. Similarly, the marginal utility of gaining the ability to project possible retaliation is much higher than the marginal utility of gaining the upper hand of a possible disarming first strike.

What U.S. leaders really value and seek today in the military sphere is not nuclear but rather conventional primacy. For all the drama and controversy surrounding the nuclear rhetoric of the Bush administration, the bunker buster and 'reliable replacement warhead' programs, the deeper historical current of U.S. policy is to downgrade nuclear and upgrade conventional roles, missions, and capabilities. All of the branches of the U.S. military including the Strategic Command grasp this trend and have been casting about for new conventional missions in lieu of nuclear – for instance, Strategic Command's bringing information warfare and space under its umbrella.

The professors' preoccupation with U.S.-Russian-Chinese nuclear deterrence and their use of an obsolete Cold War formulation of stability only impedes new thinking and answers to today's real nuclear challenges. Their

formulation reinforces the tendency of current nuclear strategists to overstate the utility of U.S. military strength in countering nuclear threats, and to understate its counter-productive effects. U.S. nuclear (or conventional for that matter) primacy hardly addresses the asymmetrical warfare conducted by weaker states and terrorist organizations, which constitutes a more real and lethal threat to Americans. This threat is less visible and full-bodied than the awesome Cold War rivals presented by Russia or China, but it is also less impressed by U.S. primacy and thus more problematic.

The misplaced focus on ‘normal’ deterrable threats in the form of Russia and China fosters a kind of transference of faith in military solutions to threats that are too slippery to handle with standard military force. This overconfidence in and over-reliance on military solutions to emerging proliferation dangers appears in fact to have created more problems than it has solved. Notwithstanding the Pentagon’s criticism of the professors’ argument, they all share a common worldview that revolves around military power despite its sharp limitations, and oft-proven dysfunctionality. The resort to nuclear force as articulated in the 2002 Nuclear Posture Review and other official statements of U.S. strategy in recent years convey an aggressive message that works not to reduce but increase the threat to the United States.

If history teaches us anything, nuclear superiority has hardly cleansed the world of America’s enemies. Opposite approaches based on arms control and security reassurances instead of projection of military threat have generally been far more effective – for instance, U.S. leadership in building a non-proliferation regime that provides security for non-nuclear states has limited the number of countries possessing nuclear weapons. The world is changing and in many ways is growing more menacing, but nuclear primacy is an irrelevant reference point. Or worse, it is a misguided, even self-destructive one that diminishes America’s ability to set the best course for its security. 🌐

Notes

¹ Keir A. Lieber and Daryl G. Press, “The Rise of U.S. Nuclear Primacy,” *Foreign Affairs*, Vol. 85, No. 2, March/April 2006, pp. 42-54;

“The End of MAD? The Nuclear Dimension of U.S. Primacy,” *International Security*, Vol. 30, No.4, Spring 2006, pp. 7-44.

² This section is based on the criticism and rejoinder by Peter C. W. Flory, Keith Payne, Pavel Podvig, Alexei Arbatov, Keir A. Lieber and Daryl G. Press, “Nuclear Exchange: Does Washington Really have (or Want) Nuclear Primacy?” *Foreign Affairs*, Vol. 85, No. 3, September/October 2006.

³ Flory, *ibid.*

⁴ Payne, *ibid.*

⁵ Lieber and Press, *ibid.*

⁶ Bruce G. Blair, *Global Zero Alert for Nuclear Forces*, Brookings, 1995, pp. 72; see also Bruce G. Blair, *The Logic of Accidental Nuclear War*, Brookings, 1993, pp. 52-55.

⁷ Interview with former senior U.S. nuclear target planner.

⁸ Blair, *The Logic of Accidental Nuclear War*, *op. cit.*

⁹ See the interview with General (Ret.) George Lee Butler in Jonathan Schell, *The Gift of Time: The Case for Abolishing Nuclear Weapons Now*, Metropolitan Books, 1998, pp. 191-94.

¹⁰ Blair, *Global Zero Alert for Nuclear Forces*, *op. cit.*, pp. 60-72.

¹¹ On original assessment of these problems, see Theodore A. Postol, *The Nuclear Danger from Shortfalls in the Capabilities of Russian Early Warning Satellites*, MIT Security Studies Program, March 1998; See also David Hoffman, “Russian Myopic Missile Defense,” *The Washington Post*, Feb 10, 1999, p. A1.

¹² Podvig, *op. cit.*

¹³ See Col. (ret.) Valery E. Yarynich, *Nuclear Command, Control Cooperation*, Center for Defense Information, Washington, D.C., May 2003, esp. pp. 139-66.

¹⁴ Blair, *The Logic of Accidental Nuclear War*, *op. cit.*, pp. 154-55.

¹⁵ Bruce G. Blair, “De-alerting Strategic Nuclear Forces,” in Harold A. Feiveson, ed., *The Nuclear Turning Point: A Blueprint for Deep Cuts and De-Alerting of Nuclear Weapons*, Brookings, 1999, pp. 117-18.

¹⁶ Personal communications with first author.

¹⁷ Russian experts apprehension about mobile missile vulnerabilities is detailed in Blair, *Global Zero Alert for Nuclear Forces*, *op. cit.*, pp. 64-67.

¹⁸ Personal communication of Robert S. Norris and Hans M. Kristensen, Natural Resources Defense Council, with authors.

¹⁹ “The Soviet military has indeed performed classified computer simulation that have produced the worst possible results: decapitation and total paralysis of the

Soviet strategic forces.” In Blair, *Global Zero Alert for Nuclear Forecast*, op. cit., pp. 45.

²⁰ See Bruce G. Blair, *Strategic Command and Control: Redefining the Nuclear Threat* (Brookings, 1985); Blair, *The Logic of Accidental Nuclear War*, op. cit.

²¹ For a detailed assessment of Russia’s operational decline during the 1990s, see Blair, *Global Zero Alert for Nuclear Forces*, op. cit., esp. pp. 64; Bruce G. Blair, “The Plight of the Russian Military and Nuclear Control,” in *Commission to Assess the Ballistic Missile Threat to the United States*, Appendix 3, July 15, 1998, esp. pp. 44-45; Bruce G. Blair and Clifford Gaddy, “Russia’s Aging War Machine: Economic Weakness and the Nuclear Threat,” *Brookings Review* 17, No 3, Summer 1999; and Blair, “De-alerting Strategic Nuclear Forces,” op. cit., esp. pp. 109.

²² For a recent discussion of China’s nuclear policy, see articles by General (ret.) Pan Zhenqiang, Shen Dingli, Sun Xiangli and Bruce G. Blair in the special issue of *China Security* devoted to “Opening the Debates on U.S.-China Nuclear Relations,” No. 1, Autumn 2005.

²³ “China will never be the first to use nuclear weapons at any time and under any circumstance,” according to the Chinese Government Statement on Oct 16, 1964 republished in Deng Xueyuan, *Nuclear Forces and Policies of Nuclear States*, Military Sciences Press, 1991, pp. 170-172; Nie Rongzhen, *Nie Rongzhen Memoir*, PLA Press, 1986.

²⁴ “Houfazhiren”, in direct translation “to gain mastery by striking only after the enemy has struck first”; “Strategic nuclear weapons, deterrence, could scare others a bit but we can never use it first. However, it (nuclear weapons) will play a role if we have it.” “If we have what you (enemy) have, this will put pressure (on enemies); if you (enemies) want to destroy us, you (enemies) will have to face some retaliation.” Mao Zedong, quoted by Lu Haixiao of the Chinese Academy of Military Sciences in “Analysis of Mao Zedong’s Strategic Deterrence Thinking,” *Journal of Xi’an Politics Institute*, Vol. 15, No. 3, June 2002; Houfazhiren is also explained as carrying out “limited nuclear retaliation at a time and against targets of Beijing’s own choosing” after enemy’s nuclear attack. See the quote of Yin Weixing who works in the Political Department of the Second Artillery in John Wilson Lewis and Xue Litai, *China Builds the Bomb*, Stanford University Press, 1988, esp. pp. 214-17; Chong-Pin Lin, *China’s Nuclear Weapons Strategy*, Lexington Books, 1988, pp. 105-135.

²⁵ Chen Lixu, “Implication of Nuclear Weapons for Modern National Defense Deterrence”, *Mao Zedong Thought Forum (Changsha)*, No. 4, 1995, pp 80-82.

²⁶ Sun Xiangli, “Analysis of China’s Nuclear Strategy,” *China Security*, No. 1, Autumn 2005, pp 23-27; Li Bin, “Identifying China’s Nuclear Strategy,” *World Economics and Politics*, No. 9, 2006, pp. 16-22; China National Nuclear Corporation, “Mao Zedong and China’s Nuclear Energy Enterprise,” Nuclear Power Press, 1993.

²⁷ Sun Xiangli, *ibid*; Li Bin, “Identifying China’s Nuclear Strategy,” *ibid*, pp. 20.

²⁸ Mao Zedong, *Mao Zedong Essays on Foreign Policy*, Chinese Central Literature &

Education Press, 1994.

²⁹ See Richard K. Betts, *Nuclear Blackmail and Nuclear Balance* (Brookings, 1989); Zhu Mingquan, "China Was Frightened to Step Back by U.S. Nuclear Threats: A Myth or History?" *Fudan Journal (Social Sciences)*, No. 1, 2001; Zhan Xin, Analysis of the American Evaluation and Countermeasures towards China's Nuclear Weapon Research and Development (1961-1964), *Contemporary China History Studies*, Vol. 8, No. 3, May 2001; FRUS: 1964-1968, Vol XXX, China, pp. 27; Zhao Xuegong, "Nuclear Weapons and American Policy towards the First Taiwan Straits Crisis," *American Studies*, Issue No. 2, 2004; Yu Jiang Xin, "Nuclear Policy of the United States in Korean War," *Military History*, No.5, 2005.

³⁰ See Bruce G. Blair, Eric Hundeman and Haninah Levine, "The U.S. Conventional Threat to China's Nuclear Deterrent," *China Security* (Forthcoming); Yang Yi, Guo Xinning and Xu Qiyu, *Studies of Global Strategic Stability*, National Defense University Press, 2005, pp. 130, 145,

³¹ He Zuoxiu, "Analysis of China's No-First-Use Nuclear Strategy," *Journal of Dialectics of Nature*, No. 1, 1989.

³² Lin Guojiong, "Deterrence Theory and Its Role in China's Reunification", *Studies of International Politics*, No. 4, April 2004.