



Gaurav Kampani

# China-India Nuclear Rivalry in the “Second Nuclear Age”

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## SUMMARY

In the last quarter century, Asia has become home to four modernizing nuclear weapon powers (China, India, Pakistan, and North Korea) and is now the epicenter of the “second nuclear age.” There is a growing belief that China and India’s growing geopolitical rivalry in the Indo-Pacific region alongside their efforts to build diverse and sophisticated deterrent forces could potentially produce security dilemmas and arms race spirals similar to the one that enveloped the superpower rivalry during the Cold War. Although the China-India rivalry has received serious attention from scholars, the nuclear competition in their relationship has not. As a result, large gaps exist in our understanding of the China-India nuclear equation.

This Insight expands our understanding of the China-India nuclear relationship by incorporating standard bean counting practices with Chinese and Indian thinking on nuclear weapons. It reviews the open source literature on the evolving view of national security managers in both countries on operational planning concerning the deployment and use of nuclear weapons. More specifically, this Insight examines the convergences and divergences between civilian and military policy planners, the contending logics behind their approaches, the contradictions that remain unresolved, and the areas of ambiguity that spell uncertainty in operational policy. It concludes on the basis of the available data that although there is reason for concern, the case for nuclear pessimism in the China-India nuclear dyad is overstated.

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## APPRAISING THE CHINA-INDIA NUCLEAR RIVALRY IN THE "SECOND NUCLEAR AGE"

In the last quarter century, Asia has become home to four modernizing nuclear weapon powers: China, India, Pakistan, and North Korea. As a consequence of this development, it is now the epicenter of the "second nuclear age" (Tellis 2013). Since the early 1990s, China has ended its anemic pace of nuclear modernization and for the first time in five decades is on the verge of acquiring a credible second-strike capability against the United States and Russia. Farther south, India and Pakistan are rapidly developing operational arsenals. And after a decade of trial and error, there are now signs that North Korea may finally be capable of deploying operational warheads on ballistic missiles (Sanger 2014).

Chinese nuclear modernization is of increasing interest to scholars and policy makers because of China's rise as a great power and the challenge it poses to US hegemony in the twenty first century. The India-Pakistan rivalry rouses concerns because of the likelihood of a conventional war in South Asia with nuclear overtones. And North Korea's nuclear developments command attention because of the unpredictability of its regime and the possibility of internal state collapse.

The China-India nuclear dyad, however, has received little analytic attention. This is somewhat surprising because there is growing awareness among scholars as well as policy makers of an unfolding and intensifying geopolitical rivalry between the two countries. This rivalry is rooted in both geopolitical concerns that relate to borders, the security of the sea-lanes of communications, and military assistance to third parties, as much as in China and India's self-identification as peer competitors and regional hegemonic powers.

Several reasons could possibly explain why the China-India dyad has received such little attention in the past. One is China's nuclear fixation with the United States, Russia, and Northeast Asia. A second is that, until recently, China's preferred solution for

dealing with a potential Indian nuclear threat was to deal with it indirectly by helping Pakistan acquire matching capabilities. A third is that although India has historically professed the China threat, yet until about the middle of the last decade, the technical and operational focus of its nuclear arsenal development was Pakistan and not China.

Because of this lack of serious analytic attention, there exist large gaps in our understanding of the China-India nuclear equation. When observing it, scholars and policy makers therefore generally tend to superimpose military bean-counting methods on geopolitical trends to arrive at threat estimates. These include estimates of fissile material, warhead inventories, and extant or planned delivery systems. These are combined with states' declaratory postures and use policy to arrive at a more rounded understanding of the nature of the phenomenon. Although useful, bean counting and declaratory statements constitute a relatively passive method of threat assessment. They tell us little about the intellectual, institutional, and organizational processes that produced those structural outcomes.

This paper expands our understanding of the China-India nuclear relationship. It attempts this by incorporating the standard bean-counting practices with Chinese and Indian thinking on nuclear weapons as political and military instruments. It reviews the open source literature on the evolving view of national security managers in both countries on operational planning concerning the deployment and use of nuclear weapons. More specifically, this paper examines the convergences and divergences between civilian and military policy planners, the contending logics behind their approaches, the contradictions that remain unresolved, and the areas of ambiguity that spell uncertainty in operational policy.

It proceeds in four parts. The first part situates the China-India nuclear rivalry within the broader geopolitical competition between the two countries

in the Asia-Pacific and the Indian Ocean regions. Next, it reviews their current nuclear modernization programs. Third, it outlines and analyzes the new Chinese and Indian thinking on nuclear weapons use and operations planning. In the fourth and final section, it analyzes China and India’s operational postures and the anchors behind stability and instability in their nuclear equation.

Four conclusions emerge from this study.

*First*, Chinese and Indian decision makers share an understanding that nuclear weapons are political instruments that best serve the purpose of vacating threats and intimidation on the part of nuclear adversaries. Political leaders who hold the final decision-making authority in both countries are averse to ideas of nuclear war fighting with the result that nuclear modernization efforts are modest and finite.

*Second*, civilian scientists and technocratic elites in both states play a strong role in shaping the arsenal’s development. Historically, they have preferred technological determinism, demonstration, and playing catch-up with the more advanced nuclear weapon powers to the operational requirements of their armed forces. Symbolism, however, is now giving way to numbers, engineering reliability, and operational demands. The militaries in both states now play a more influential role in the planning and the

operational aspects of the nuclear arsenal. However, civilian leaders exercise firm institutional control over the militaries and the latter constitute only one voice within the institutional collective that shapes policy.

*Third*, there is growing disenchantment within the militaries in both countries with politically determined “no-first-use” (NFU) doctrines. Both the Chinese and Indian militaries also share a propensity for developing operational doctrines that discard simple retaliatory for limited deterrent postures. Thus far, however, the political leaderships in both countries have warded off efforts to end NFU. But the move toward operational forces is increasing pressures for the adoption of limited war fighting doctrines. Although the latter strengthens deterrence credibility, it also lowers the bar for potential nuclear weapons use in the future.

*Finally*, despite operational pressures to discard NFU and adopt more complex limited deterrence postures, the geopolitical competition between China and India is not sufficiently intense to warrant alarm. Both China and India have marginally revisionist global agendas. Their regional rivalry on the other hand does not pose existential security dilemmas likely to trigger arms race spirals of the type that consumed the superpowers during the Cold War.

## NATURE OF THE CHINESE-INDIAN GEOPOLITICAL RIVALRY IN ASIA CHINESE THREAT PERCEPTIONS

The China-India rivalry has long been considered a “civil” rivalry (Smith 2014, 3). Despite the 1962 border war, in the subsequent decades both China and India have successfully avoided any further armed conflict. Occasional border intrusions, stand offs, posturing, and minor skirmishes notwithstanding, for over five decades the two sides have successfully managed an otherwise uneasy relationship, buttressed by a string of confidence-building measures and negotiated agreements and

understandings to avoid armed clashes and resolve the border dispute peacefully.

Given the asymmetry of power, both economic and military that clearly favors China, scholars such as Susan Shirk, for example, have characterized the China-India rivalry as “one sided” because power asymmetries in the relationship cause New Delhi to perceive threats from China rather than the reverse (Shirk 2004, 75-76). Such characteriza-

tions notwithstanding, the evidence shows that the threat environment between the two states is more perverse. The surface calm conceals a deep sense of foreboding and rivalry that pervades the China–India relationship on both sides, amounting to what John Garver has described as a classic “security dilemma” (Garver 2002, 1–3). This dilemma is rooted in structural geopolitical rationales as much as China and India’s self-identification as emerging hegemonic rivals in the Asia-Pacific. Indeed, as China and India become poised to emerge as the two largest economic powers after the United States and perhaps even displace the United States sometime in the middle of this century, the triangular relationship between these three states could become the most important one in the near future.

There are three sources of Chinese unease and rivalry with India: (1) control over the Tibet Autonomous Region (TAR); (2) the security of the Sea-Lanes of Communications straddling the Indian Ocean region through which the bulk of Chinese global trade and energy supplies traverse; and (3) India’s participation in US plans to potentially contain or at least check Chinese power in Asia and the western Pacific.

### *Tibet*

Despite controlling Tibet for nearly 400 years, sometimes in a superordinate manner and at other times nominally, China has become increasingly concerned that India could exploit domestic unrest in the TAR region and dilute or evict Beijing’s authority, causing schisms in China’s national fabric. These concerns, for example, shaped Mao’s decision to force a decisive military showdown with India in 1962 (Garver 2002, 6). Prior to that war, India for a while had insisted on retaining its special privileges in Tibet, a legacy of British imperialism. Even when India relinquished those privileges, it gave asylum to Tibet’s supreme religious leader, the 13<sup>th</sup> Dalai Lama, who fled Chinese repression and set up base in India (Malik 2011, 129).

Subsequent to the 1962 India–China border war, India collaborated with the US to arm and train Tibetan insurgents in an attempt to weaken Chinese control over TAR (Garver 2007, 6–7). Today China

fears that this strategy could be repeated when the current Dalai Lama passes from the scene and the issue of his succession becomes controversial in Tibet. The latter process could potentially trigger a revolt among an increasingly restive Tibetan population. Chinese thinking assumes that insurgent Tibetan militias trained and armed by India, supported by Indian and US Special Forces, and backed by the Indian Air Force (IAF) could in theory threaten China’s control over the region (Garver 2002, 6–7).

Scholars including Malik believe that Chinese anxieties about the future of Tibet and the post-Dalai Lama succession are central to Beijing’s intransigence over settling the border dispute with India. A broad survey of China’s border disputes with neighbors and settlement deals shows that China has settled its border disputes with every other state but India. The rationale for this exception is a Chinese desire to retain leverage over India given the uncertainty surrounding Tibet’s future (Malik 2011, 136–58).

### *Sea Lanes of Communications*

A second underlying cause of the growing Chinese security dilemma is the security of the Sea Lanes of Communications that connect the South China Sea to the Indian Ocean region. Robert Kaplan has recently pointed out that South East Asia is the “demographic cockpit” of the world where 1.1 billion Chinese, 600 million South East Asians, and 1.5 billion Indians converge (Kaplan 2014, 9). The South China Sea is also believed to sit atop oil reserves estimated at 130 billion barrels and gas reserves that could top 900 trillion cubic feet. These make it a veritable “second Persian Gulf” (Kaplan 2014, 10). Rival claims to these oil and gas reserves are the reason for the intensifying rivalry in the South China Sea between China and its neighbors.

In addition, as the global economic center of gravity in the last two decades has shifted to the Pacific Rim, the security of the sea-lanes in the region has assumed increasing importance. Ninety percent of the goods traded between continents are still moved via the sea. More specifically, about two-thirds of South Korea’s oil, 60 percent of Japan’s imports,

and 80 percent of China’s crude oil imports are transported via the South China Sea (Kaplan 2014, 9-10; Smith 2014, 146-151). The sea-lanes connecting the South China Sea and the Indian Ocean have therefore become according to Kaplan the “throat,” the “connective tissue” whose security is vital to the continued expansion and prosperity of the Chinese economy. The South China Sea and its approaches from the Indian Ocean have turned into what the Caribbean was to US security interests in the late 19th and early 20th centuries (Kaplan 2014, 13-14).

India’s dominant geographic location in the Indian Ocean astride the Straits of Malacca, through which the bulk of China’s trade and energy supplies traverse, provides India the default means for a chokehold over the Chinese economy. India’s attempt to actualize this potential is not without military, logistical, and political challenges that render it nearly impossible in practice (Collins and Murray 2008, 79-93). But the theoretical possibility exists nevertheless and is sufficient to provoke China into planning a blue water navy capable of operating in the Western Pacific and the Indian Ocean against the United States and India.

Unlike the Cold War in Europe in the last century, this new rivalry in the South China Sea and the Indian Ocean is not about ideology. All the regional powers in Asia are embedded in the global capitalist system and their domestic political systems are not in play. The new rivalry, however, is about securing and expanding trade and business. Further, as Kaplan frames it, unlike Central Europe (the ground zero of the Cold War) where land warfare remained the primary threat, in Asia the regional power rivalry is manifest through naval competition (Kaplan 2014, 15-16). The latter phenomenon is increasingly manifest in China, India, Vietnam, and Australia’s expanding defense expenditures and naval modernization programs.

#### *India as Part of the Anti-China Bandwagon*

Finally, China is now deeply concerned about India’s potential participation in a balancing coalition against it in cooperation with the United States. Much to China’s surprise and structural international relations theorists as well, US hegemony in the post-Cold War era has not invited counterbalancing coalitions. States in the Asia-Pacific region have instead sought to bandwagon with the United States against Chinese power. Fifty years of US alliance building, trade and military partnerships, global governance-centered public goods creation, transparency and democratic decision-making at home, and geographic distance from the Asian mainland have made the US the natural go to state for states in the region concerned with China’s aggressive and rude attempts at regional hegemony (Ikenberry 2014, 1-9).

The US pivot to the Asia-Pacific under the Obama administration, the expanding naval cooperation, military exercises, and strategic dialogue between the US, India, Singapore, Japan, and Australia are viewed by China’s national security managers and strategic elites as the scaffoldings of a potential balancing coalition designed to contain China in the region (Smith 2014, 121-122). China views the 2005 Indo-US nuclear cooperation agreement as the clearest marker of US attempts to remove hurdles in the expansion of Indian power and by extension create a passive and default mechanism to balance Chinese power in Asia (Smith 2014, 121). From the mid-2000s onward, the Indian military, especially its navy and air force, have become the largest participants in bilateral military exercises with their US counterparts outside NATO and other US alliance partnerships (Smith 2014, 120). Since then, India has also emerged as the largest buyer of US arms. As India alone among Asian powers possesses the structural means to emerge as China’s peer in Asia, Chinese policy planners see in the India-US relationship the potential foreshadowing of Containment 2.0.



## INDIAN THREAT PERCEPTIONS

In India, there are two views of the Chinese threat. The first, the liberal view, regards the threat as manageable. Despite the rivalry and the security dilemmas that it generates, the liberals take a relatively benign view of China. They argue that the China-India rivalry does not boil down to a “zero-sum” game but as one that involves absolute gains, especially in economic terms. The liberal view of China in India, however, is a minority one. India’s national security managers and the strategic elites at large view the China-India rivalry in terms of relative gains. They regard Chinese policies as instrumentally designed to maintain strategic leverage over India, contain it in South Asia, and prevent it from emerging as a great power in Asia and the world (Malik 2011, 51–62). Three issues are of particular concern to India’s national security managers: (1) the border dispute; (2) China’s attempts to divide India’s strategic attention; and (3) the emerging maritime rivalry in the Indian Ocean region.

### *Unsettled Border Dispute*

The unsettled border dispute with China remains a core Indian security concern. This dispute lies at the heart of the belief among India’s national security managers that China wishes to leave the border unsettled as a means of retaining strategic leverage over India. According to Jeff Smith, negotiations on the border issue remain the longest that any two states have conducted on the subject in the post-World War II era (Smith 2014, 29). After eight rounds of border talks (1981–88), 14 rounds of Joint Working Group meetings (1989–2002), and 15 rounds of meetings between special representatives (2003–2014), the border dispute seems farther from resolution than ever (Smith 2014, 29–30).

The high point of Chinese and Indian amicability was reached in 2005, after which the border dispute once again flared up. On the positive side, both countries have agreed not to hold their overall relationship hostage to the border dispute (Smith 2014, 30). In 1993, they signed the *Agreement on the Maintenance of Peace and Tranquility on the Line of Actual Control*, which was followed in 1996 by the *Agreement on Confidence Building Measures in the*

*Military Field Along the Line of Actual Control*. The first agreement commits the parties to the non-use of force and the use of peaceful means to resolve the border dispute (United Nations Peacemaker, 1993). The second reduces the presence of military forces along the line of actual control and restricts the scale of military exercises (United Nations Peacemaker, 1996). The net result of both agreements has been the absence of any large military clashes between India and China since 1967.

Beneath these diplomatic agreements, however, tensions have flared up again. India believes that China has backtracked on its commitment on the principles of border settlement that the two parties agreed to in 2005 and that Chinese leaders have boldly reasserted China’s claims over the disputed territories in India’s northeast (Smith 2014, 39–40). Likewise, Indian national security managers complain that China has dragged its feet on recognizing Sikkim’s accession to India even though India acquiesced to Chinese claims over Tibet (Malik 2011, 145–151). Further, China has embarked on a massive program of infrastructure development of roads and railways to connect Tibet to the western parts of China, efforts that are likely to reinforce the People’s Liberation Army’s (PLA) logistic advantage over the Indian military (Smith 2014, 41).

Post-2005, India has responded similarly by toughening its diplomatic posture against China. India is now no longer willing to reiterate its commitment to a “One China” policy in the absence of Chinese reciprocity over Indian claims in Kashmir (Madan 2014). It has also ended its deference toward Chinese sensitivity over the Dalai Lama and allowed the latter and his regime greater political latitude that trespass on Chinese claims (Smith 2014, 93–94). Most significantly, India is responding to Chinese infrastructure improvements in Tibet with a massive military build-up of its own. This involves improvements in the road network in the border regions of the northeast and the northwest (Katyal 2014), the raising of two new mountain infantry divisions (Patil 2013), the upgrading of airports, deployment of land attack cruise missiles, and the newest com-

bat aircraft in the IAF’s inventory (Smith 2014, 42). The India-China border is now beset with heavy patrolling, intrusions, standoffs, and tensions that could trigger armed clashes in the future (Fairclough 2014).

#### *Dividing Indian Strategic Attention*

In the last three decades, China has feigned indifference toward Indian power but has worked actively to confine it to South Asia (Tellis 2002, 137-145). It has achieved this by dividing Indian strategic attention between two fronts (Pakistan and China) and by countervailing Indian power through the building of economic and strategic relations with its neighbors in South Asia (Smith 2014, 151-152). Pakistan in particular has emerged as China’s primary counterweight to India in the region. China’s “all weather relationship” with Pakistan involves the supply of conventional arms (Malik 2011, 165-188). But more critically, it has involved assistance to Pakistan’s nuclear weapons and strategic delivery programs in the realm of weapon design, testing, diagnostics, the sale of complete ballistic missile systems, and plants to manufacture them (Reed and Stillman 2009, 252-253). The sophistication of Pakistan’s nuclear operational planning and confidence in its ability to execute nuclear operations suggests that Chinese assistance may be far more extensive than is publicly known.

India’s national security managers are not only concerned with the direct threats that Chinese proliferation to Pakistan poses for India, but also for its indirect implications that are far more lethal. Pakistan’s external policy toward India is driven by both revanchism and revisionism. Since the 1980s, Pakistan has leveraged nuclear weapons to wage a low-intensity conventional war against India by training and arming insurgents in the Indian states of Punjab and then Kashmir (Kargil Review Committee Report 1999, 53-78). It has intervened directly as by its attempt to seize Indian territory in Kashmir’s Kargil heights in 1998-99 (Singh 1999). Likewise, Pakistani based terrorist groups, many supported directly and indirectly by Pakistani intelligence agencies, have waged terror attacks including the 2001 attack on the Indian parliament (Dugger 2001), and the 2008 attack in Mumbai (Rotella 2013).

Pakistan has used its nuclear arsenal as a shield from behind which to wage an undeclared asymmetric war against India. Its nuclear weapons program, aided by China, has immobilized Indian’s conventional war machine. As a consequence, a regime of “ugly stability” has descended upon South Asia with frequent crises and occasional threats of war (Tellis, Fair, and Medby 2001). The direct cost of this ugly stability to India in terms of lives lost and financial outlays over three decades has been immense. But its geostrategic implications are even more profound. China has essentially become an indirect party to Pakistan’s strategy of a “thousand cuts” to bleed the Indian military. From the Indian national security managers’ point of view, Chinese nuclear proliferation assistance to Pakistan has created instability in the region and poisoned relations with China.

#### *Naval Rivalry in Indian Ocean Region*

Finally, the increasing presence of the Chinese navy and regular patrols in the Indian Ocean region have become the third component of the India-China rivalry. Prior to the 21st century, both the People’s Liberation Army Navy (PLAN) and the Indian Navy (IN) lacked the capabilities and interests to conduct operations in the Indian Ocean and the South China Sea. But this is no longer the case. Given its increasing energy dependence on sea-based imports, China’s South Asia policy in the past 13 years has morphed into a broader Indian Ocean strategy (Smith 2014, 146-155). As a consequence, China has assiduously courted and established container terminals and allegedly listening posts and radar stations along the Indian Ocean littoral (Smith 2014, 151-152). Over time, these investments have proven to be economic and not military. But China’s forays into the region has aroused concerns in India that over time commercial investments could give way to negotiated access and support for the PLAN’s vessels of war.

Just as the PLAN now has a semi-presence in the Indian Ocean region, the IN too has sent naval vessels to participate in US-led exercises in the western Pacific (U.S. Dept. of Defense 2011). China in turn deploys naval vessels off the coast of East Africa to assist with anti-piracy operations (Erickson and Strange 2013). Chinese submarines also conduct patrols out of Hainan island and operate west of the

St. of Malacca, including that of a nuclear submarine recently (Page 2014). Privately, Chinese military officers assert that China is no longer willing to concede the Indian Ocean as India's sphere of influence and the PLAN's semi-permanent presence has breached India's unofficial Monroe doctrine (Smith 2014, 154-155). The naval rivalry between China

and India is still in its formative stages. It is by no means certain if it will become inflated in the future. However, India's development of a submarine-based nuclear deterrent and China's submarine patrols, particularly the deployment of nuclear hunter-killer submarines in the Indian Ocean, is likely to cause incidents and raise tensions in the future.

## THE NUCLEAR DIMENSION

In the wake of India and Pakistan's nuclear tests in 1998, North Korea's subsequent nuclear tests in 2006, '09, and '13, and the continued development of operational arsenals in China, India and Pakistan, it is generally accepted that the Asia-Pacific is now the epicenter of the “second nuclear age” (Tellis 2013, 13-23). Many observers point to an apparently three-way nuclear arms race between China, India and Pakistan although the motivations of the countries involved vary significantly. Historically, China's nuclear arsenal development, its modernization, and attempts at operational improvements have been directed at the US, the US's regional allies in the Asia-Pacific, the former Soviet Union, and now Russia (Lewis 2013, 68-74). India has been a relatively marginal factor in Chinese nuclear concerns. Chinese leaders and its military have sought to squander India's strategic attention through nuclear assistance to Pakistan and have neither addressed its nuclear security concerns nor acknowledged its nuclear status. In the process, they have exacerbated India's security dilemmas (Tellis 2002, 137-145).

For India, China remains at the center of its nuclear security dilemma. India's nuclear quest was triggered by the humiliating defeat of its military during the 1962 war with China along the Himalayan border (Ganguly 1999, 151-153). Although India's nuclear weapons program was largely passive until the early 1980s, its unsettled border with China, the occasional Chinese threats during crises and wars with Pakistan, and ultimately Chinese assistance to Pakistan remain causes for concern. The consensus in India is that the immediate nuclear threat to India emanates from Pakistan. India's military and its national security managers, however, view the longer-

term threat from China. India's national security managers also express the fear that a border conflict could involve nuclear blackmail. China might attempt to intimidate Indian leaders into abandoning claims by inducing a collapse of political will (Tellis 2001, 58-75, 273-280). The Indian military and strategic elites are also unconvinced of China's NFU pledge on grounds that it is unlikely to apply to territories China claims as its own or even disputed ones (Shankar 2010). Due to such fears, the long-term nuclear operational goals in India are geared toward deterring China.

In the China-India nuclear dyad, power asymmetries clearly favor China. China has developed three generations of nuclear warheads – fission, thermonuclear and enhanced radiation, has tested and may possess tactical nuclear weapons, has a four decade lead over India in the development, deployment, and operations of ballistic missiles as well as procedures and training protocols for deployment and use of nuclear weapons. It also enjoys a three-decade lead in the development of a sea-based deterrent (Kristensen and Norris 2014). These technical and operational asymmetries notwithstanding, historically, both the Chinese and Indian programs have shared surprising convergences.

### *Idiosyncratic leaderships*

The nuclear weapon programs in both countries have been shaped by the ideological predilections of political leaders at the very top. In China, Mao and later Deng Xiaoping, imposed a political logic on the program (Fravel and Medeiros 2010, 51). In India the Nehru-Gandhis and their successors in the prime minister's office have done the same (Basur

2001, 181-198). The political leaderships in both countries have embraced the idea that nuclear weapons, because of their scale of destruction, are unusable in war, which makes them political weapons. They have therefore felt the need to avoid the runaway nuclear upmanship of the sort pursued by the superpowers during the Cold War. Leaderships in both countries have believed that a small nuclear deterrent and the prospect of assured retaliation is very likely sufficient to vacate nuclear threats from a stronger adversary (Fravel and Medeiros 2010, 51; Basrur 2001, 181-198). Above all, they have regarded nuclear weapons as symbols of prestige, means to close the capability and technological gaps with other great powers in the international system (Lewis 2013, 68-71; Perkovich 1999, 445-450).

#### *Technological determinism*

Historically, arsenal development in both countries was and is still led by technocratic elites. Chinese warhead designs and ballistic missile developments were driven by scientific and technological imperatives to test and develop newer systems and close the gap with the great powers in the international system (Lewis 2013, 69-71). In India too, the scientific elites in the past have preferred to develop “technology demonstrators” to operational systems (Kampani 2003, 56-58). The political leaderships in both countries have remained sympathetic to this technocratic view of the scientists. The latter’s entrenchment within decision-making institutions has overshadowed the military’s user-related demands. As a result, until recently, there existed large operational gaps in both Chinese and Indian nuclear capabilities.

#### *Weak role of militaries in operational planning*

Because of the command of the scientific-technological community in giving direction to nuclear weapon programs and delivery capabilities, as well as the dominance of the civilian leaderships who have sought to impose their top-down political view of nuclear weapons, the professional militaries, unlike the cases of other nuclear weapon powers, until

recently played a marginal role in planning the use of nuclear weapons. Until the late 1980s, China’s Second Artillery Corps (SAC), the agency tasked with the custody and use of nuclear weapons, lacked institutional capacities to develop a serious operational capability (Fravel and Medeiros 2010, 51-52). In India’s case as well, the military remained until the last decade, shut out of operational plans on nuclear weapons (Kampani 2013, 106-109). Hence, China, until the late 1980s and possibly even the mid-1990s possessed a truly minimal retaliatory capability (Fravel and Medeiros 2010, 53-55). In India’s case as well, until the last decade, nuclear weapons were not embedded into soft institutional and organizational routines that could give India a true use capability (Kampani 2014, 81-82).

#### *Emphasis on Operationalization*

Both China and India, however, are becoming increasingly cognizant of the challenges of operationalization. In China’s case, the realization has dawned that its capabilities suffer from serious lacunae – both hardware and institutional-organizational – that leave it dangerously vulnerable to a first strike by the United States and Russia. Among other factors, the passing away of idiosyncratic strongmen, the growing professionalization of the PLA, especially the SAC, the greater availability of funds, and the maturing of technological programs launched in the 1980s and 1990s have added to the push for better operational capabilities (Lewis and Xue 2012, 45-62). India’s stepping out of its nuclear closet in 1998 and formal claims to nuclear status have also produced a realization among its national security managers that India must develop operational capabilities because its nuclear adversaries assume that it possesses such capabilities and will proceed to act on that assumption during a future crisis or war. In addition, the growing institutionalization of the professional military’s role in policy planning has also led to the realization that symbolic capabilities are likely to produce deterrence failures (Karnad 2008, 83-105).

## CHINA

### HISTORICAL SOURCES OF CHINESE RESTRAINT

In comparison to its nuclear peers, China's arsenal has remained small and crude. Until 2008 it was estimated to consist of no more than 151 nuclear warheads. The core of the arsenal remains a small force of land-based mobile ballistic missiles (Fravel and Medeiros 2010, 54). Chinese nuclear bombers are obsolete and its “boomer” submarine fleet is believed to operate without its complement of ballistic missiles (Jeremy 2014). Until about a decade and a half ago, China primarily deployed liquid-fuel engine missiles that required long and laborious preparations for launch (Lewis and Di 1992, 5-40). Warheads were and are still stored separately from the missile systems (Stokes 2010). Similarly, until the late 1980s, China had a skeletal early warning system to warn of an impending nuclear attack and its command and control connectivity was considered fragile (Mulvenon and Yang 2003, 193-208). These conditions left the Chinese arsenal highly vulnerable to a pre-emptive attack. Since the early 1990s, China has sought to modernize its arsenal as well as institute more robust operational practices. But scholars and policy practitioners have puzzled over China's historical inattention to its nuclear force as well as the future direction of its force modernization and operational profile.

Despite the limited availability of Chinese source materials and data, scholars have pieced together the evidence that very likely explains this puzzling behavior. Their evidence and explanations cover ideological, structural, and institutional factors and also offer clues to the future direction of China's nuclear trajectory.

From 1964 when China tested its first nuclear weapon until the ascent of the third generation of Chinese leaders in the 1990s, the nuclear arsenal was shaped by the views of China's strongmen: Mao and Deng Xiaoping. Both leaders and their top cohort believed that nuclear weapons served the purpose of deterring their use by others, that such weapons were generally unusable for war fighting purposes, and that China needed a small arsenal to close the technical gap with its peers in the international system. Nuclear weapons for this generation of China's leadership served the purposes of symbolism and

deterrence. Although Chinese leaders such as Mao and Marshal Nie Rongzhen did spell out the political principles of nuclear policy – NFU and assured retaliation – they did not issue directives to the military on operational policy (Lewis and Xue 2012, 47).

It is not atypical for political leaders to not delve into operational aspects of military policy. That task is generally the domain of professional militaries. In China, however, this did not happen until the late 1980s as the PLA was caught up in the turmoil of the Cultural Revolution from 1966 until 1976. The PLA's academic and officer training institutions, the Academy of Military Sciences and the Military Affairs Academy ceased to function and an entire generation of military officers was left formally unschooled in military affairs, strategy, and doctrine. The aftershocks of the Cultural Revolution reverberated in the PLA well into the 1980s and caused severe damage to Chinese military institutions (Fravel and Medeiros 2010, 51-52).

In this institutional vacuum, information relating to the state of the nuclear weaponization program was compartmentalized and confined to a small group of political leaders within the Chinese Communist Party and weapon scientists. This coterie of weapon scientists and technologists assumed a predominant role in giving direction to the Chinese arsenal. They interpreted Mao and Deng's political principles to favor technical advances over operational requirements of the PLA's General Staff Department (Lewis 2013, 69-71). All information concerning the nuclear weapons program and its related delivery systems was cocooned in an intense regime of secrecy. Given such tightly restricted information flows, the PLA and its Second Artillery, the agency formally entrusted with the nuclear deterrent, had few institutional means to plan for an operational nuclear strategy (Fravel and Medeiros 2010, 70-71).

The technical determinism in the Chinese nuclear arsenal's development became apparent in several ways. For example, China developed and tested an enhanced radiation warhead (neutron bomb) in the 1980s as well as tactical nuclear weapons but has allegedly not deployed either (Lewis 2013, 70-71;

Johnston 1995-96, 34-35). Similarly engineering improvements were incorporated in the small family of land-based ballistic missiles. These improvements, however, did not translate into an increase in deployed numbers of these missiles (Lewis 2013, 70-71). In the 1980s, the development of the sea-based arsenal was suspended and money diverted for computing and space travel (Lewis 2013, 70). In

doing so, the technologists and the political leaders hoped to galvanize China's high-tech industry and close the gap with the more advanced technological powers. In essence, the PLA's Second Artillery was tasked with managing the nuclear arsenal. But it was not tasked with force planning or determining the size and shape of the force on the basis of its operational requirements.

## THE SHIFT FROM TECHNOLOGICAL DETERMINISM TO MODERNIZATION AND OPERATIONAL PLANNING

Starting in the late 1980s and early 1990s Chinese military strategy began to change with a new emphasis on the modernization of the Second Artillery Corps. Unlike China's first and second-generation leaders, the third-generation realized the significance of high-technology in modern warfare showcased so spectacularly by US successes in the first Persian Gulf War. The advent of precision-strike, surveillance, and information dominance technologies and doctrines that enveloped them institutionally and organizationally not only threatened China's obsolete conventional military, it highlighted the grave implications for its nuclear force survivability, strategic connectivity, and command and control (Lewis 2013, 71; Lewis and Xue 2012, 50-51). With the Cultural Revolution behind, there was a renewed emphasis on professional training and education in the PLA and its SAC. And as China's economic successes during the 1980s and 1990s made larger defense budgets possible, the focus within SAC shifted to hardware modernization and operational planning.

### *Hardware*

The primary developments in China's nuclear hardware modernization in the last two decades are the replacement of liquid-engine with solid-motor missiles and a serious attempt at developing a submarine-based ballistic missile force. Starting in the early 1990s, the DF-21, a two stage solid-fuel road mobile missile began replacing the oldest missile in the Chinese inventory, the DF-3A. The nuclear version of the DF-21 comes in two models, A and B, with ranges of 1,750km and 2,150km respectively and the missile carries a single 200-300kt warhead. The DF-21 is China's primary weapon targeted at regional powers including India. A third 'C' model

of the DF-21 deploys conventional warheads and is primarily aimed at Taiwan (Kristensen and Norris 2013, 80-81). But given the missile's mobility, it could easily be re-deployed against Indian targets.

China also began deploying a second missile, the DF-31, in 2006. The DF-31 is a three-stage solid-motor system with a 7,000km-range. It is believed to be the primary weapon that would be used to target regional rivals such as Russia and India (Kristensen and Norris 2013, 81). A still longer-range DF-31A (11,000km-range) currently being developed will very likely target the United States. Thus far, US intelligence agencies have counted a small number of launchers associated with the DF-31 and the missile is believed to deploy a single 200-300kt warhead (Kristensen and Norris 2013, 81-82). US intelligence agencies believe that China is capable of developing a multiple independently targetable re-entry vehicle (MIRV) and maneuverable re-entry vehicle (MARV) capability for its ICBMs and may be developing a MIRV capability for its road mobile DF-31A (OSD 2013, 31). The multiple warhead capability will permit the incorporation of decoys on the missile to defeat the US missile defense system. The use of decoys, however, will increase the payload of the missile and reduce its range. The consequences of heavier payload and reduced range, while likely to produce negative trade-offs in the China-US nuclear dyad, will not have similar negative implications for Chinese targeting plans against India.

In addition to the land ballistic missile fleet, China has developed a 1,500km-range land attack cruise missile, the DH-10, which can be launched from a mobile launcher. China is also believed to be developing an air-launched version of the DH-10 that



could be deployed on the H-6 bomber (Kristensen and Norris 2013, 82). The US air force and intelligence agencies judge the cruise missiles to be conventional and nuclear capable and China is believed to have tested a warhead for cruise missiles in 1995 (Kristensen and Norris 2013, 83). This system provides China a flexible albeit limited nuclear attack capability against India.

Finally, China is seriously pursuing a sea-based ballistic missile capability. The current and only Xia-class nuclear submarine armed with JL-1 ballistic missiles is slated for retirement soon. It is in the process of being replaced by three Type 094 or Jin class submarines, which are currently operating without their missile complements. Each submarine is expected to deploy 12 JL-2 missiles (OSD 2013, 6). The JL-2 was tested in 2012 and is similar to the DF-31 (OSD 2013, 31). It has an estimated range of 7,400km and may come with penetration aids or possibly carry a single warhead. The Type 094/Jin-class submarines will in theory provide China with a secure second-strike capability against regional powers such as Russia and India and against the US in the Western Pacific. US intelligence agencies believe that China will likely build a total of five submarines of the Type 094 class before developing the next generation Type 096 submarines in the next decade (OSD 2013, 6).

#### *Nuclear Operations and Use Strategy*

Although the key elements of Chinese nuclear policy are well known in public, until recently little was known about the Chinese military's operational nuclear strategy. Policy entails the political principles that govern China's nuclear forces. The stated elements of Chinese nuclear policy include the acquisition of nuclear weapons solely for defensive purposes, the political commitment not to use nuclear weapons first against a nuclear adversary, resolve against threatening nuclear use against non-nuclear weapon states and nuclear-free zones, the assurance not to proliferate nuclear weapons to other countries or deploy nuclear weapons abroad (Lewis and Xue 2013, 46-47). Operational policy on the other hand consists of the principles and procedures regarding the storage, safety, deployment,

maintenance, alerting, and firing of nuclear weapons. It concerns strategic connectivity between the national command authorities and the military leadership and most importantly how China proposes to use nuclear weapons during crises and wars.

In the history of China's nuclear arsenal development, operational aspects of policy only began to gain importance from the late 1980s and early 1990s onward. This was the consequence of domestic institutional reforms, the training and institutional development that created the means for the Second Artillery to think through operational aspects of policy (Lewis 2013, 71). The institutional reforms and growing professionalization has led to a debate within the Chinese military and its national security managers over the operational aspects of deterrence, particularly “minimal” versus “limited” deterrence and the retention of China's historic NFU policy (Johnston 1995, 5-42).

The Second Artillery established an academic research office at the headquarters level for the first time in 1978 and issued the “Science of Second Artillery Campaigns” in the early 1980s, which scholars believe constitutes its first major study on nuclear weapons after China exploded a nuclear device in 1964 (Fravel and Medeiros 2010, 67; Lewis and Xue 2012, 48). Until 1987, however, the Second Artillery lacked a comprehensive and integrated operational nuclear strategy (Lewis and Xue 2012, 48). In 1987 it published the “The Science of Military Strategy” which is regarded as the PLA's first comprehensive text in the post-1949 era on military and nuclear strategy (Lewis and Xue 2012, 48; Fravel and Medeiros 2010, 68).

Although the nuclear aspects of this “operational text” exclusively focused on China's handling of a Soviet nuclear strike, it laid down the central tenets of China's operational nuclear doctrine, namely: (a) deterring a nuclear attack; and (b) absorbing a nuclear attack and then launching a counterstrike through means of assured retaliation. This text highlights the constraints placed on China's operational capabilities by the small size of its arsenal, and a growing awareness for increased numbers. The PLA's grow-

ing nuclear sophistication becomes evident from the emphasis on achieving better effectiveness, which is the sum of warhead miniaturization, penetrability of the delivery system, and overall systems reliability (Fravel and Medeiros 2010, 69–70). Despite China’s political emphasis that nuclear weapons are instruments of deterrence and not war fighting, yet by the late 1980s there are hints in the Chinese use strategy of the blurring of distinctions between counterforce<sup>1</sup> and countervalue<sup>2</sup> targets and a stress on counterforce attacks on an enemy’s military as well as economic power centers (Lewis and Xue 2012, 59).

In 1993, the Central Military Commission (CMC) under China’s third generation leadership led by Jiang Zemin issued new directives to the PLA to develop principles for fighting and winning “local wars” under “high-technology conditions” (Lewis and Xue, 51). Each of the services including the Second Artillery developed operational plans. The new guidelines for nuclear operations were completed by the early 2000s. Like their 1987 predecessor, these new guidelines emphasize “close defense” and “key point counterstrikes.” (Fravel and Medeiros 2010, 76–77) The former concerns force protection and survivability through mobility and concealment. The latter concerns China’s retaliatory policy, which is a combination of counterforce and countervalue strikes. The goal of the Chinese military is to shock a nuclear adversary into capitulating and de-escalating a conflict. By the mid-2000s Chinese military publications also make clear that China’s goal is to develop a “lean and effective” nuclear force and they reiterate its NFU nuclear use doctrine (Fravel and Medeiros 2010, 77).

From the late 1980s and early 1990s a debate has raged within the Chinese military on whether China should continue with Mao’s traditional “minimum” deterrence posture or whether it should adopt a more ambitious “limited deterrence” posture. A useful definition of minimum deterrence is that it “threatens the lowest level of damage necessary to prevent attack with the fewest numbers of nuclear weapons possible.” (Fravel and Medeiros 2010, 50) The determinants of minimum deterrence are the ability to conduct undifferentiated attacks against counterval-

ue targets, a small and finite arsenal, and relatively unsophisticated command and control. A limited deterrence posture on the other hand entails “limited war fighting capability to inflict costly damage on the adversary at every rung on the escalation ladder, thus denying the adversary victory in a nuclear war.” (Fravel and Medeiros 2010, 50) It demands larger, more diverse and sophisticated nuclear forces with multiplication of delivery systems and warheads, a robust command and control, civilian defense, and the ability of the military to conduct sustained and repeated nuclear attacks.

Chinese analysts distinguish “minimal” and “limited” deterrence postures from “maximalist” postures of the type pursued by the US and the former Soviet Union during the Cold War. A maximalist posture entails capabilities that allow the execution of a disarming first strike aimed at counterforce targets and sustained war fighting (Johnston 1995, 18). They reject this because of its cost, technical complexity, and the hegemonic principles it signifies. But between nuclear minimalism and limited postures, they favor the latter. The PLA’s preference has to do with the growing realization that (a) minimal capabilities are vulnerable to a pre-emptive attack; (b) that crude countervalue targeting does not help in either controlling escalation or achieving intra-war deterrence; and (c) that deterrence is actually achieved when the deterring party signals a will to be able to fight a nuclear war. The latter is more likely when the deterring party possess the ability to initiate nuclear attacks across a spectrum of violence ranging from tactical to strategic nuclear use (Johnston 1995, 17–18).

The debate on a limited posture has also become enmeshed with another, on whether China should abandon its historic adherence to NFU or alternatively dilute it by qualifying it. The rationale once again is that NFU leaves China vulnerable (Johnston 1995, 21). Alongside these debates are also attempts in what Ian Johnston dubs the Sinification of nuclear strategy. Following the ancient Chinese military strategist Sun Tzu’s maxim that the most efficient victory is the one that results from a war never fought, Chinese military professionals often favor the coercive elements of nuclear strategy either politically or in military operations (Johnston 1995, 17).



Thus alongside China's actual targeting plans, there is ambiguity on whether China proposes to launch nuclear forces under attack, or under circumstances when it claims it is fighting on its (or disputed) territory, or when it receives intelligence that a nuclear attack is imminent.

Western experts generally agree however that there is a vast gap between these doctrinal debates and China's ability to execute more ambitious nuclear operations. Optimists argue that Chinese warheads and delivery systems are not increasing to numbers that would signify the transition to a limited deterrent posture. China at best is improving the mobility, range, reliability, and survivability of its nuclear forces by building a new generation of delivery systems. This fits in with a minimal deterrence posture. Similarly, China's nuclear command and control and relatively weak strategic connectivity is another

indicator of its minimalist posture. Nor has China likely deployed tactical nuclear or enhanced radiation weapons that would suggest nuclear battle fighting capabilities (Fravel and Medeiros 2010, 81-82; Johnston 1995, 31-35). The PLA has however conducted exercises since the mid-1950s simulating war under battlefield nuclear conditions. But China is believed to possess limited data on the effects of battlefield nuclear weapons (Johnston 1995, 27-28, 34-35). What all this evidence likely suggests is that China's civilian leadership has reasserted control over the military and rejected the limited nuclear posture in favor of China's historic minimalist stance. However, it could well be that China's posture toward the US is minimalist while its improving force capabilities in the future will permit it to maintain a limited deterrent posture toward regional rivals including India.

## INDIA

### HISTORICAL SOURCES OF INDIAN RESTRAINT

Although India has embarked upon an ambitious attempt to develop an operational nuclear arsenal in the last fifteen years, a series of structural constraints have created powerful path dependent effects, which place overall limits on the scope of its program. These constraints, like that of its Chinese counterpart, have to do with the ideological predilections of India's political leadership, the predominant role of civilian scientists who favor technical demonstrations over operational systems, the stymieing institutional effects of excessive secrecy, and the limited role of the military in operational planning. Although the Indian military now has a larger role in shepherding the nuclear arsenal, like China's SAC, it shares this role with a host of other actors, which limits its autonomy in policy planning.

Indian political leaders have accepted a primarily political role for nuclear weapons as against a war fighting one. From 1989-1993 when India first acquired nuclear weapons, its top political leadership has internalized the notion that nuclear weapons best serve the purposes of deterrence (Perkovich 1993, 85-104). The view among most of India's

civilian national security managers who determine policy is that nuclear weapons prevent other nuclear weapon powers from making nuclear threats and their most purposeful use is to countermand the effects of blackmail. As India acquired a rudimentary nuclear weapons capability in the 1990s, several Indian and western scholars justified this crude capability on grounds that "existential" deterrence was sufficient to ward off nuclear blackmail (Perkovich 1993, 85-104). Post-1998, this Indian belief morphed into the doctrine of minimal deterrence (Draft Nuclear Doctrine 1999) and more recently there are indications that India might ultimately adopt a limited deterrence posture (Karnad 2008, 92-96). Such mutations in policy notwithstanding, Indian decision-makers tend to regard nuclear weapons in existential terms.

Because India was a nuclear fence sitter for nearly 15 years after it conducted a nuclear test in 1974, civilian scientists (nuclear and defense) assumed a critical role in the program's development. During these years Indian political leaders sanctioned the development of a host of strategic technologies that

could eventually be harnessed into a nuclear weapons-related effort. But because there was no immediate requirement for operational systems, technical symbolism and demonstration assumed center stage in the program (Basrur 2006, 58-75). Like their Chinese counterparts, Indian scientists too sought to build prototypes to "catch up" with their more advanced peers in the international system and sought to develop technologies as means to keep funds flowing into their laboratories.

Much of this technology development was conducted under a regime of severe internal opacity. Although India was not a party to the Nuclear Nonproliferation Treaty (NPT), yet it remained a principal target of the treaty-regime for many years. US threats to deny India high technology, both military related and dual-use, as well as constrict its sources of international finance, acted to push the program underground, deep into the bowels of the state. Starting in the early 1980s and until 1998, all information concerning the nuclear weapons effort was highly compartmentalized and no efforts were made to institutionalize the state's internal monitoring capacity. Thus huge technical anomalies crept into the program including flaws in warhead designs, which because of the current moratorium on testing, can no longer be cor-

rected (Kampani 2014, 79-114; Karnad 2008, 63-71). This lock-in effect imposes huge design constraints on future developments within India's arsenal.

Finally, until about 2002, the Indian military played a marginal role in nuclear planning, which was largely the domain of civilian scientists. This situation is analogous to the state of the US nuclear arsenal in its early stages from 1945 until 1947-49 (Schlosser 2013, 202-236). Thus, although India possessed nuclear weapons as early as 1995-1996, it did not develop the soft operational routines to use its weapons instrumentally until 1999 (Kampani 2014, 99-104). The Indian government institutionalized the participation of the military in the form of the Strategic Forces Command (SFC) in 2002. But like the Second Artillery in China, until about 2005-2006, the SFC managed the arsenal but played a marginal role in planning for it on the basis of operational requirements. Much has changed since then. However, the path dependency effects of India's peculiar civil-military relations and the dominant role of the civilian scientists have created considerable teething problems in the development of robust operational capabilities.

## FROM NUCLEAR SYMBOLISM TO OPERATIONS

### *Institutional and Organizational Developments*

India's stepping out of the nuclear closet in 1998 was a game changer. The end of external nuclear ambiguity paved the way for the collapse of the regime of internal ambiguity as well. It helped relocate the nuclear weapons program from its narrow technical confines and embed it into a broader template of institutions, organizations and procedures, a process that has given meaning to the idea of force employment.

National security-related institutional reforms in India exploded in the aftermath of India's 1999 Kargil War<sup>3</sup> with Pakistan. The principal vector of institutional reform was the Arun Singh 'Task Force on Management of Defense.' It proposed defense reforms in the context of the revolution in military affairs and India's status as a nuclear weapon state.

The heart of its recommendations concerned the creation of an Integrated Defense Staff (IDS) led by a Chief of Defense Staff (CDS) at its head to bring joint planning and coordination among the armed services (Chandra 2005, 49-51; Prakash 2007, 13-31). Pursuant to the Singh task force's recommendations, the government instituted the IDS in 2001. A tri-service SFC to coordinate and manage nuclear forces was subsequently instituted within the IDS in May 2002 (Sawhney 2004, 10; Karnad 2008, 94-95). In January 2003 India also made public the establishment of a National Command Authority (NCA) (CCS 2003).

Since the middle of the last decade, the SFC's organizational presence within India's nuclear planning has grown substantially. One of the SFC's principal

attempts has been to force a change the methodology for nuclear force planning from one based on heuristics to one based on robust statistical damage expectancy (DE) estimates (Postol 1987, 379–380).<sup>4</sup> In the pre-SFC era, it is highly likely that projections of fissile material availability and crude guesstimates for overall systems and pre-launch survivability were the basis for force planning. However, the greater availability of fissile material in the aftermath of the 2005 Indo-US nuclear rapprochement and the deeper institutionalization of the SFC appear to have changed that reality. Senior SFC commanders such as Rear Admiral (retd.) Shankar insists, “Everything is numbers based ... on operations research-based probabilistic analysis. The former is necessary to arrive at facts ... in contrast to the intuitive gut-instinct analysis of the nuclear scientists, politicians, and their civilian advisors in the past” (Shankar 2010).

#### *Nuclear Hardware*

Fission weapons are the mainstay of India’s nuclear arsenal. These very likely have a yield in the range of 12–15kt (Tellis 2001, 319–322), although some analysts believe that the yield of the fission weapons in India’s inventory could be boosted to 30kt (Koithara 2012, 125). Designing reliable boosted weapons entails repeated testing and doubts persist that Indian scientists can build and deploy such weapons on the basis of a single test with confidence. The proven fission design in India’s inventory has a significantly reduced yield-to-weight ratio in comparison to the device tested in 1974. It is also believed sufficiently light and rugged for delivery by combat aircraft and ballistic missiles. During the 1998 test series, the fission device was the only device tested in weaponized form (Sharma, Ashraf, and Santhanam 2009).

It is unclear if India has weaponized low-yield fission devices in the sub-kiloton range. Such devices are ruled out in India’s nuclear doctrine. Statements by Indian political leaders and national security managers make clear that India does not view nuclear weapons as usable weapons on the battlefield. However, the question of a proportionate Indian retaliatory response or “calibrated deterrence” to limited battlefield strikes by Pakistan and China on Indian forces persists both within India’s armed forces and

the strategic community at large. But the Indian government has not acknowledged the existence or planned use of low-yield nuclear devices.

India’s claim that it possesses or is capable of deploying thermonuclear and boosted-fission weapons has met with enormous skepticism both within the country and abroad. Although India’s nuclear establishment claimed in the immediate wake of the 1998 nuclear tests that it tested a thermonuclear device successfully, those claims were contradicted by visual data of the device’s crater morphology, the seismic signal from the test series as well as conflicting data claims and makeovers of the data by the Indian scientists involved in the tests (Tellis 2001, 508–519). The nuclear scientists’ claims were also disputed by members of India’s own nuclear and defense establishment who at one time or another were involved with the weapons design, test, and data verification programs (Iyengar 2009).

As stated in the Draft Nuclear Doctrine 15 years ago, India remains committed to developing nuclear forces based on “a triad of aircraft, mobile land-based missiles and sea-based assets” (NSAB 1999). The Indian Air Force has several nuclear-capable aircraft, which include the Mirage 2000, the Jaguar, MIG-27 and Sukhoi-30 MKI. During the 1990s, a small number of Mirage 2000s was converted to perform nuclear missions (Chengappa 2000, 382–384). Several analysts believe that the Sukhoi-30 MKI may have also been tailored for nuclear missions although the evidence is conflicted (Acheson 2012). The air leg of India’s triad is by far the most flexible and reliable, but suffers from penetrability limitations, especially in targeting China. Some of the range and communications hurdles that impeded the air leg in the 1990s have been partially addressed in the last decade through the acquisition of mid-air refueling systems and airborne early warning aircraft (NDTV 2012; Defense Industry Daily 2013).

Since the early 2000s, India’s operational effort has shifted to developing and deploying land-based ballistic missiles, which afford advantages of longer-range, easier storage, maintenance and mobility. Since then, three variants of the missile, Agni I, II and III have been or are in various stages of entering operational service. Two variants, Agni IV and

V, are in the test phase, while Agni IV is in the design and development phase (Subramaniam 2011; Subramaniam and Mallikarjun 2012). The first five variants of Agni are all capable of deploying a one-ton warhead. Agni VI reportedly will have a three-ton payload capability and will deploy three MIRVed warheads (Shukla 2013).

The Agni I is a 700km road mobile missile. The 2,000km Agni II is rail mobile although it is also available in a road mobile configuration. Both Agni I and Agni II have entered production and have been tested in an operational configuration by the SFC (Indian Express 2011; Mallikarjun 2014). The 3,500km rail mobile Agni III has completed development tests and is in the process of entering operational service (Mallikarjun 2012). The 4,000km Agni IV was likely designed to test new technologies (PTI 2012). It is not clear if the missile will enter operational service or will only serve as a test vehicle to validate technologies that will become incorporated into the Agni V and IV. In 2012, DRDO tested the 5,000km-range Agni V and more tests are planned between now and 2015 (Mallikarjun and Subramaniam 2012). The Agni VI, currently under development, will have the same range as the Agni V, but will deliver a heavier payload and incorporate three independently targetable warheads (Shukla 2013). Like other missiles of the Agni family, it too will be road mobile.

Finally, as first stated in the DND in 1999, India remains seriously invested in developing a secure sea-based second-strike capability. India's current sea-based capability consists of a small number of 350km-range Prithvi liquid fuel missiles deployed on board two offshore patrol vessels (Koithara 2012, 137). For reasons of limited range of both the ships and the missiles, this force represents a token capability against Pakistan. However, India will acquire a true sea-based deterrent when its planned fleet of three SSBNs begins entering service later in this decade and the next.

The first of these boats, the S-2 is currently undergoing sea-trials. The vessel's power plant consists of a 90MW reactor that uses low-enriched uranium. Its

overall displacement weight is 6,000 tons (Prakash 2009). The S-2 has four launch tubes for a ballistic missile with an estimated range of 700-1000km (Sawhney and Shankar, 2012). This missile, variously known as the K-15, Sagarika and more recently the B-05, has been under development since the early 2000s (Bagla 2013). Thus far India's missile development agency has only used underwater pontoons for test launches of the B-05.

The S-3 and S-4 will follow the development of the S-2. These will incorporate modifications and improvements capable of being incorporated within the S-2 hull and supported by its power reactor. However, they will not incorporate any fundamental re-design, which will come in the S-5, the successor to the S-2 class (Sawhney and Shankar 2012). The S-2 is essentially a “technology demonstrator” for follow-on systems. Building it and the successor vessels in its class will help Indian consolidate its submarine design building and industrial infrastructure. Like a carrier task force, however, nuclear submarines have huge operational time lags. Hardware acquisition is only tip of the iceberg as it brings with it requirements for a large ancillary infrastructure for safety, maintenance, refueling, navigation, crew training in operations, communications, and nuclear launch procedures (Shankar 2012).

#### *India's Evolving Operational Idea of Deterrence*

The document that best captures Indian thinking on the *declaratory* aspects of nuclear policy is the draft nuclear doctrine (DND), which was made public in 1999. The DND formalized the core elements of India's nuclear posture that were first prepared in the early 1990s: NFU, “retaliation only” against the use of nuclear weapons, recessed deployment, and assertive command and control (Draft Nuclear Doctrine 1999). The DND did, however, dilute India's historic and unqualified commitment to the principle of NFU against non-nuclear weapon states by stating: “India will not resort to the use or threat of nuclear use of nuclear weapons against states which do not possess nuclear weapons, or are not aligned with nuclear weapon powers” (Draft Nuclear Doctrine 1999).

India's Cabinet Committee on Security (CCS) issued a subsequent document on the "operationalization" of the nuclear doctrine in January 2003, which removed the above caveat. The new document states: "nuclear weapons will only be used in retaliation against a nuclear attack on Indian territory or on Indian forces anywhere" (CCS 2003). The latter clause removed the qualified commitment to NFU. However, by including the possibility of nuclear use against Indian armed forces anywhere it expanded the scope conditions under which India might undertake nuclear retaliation. Further, the January 2003 document also qualified NFU by stating "in the event of a major attack against India or Indian forces anywhere by biological or chemical weapons, India will retain the option of retaliating with nuclear weapons" (CCS 2003). Observers speculate that changes in India's scope conditions for nuclear use are probably (a) a political attempt to extend the benefits of deterrence in the widest possible sense of term; and (b) the result of social isomorphism where Indian doctrine, at least at the level of stated policy, has begun to mimic US doctrinal statements (Sagan 2008, 49). The January 2003 document issued by the CCS also expanded the scale conditions of India's retaliatory response. The original DND proposed "punitive" retaliatory attacks, thereby leaving open the door for proportionate deterrence or retaliatory attacks that were calibrated to match a nuclear attack against India. However, the CCS statement threatens "massive retaliation" regardless of the scale of attacks against India. However, statements from senior Indian military leaders suggest that the operational reality of India's nuclear use policy is more in line with the original DND (Bhavnani 2009).

Scholars such as Ashley Tellis and Vipin Narang, among others, have argued that Indian planners have deliberately eschewed an asymmetric nuclear escalation strategy in war because of the structural advantages India's conventional military enjoys vis-à-vis Pakistan and China as well as the natural defense afforded by the Himalayas in the north (Tellis 2001, 296-475, X; Narang 2014, 78-95). Indian military leaders, however, downplay these structural advantages in private. Their opposition to an asymmetric escalation or a first-use doctrine stems from the massively destructive and uncontrollable nature

of nuclear warfare, which they find impossible to relate to any reasonable political objective barring the removal of a nuclear threat (Shankar 2010). The DND explicitly emphasizes that India would maintain "highly effective conventional capabilities" to "raise the threshold of outbreak both of conventional military conflict as well as that of threat or use of nuclear weapons" (DND 1999). In other words, conventional superiority does not inhere by default in the Indian state. Building and sustaining it constitute a political choice. The choice that Indian leaders have actualized is the avoidance of a conventional situation that might potentially force India into a nuclear corner.

This is not to suggest that strategic rationales, more specifically India's local conventional force asymmetry vis-à-vis Pakistan and China or its favorable geography, have no role in the choice of posture. However, in most Indian formulations on nuclearization, the deductive logic begins with ethical and political rationales and then continues downward to recruit strategic arguments as justifications for posture selection, not the other way around. There is some new evidence to suggest, however, that several senior military leaders in India oppose NFU (Karnad 2008, 90-92). But Indian military leaders' opposition to NFU stems from a reasoning very different from the one rooted in conventional force advantage or geography argument. The first line of reasoning is political. Its goal is enhancing deterrence optimality, but *only* insofar as it concerns preventing nuclear use against India, not war in general. This argument begins with the operating assumption that "nuclear weapons should be treated as political weapons." But "if they are to be treated as political weapons then NFU becomes problematic," because "you have to compel, coerce, or threaten...(otherwise) the initiative for nuclear use will lie with someone else" (Shankar 2010). The second argument has a narrower logistical focus. It stems from the SFC's organizational concerns that given the current state of India's recessed capabilities and distributed command and control, it might find it hard, if not impossible, to mount a credible retaliatory strike in the aftermath of absorbing a nuclear strike (Karnad 2008, 97-98).

But despite these concerns, there is no overwhelming pressure within the SFC or from India’s wider military leadership to jettison NFU. For one, the SFC does not self-identify as a radical force for nuclear revisionism. Rather, its leaders envision it as a professional body whose “sole objective is operational planning to ensure that the arsenal is maintained in a state of readiness sufficient to ensure assured retaliation” (Bhavani 2009). They are also aware that first-use doctrines generate pressures for pre-emption, the “use them or lose them” syndrome. With tactical nuclear weapons “there is an inbuilt propensity to lose control over the escalation process. Once the nuclear threshold is crossed, a large-scale exchange will be likely,” which is something they hope to avoid. Finally, they reason that “if there is incontrovertible evidence that a nuclear attack is imminent, India’s optimal solution would be to preempt using conventional precision strikes” and not nuclear means (Shankar 2010). However, this deci-

sion would be best left to political decision-makers in the moment of that contingency and is not something that need concern the determination of India’s peacetime posture.

Massive retaliation remains the Indian government’s officially declared operational policy. But notwithstanding this declaration, as Ashley Tellis surmised a decade and a half ago, the impending threat of nuclear operations produces a steady pressure downward to the lowest possible level of a nuclear exchange (Tellis 2001, 363–365). And Indian policy is no different. Regardless of India’s public rhetoric of a massive retaliatory response to any nuclear, chemical or biological strike against India, the SFC’s operational plans likely encompass a range of options that include nuclear demonstration shots, tactical use against military area targets on the conventional battlefield, and counter force targets besides large-scale genocidal counter city attacks.

## SOURCES OF STABILITY AND INSTABILITY IN THE CHINA–INDIA NUCLEAR RELATIONSHIP

China and India’s growing rivalry in Asia and developments in their nuclear arsenals tend to provoke alarm. Many scholars and policy analysts correlate the growth and modernization of these arsenals to the beginnings of a nuclear rivalry reminiscent of the one between the US and the former Soviet Union during the Cold War years. Although India and China are not ideological rivals engaged in a life and death struggle of the sort that consumed the superpowers, observers draw from international relations theory and recent history to point to the intensity of geopolitical struggles among rising powers, the propensity of arms races to assume a life of their own, and secu-

rity dilemmas that produce arms race spirals. More specifically, concerns center on China and India’s nuclear modernization programs, the participation of their militaries in nuclear operations planning, and the morphing of their historically restrained nuclear use policies and deterrence postures into more aggressive ones. Others, especially regional observers from both countries, are more sanguine and do not view the nuclear developments in alarmist tones. This section evaluates some of the key sources of stability and instability in the China–India nuclear equation.

### STABILITY

At the outset, it is evident that China and India are satiated powers and their competition is nowhere close to rivaling the US–Soviet global rivalry during the Cold War years. Both states are not only stakeholders in the Western liberal economic order, they also share a common interest in sustaining global institutions particularly those related to global governance,

trade, and financial stability. Their positive agenda of revisionism concerns the expansion of their power in the United Nations (UN) and global financial institutions. Thus China seeks to dethrone the dollar as the global reserve currency. It seeks greater voting rights in the International Monetary Fund (Khong 2013/2014, 153–175). India similarly has sought



a larger role for itself in international institutions commensurate with its power (Nonalignment 2.0 2012, 25-37). On the negative side, their revisionism concerns a narrow defense of Westphalian state privileges against new international legal doctrines of limited sovereignty and humanitarian interventions. Thus both states seek to pursue only partially revisionist agendas in the international system and the targets of their revisionism are the US and its western allies and not themselves. The substance of India and China's rivalry by comparison concerns relatively minor territorial adjustments, the security of the sea-lanes of communications, and security assistance to third parties. Although significant, these issues do not threaten the existential security of either state, a condition that keeps nuclear weapons in the background.

There are other structural factors that also remove nuclear weapons from the front lines of the China-India geopolitical competition in Asia. As scholars of nuclear posture selection including Narang have explained, both China and India are geographically vast, a condition that provides them “strategic depth” against conventional invading armies. States with large territories have the luxury of time in conventional wars and can afford to trade space for time when confronted with losses and defeat. The same does not hold true for small states with limited geographic depth such as Pakistan and Israel. The latter must perforce use or at least threaten to use nuclear weapons to stave off defeat as their existential security might become at risk early during a conventional war (Narang 2014, 78-95).

States endowed with large populations and well-endowed conventional militaries are similarly less inclined to threaten nuclear use early in war. Both China and India meet these second criteria as well. Reasons of ideological constraints apart, a powerful conventional military incentivize both countries to adopt a relaxed NFU nuclear posture. An NFU posture in turn has other positive effects on nuclear stability. It permits the disaggregation of arsenals such as the Chinese and Indian practices of keeping war-

heads separate from their delivery systems. Arsenals need not be maintained on high alert in peacetime and dispersed in the field on ever ready. This in turn permits the institutionalization of highly centralized command and control systems. It also reduces the likelihood of accidental nuclear attacks due to false alarms or inadvertence. The existence of large and powerful conventional militaries thus creates structural conditions for nuclear stability.

No doubt, both China's SAC and India's SFC are critical of the NFU policy. Both militaries would prefer the substitution of minimalist with limited deterrence postures. Some observers view these internal debates as ominous markers of an ugly nuclear competition and instability to come. However, the evidence suggests that China's political leadership has sought to retain the NFU and minimal deterrence postures despite pressures from the PLA (Fravel and Medeiros 2010, 78). Chinese nuclear force developments: the small number of warheads; the likely absence of TNWs and enhanced radiation weapons; the modest force modernization efforts; weaknesses in strategic connectivity; the absence of missile defenses; and other weaknesses relating to intelligence and reconnaissance are indicators of the gaps between the Chinese military's internal doctrinal debates and China's actual force capabilities. Although the Second Artillery now plays a larger role in shepherding China's nuclear forces, it is only one actor in China's nuclear decision-making process (Fravel and Medeiros 2010, 83-84). The position of the Indian military is no different. Indian leaders have institutionalized the participation of the military in nuclear operations planning alongside civilian defense scientists under the leadership of the National Security Advisor in the prime minister's office (Saran 2013). Policy outcomes in both China and India suggest that civilian leaders retain a strong veto over unbridled military competition and any changes in use and doctrinal postures will likely remain a slow process.

## INSTABILITY

Despite the existence of structural and institutional factors that act as restraints on the China–India nuclear rivalry in the short term, stability is far from assured in the medium and long term. Assured destruction stemming from secure second-strike capabilities is broadly accepted as a *sine qua non* among deterrence theorists. China for decades lacked that capability against the US and Soviet forces and even today remains vulnerable to a US first strike. China, of course, suffers no such vulnerabilities when it comes to regional powers such as India. But like the small and crude Chinese arsenal of the decades past, India’s nuclear capabilities vis-à-vis China are rudimentary. Although India is rapidly developing a family of medium and intermediate-range ballistic missiles, it does not currently possess the ability to hold significant Chinese population and economic centers hostage. Indian strike forces also suffer from reliability concerns, raising questions about the Indian arsenal’s DE probabilities. Further, an Indian submarine-based deterrent capable of threatening China will probably take another decade to develop. In essence therefore, India does not yet possess the technical means that could undergird a regime of stable nuclear deterrence with China.

Emerging and proposed technical developments in the Chinese and Indian arsenals also raise questions whether their currently recessed force postures can remain a constant in the future. The principal development in this regard is the emergence of a submarine-based ballistic missile force. China is on the verge of deploying such a force while India is in the process of developing one. It is highly unlikely that the current Chinese and Indian de-mated postures involving the separation of warheads from delivery systems will survive the transition to a sea-based system (Lewis 2013, 76; Shankar 2010). The separation of delivery systems and their warhead packages is impossible aboard submarines and the transition to sea-based deterrents will undoubtedly change the readiness profile of nuclear forces in both China and India. Similarly, China and India’s deployment of road and rail mobile solid-fuel ballistic missiles and their placement in canisters is an attempt to improve mobility and survivability. As

missile systems become more mobile and the military organizations manning them more professional, pressures will likely grow for ending the institution of de-mating as well for replacing physical controls with procedural ones. If China and India make this institutional transition, a higher readiness posture will ensue by default.

India and China are also developing MARV and MIRV technologies and future missile systems could deploy multiple warheads alongside decoys. In the US and Soviet competition, multiple warheads were considered the bane of nuclear instability due to their potential for disarming first strikes. As the accuracy of Chinese and Indian missile systems improves alongside real time advances in reconnaissance, intelligence gathering, and surveillance capabilities, the potential for splendid first strikes could emerge as a theoretical option, especially for China in the context of India. India is also exploring missile defense technologies and may well deploy a limited ballistic missile defense in the future (Narang 2013, 146–147). A MIRV capability deployed in juxtaposition with a ballistic missile defense would be highly unstable and likely trigger demands for technical countermeasures as well as an increase in Chinese numbers (Fravel and Medeiros 2010, 84–85).

Gradually, the professional militaries in both countries have begun playing a more significant role in the planning for nuclear operations (Lewis and Xue 2012; Fravel and Medeiros 2010; Bhavnani 2009; Shankar 2010). These plans have inevitable spillover effects in force planning. Unlike political leaders in the past who reacted to the requirements of deterrence instinctively and simplistically, professional militaries prefer complex mathematical calculations of DE as well as automation to ensure a smooth transition from peacetime posture to readiness and employment (Johnston 1995; Shankar 2010). Doctrinally too, professional militaries generally tend to favor more diverse options for war fighting. In the minds of military leaders, limited options render deterrence more credible and are more likely to achieve intra-war deterrence. Chinese and Indian operational nuclear plans perhaps already incorporate some of



these approaches and pressures to refine them will very likely grow in the future. The net strategic effect of these operational changes will be the lowering of the bar for nuclear weapons use in the future.

Finally, China's refusal to acknowledge India's nuclear status and its continuing assistance to Pakistan's nuclear weapons program remain the greatest source of instability in the region. During the Cold War years, the superpowers kept the lid on nuclear tensions via confidence building measures, arms control agreements, hotlines, and transparency. Because of the absence of a dialogue on all things

nuclear and the high degree of opacity that surrounds the nuclear estates in both countries, China and India are unable to replicate many of these institutions. China's continuing nuclear relationship with Pakistan not only causes grave misgivings in India, but could also cause India to proliferate destabilizing cruise and ballistic missiles to China's regional rivals such as Vietnam. In South Asia in particular, Pakistan's internal instability and its leveraging of nuclear weapons to resort to asymmetric warfare against India poison the latter's relations with China and make the return to normal relations between them impossible.

## CONCLUSION

The China-India rivalry in Asia is an example of rivalry-light. Although prone to "security dilemmas," it has none of the existential dilemmas that drove rivalries between Britain and Germany at the turn of the 19<sup>th</sup> century or the US-Soviet rivalry in the last century. Both China and India are relatively satiated powers with marginally revisionist global agendas. Their rivalry therefore serves only as a spoiler mechanism in the path of their regional ambitions. In this regard, India's potential to stoke a Tibetan uprising would more likely distract China's attention and threaten its international reputation. Although this would have negative consequences, it is unlikely to stall China's rise as a global power or dominant position in the western Pacific. Likewise, China's past successes in squandering India's strategic attention notwithstanding, the constraints on the expansion of Indian power are domestic and institutional. Likewise, China's two-ocean strategy and forays into the Indian Ocean region erode but do not upend the IN's dominant position there.

The nuclear competition between the two countries is a sideshow in this rivalry. For four decades after its first nuclear test, India mattered little in China's nuclear calculus, which was largely fixated on north-east Asia, the United States, and Russia. To the extent that India posed any threat, China sought to counterbalance it by helping Pakistan acquire a nuclear arsenal. India's emergence as a nuclear power in the last decade as well as serious attempts

to deploy an operational arsenal capable of targeting China has inevitably ended Beijing's policy of splendidly ignoring India. Yet, the evidence suggests that China has incorporated the new Indian threat into its pre-existing nuclear force modernization plans.

Ironically, although India's nuclear quest began as an attempt to deal with the Chinese threat, new evidence shows that Indian leaders have treated China with far greater equanimity than is commonly believed (Kennedy 2011, 133-134). When India revived its nuclear weapons development program in 1980-1981, it did so in response to the emerging threat from Pakistan. For a quarter century, from 1980 until the middle of the last decade, India's nuclear weaponization and operational planning was focused on Pakistan. That focus began to shift in the latter half of the last decade less due to any new operational nuclear threats from China than from India's imagined role as China's peer and chief rival in Asia and the potential conflict that might ensue from that construction. Although India's strategic elites and national security managers now point to China as their principal long-term national security concern, the pace of India's nuclear arsenal development is generally slow. It is more reflective of technical opportunism and self-fulfillment than any strategic urgency.

This generally relaxed pace of the Chinese and Indian nuclear competition might change if geopolitical ten-

sions between the two countries intensify. China’s aggressive posturing in the western Pacific and the Indian Ocean region might yet persuade India to join a US-led coalition of democracies to balance China. More recently, however, Chinese leaders have tried to court India to prevent that outcome. Indian strategic elites and national security managers have also revealed a preference for “strategic autonomy” over bandwagoning with the United States.

Even should the more worst-case scenarios come to pass, however, three characteristics of the nuclear arsenal development in both countries – the civilian leaders’ internalization of the logic of the nuclear revolution, the dominant role of technologists, and the relatively weak role of the militaries – provide some reassurance that their competition is unlikely to assume the unbridled nature of the former super-power rivalry.

## NOTES

- 1 Counterforce attacks involve targets of military value including an adversary’s nuclear forces, command, control, communications, information and intelligence infrastructure. The goal of counterforce attacks is to disarm an adversary by destroying its nuclear forces and minimize the chances of a nuclear retaliatory attack.
- 2 In nuclear strategy countervalue targets refers to attacks on an adversary’s cities and civilian population.
- 3 The Kargil War between India and Pakistan was triggered by the latter’s incursion and occupation of mountain ridgelines on the Indian side of the line of control (LoC) in Kashmir. The war lasted between May and July 1999 and ended with a Pakistani withdrawal from all positions on the Indian side of the LoC.
- 4 Damage Expectancy is the product of the probability of target kill, air defense penetrability, pre-launch survivability of the weapon system, and its reliability. Among these probabilities, target kill and reliability of the weapon system form the core concerns of professional planners. Target kill substantially depends on the nuclear warhead’s yield (lethality) and it reliably producing that yield every time it is exploded.

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