INDIA'S
EMERGING
NUCLEAR
POSTURE

Between Recessed Deterrent and Ready Arsenal

Ashley J. Tellis

Prepared for the United States Air Force
Project AIR FORCE
RAND

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For Snuffles, Arthur, Athena, and Dhun— in partial recompense
for many lost weekends
The resumption of nuclear testing in South Asia in May 1998 came as a surprise to many in the United States. In the aftermath of these tests, India declared itself to be a “nuclear weapon state” and formally announced its intention to develop a nuclear deterrent. These events have significant implications both for regional security and for the future of the evolving international order. In particular, they require that American policymakers and defense planners understand the motivations behind India’s decisions as well as the nature of Indian thinking about nuclear weaponry and the character of the evolving Indian deterrent—especially insofar as these issues affect U.S. diplomatic initiatives, nonproliferation policy, and regional strategy.

This book describes India’s emerging nuclear posture in the context of a broader assessment of its strategic interests, institutional structures, and security goals. It seeks to explicate the prevailing attitudes toward nuclear weaponry among Indian security managers because such attitudes, more than anything else, will ultimately determine New Delhi’s future decisions with regard to its doctrine, capabilities, and force posture. Since the principal objective of this book is to prepare U.S. policymakers in particular and the American strategic community in general for prospective developments in these three issue areas, a critical understanding, reconstruction, and synthesis of the “official mind” on key questions pertaining to nuclearization remain the most appropriate methodological device for assessing New Delhi’s strategic choices.
Toward that end, the book draws deeply from the best of the vast number of Indian writings available on issues surrounding nuclear weaponry. In fact, all the data and information pertaining to the Indian nuclear program have been drawn from open sources, primarily Indian and Western newspapers, books, and journal articles. The author also benefited greatly from extensive interviews with important Indian political figures (both in the current government and in the opposition) as well as with high-ranking officials in the Prime Minister's Office, the Ministries of External Affairs and Defence (including the Defence Research and Development Organization), and senior Indian military officers, both current and retired. This exclusive reliance on open-source and interview materials implies that some factual information appearing in this book may be imperfect but does not fundamentally compromise either the principal analytical conclusions drawn or the policy implications for the United States. The writing of this book was substantially completed by October 2000.

This study is part of an ongoing analysis of emerging strategic trends in Asia and their implications for the U.S. Air Force. This research is conducted in the Strategy and Doctrine Program of Project AIR FORCE under the sponsorship of the Deputy Chief of Staff for Air and Space Operations, U.S. Air Force (AF/XO), and the Commander-in-Chief, Pacific Air Forces (PACAF/CC). This book should be of interest to the U.S. national security community, regional military and intelligence analysts, the nonproliferation establishment, and academics in general.

PROJECT AIR FORCE

Project AIR FORCE, a division of RAND, is the Air Force federally funded research and development center (FFRDC) for studies and analyses. It provides the Air Force with independent analyses of policy alternatives affecting the development, employment, combat readiness, and support of current and future aerospace forces. Research is performed in four programs: Aerospace Force Development; Manpower, Personnel, and Training; Resource Management; and Strategy and Doctrine.
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I have incurred many debts in the writing of this book. First and foremost, I am deeply grateful to my principal sponsors in the Air Force: Both General Patrick K. Gamble, Commander-in-Chief, Pacific Air Forces, and Lieutenant General Marvin R. Esmond, Deputy Chief of Staff for Air and Space Operations, United States Air Force, were extraordinarily generous in their support of this work. They spent many hours listening to the briefings associated with this book, actively discussed the methodology of the research and its principal conclusions, and enthusiastically encouraged the dissemination of its findings throughout the intelligence and policymaking communities in the United States government.

This book also benefited greatly from the time spent and the questions posed by three other senior officers: General Michael E. Ryan, Chief of Staff, United States Air Force; General John A. Gordon, Deputy Director of Central Intelligence; and Brigadier General Timothy J. McMahon, USAF/XON, all helped greatly by prodding me to think more deeply about certain technical issues within the Indian nuclear program that have a significant bearing on both regional stability and U.S. interests.

The support offered by many individuals on the Air Force staff was also critical to the successful completion of this work. James W. Hertsch, Jr., South Asia Branch Chief, National Air Intelligence Center, began as the intelligence point of contact for this project and—despite having had to read this dense volume while it was still in manuscript form—has, much to my delight, remained a dear and steadfast friend. His thoughtful advice and gentle criticism improved
this book considerably. Robert S. Boyd, Director, National Air Intelligence Center, provided several helpful criticisms as well, and Gerald J. Butkus, Major Mark Westergren, and Lieutenant Colonel James Nees, also of the National Air Intelligence Center, gave generously of their time (and patience) on several occasions. At the Headquarters, USAF/XOXX, first Lieutenant Colonel Milton Johnson and later Lieutenant Colonel Max Hannesian, Chiefs, Regional Plans and Issues, Asia-Pacific Branch, helped connect me to other individuals and resources within the Air Force family whenever that was required by the exigencies of my research. All in all, the institutional support offered by the United States Air Force to Project AIR FORCE at RAND in general and to this research effort in particular went above and beyond what one is allowed to expect of a sponsor: It made the task of writing this lengthy book much easier and even pleasurable.

A book of this kind could in principle have been written at other scholarly institutions in the United States, but there is still no better place than RAND to pursue research relating to nuclear deterrence. Despite all the changes that have taken place in global politics over the past decade, RAND remains—thanks to the diverse technical skills of its researchers, its continued emphasis on interdisciplinary research, and its institutional memory on many matters relating to Cold War nuclear deterrence—the best institution for studying the strategic postures of the emerging nuclear states. I have benefited greatly from RAND's unique resources in the writing of this book. My greatest debt here is to Zalmay M. Khalilzad, Director of the Strategy and Doctrine Program within Project AIR FORCE, who supported this research project from its inception and encouraged me—despite my many other commitments at RAND—to produce a substantial monograph that would illuminate the unique characteristics of the emerging Indian nuclear posture. In addition to providing all the bureaucratic support associated with this effort, Dr. Khalilzad brought to bear his own past work on the nuclear programs in Southern Asia and his great familiarity with the region to lend unique assistance; in numerous hours of meetings, conversation, and travel, he helped me think through many of the issues addressed in this work, and the book as a whole is all the better for it.

Several other individuals in Project AIR FORCE also deserve mention for supporting this work in other ways. C. Richard Neu read the
entire manuscript critically and lightened several burdens associated with RAND’s formal review process. Donald V. Palmer was helpful in more ways than can be detailed here; among other things, he arranged for my research to be widely disseminated throughout the Air Force, particularly within its nuclear community, and shepherded this volume through the security review process conducted by the Office of the Secretary of Defense prior to its publication. Natalie W. Crawford, Vice-President, Project AIR FORCE, not only has strongly supported my research interests in general but has also enthusiastically championed this book both within RAND and before several Air Force audiences. I owe Project AIR FORCE a great deal for the freedom and support it has extended me in connection with many of my endeavors at RAND, and it remains a pleasure to work in this division on several other research projects currently under way.

Working on research projects at RAND invariably means working with many other analysts, some of whom are nationally recognized experts in their fields—and thanks to their generosity, this book has profited in many ways: sometimes through formal consultations, sometimes through conversations in hallways, sometimes through critical comments on the manuscript and on briefings, and sometimes simply through the mirth and laughter found in collegiality and friendship. Among those I must particularly mention are John Baker, Anil Bamezai, Glenn Buchan, Brian Chow, Lynn Davis, Carol Fair, Andrea Gabbitas, Mark Gabriele, Jerrold Green, Jeff Hagen, Edward Harshberger, Jeff Isaacson, Stuart Johnson, David Kassing, Benjamin Lambeth, Ian Lesser, Thomas McNair, Charles Meade, Richard Mesic, James Mulvenon, Bruce Nardulli, Kevin O’Connell, David Orletsky, Jonathan Pollack, Kevin Pippenger, James Quinn, David Shlapak, Abram Shulsky, Michael Swaine, and Alan Vick. For a book that relied so heavily on printed documents, many of which were published abroad, special thanks are owed to the librarians at RAND, who routinely produced hundreds of newspaper reports, journal articles, and government documents without which this work could not have been completed. They remain the silent heroes behind much of the best research done at RAND.

As the writing of this manuscript progressed, I enjoyed the benefit of discussing its general argument and conclusions with several individuals in the U.S. government, academia, and other think tanks both in the United States and abroad. For all the support, comments,

Several other individuals took the time to read part or all of the manuscript, offering detailed comments and suggestions that not only saved me from much embarrassment but also improved the content considerably. Given the size of this book and the density of its analysis, such assistance went far beyond the formalities of collegiality: I am grateful to Walter Andersen, Sumit Ganguly, Lieutenant Colonel Jack Gill, Gregory Jones, Peter Lavoy, Fred Mackie, George Perkovich, Lieutenant Colonel Anne Rieman, Leo Rose, and Ambassador Frank Wisner for their critical reading of the manuscript and, more important, for their continuing friendship and support. In Stephen P. Cohen and Neil Joeck I found two thoughtful formal reviewers who not only reviewed the manuscript for RAND quickly and with their customary high standards but also continued to assist me throughout the postreview process by offering good advice on a host of matters.

Several individuals played a critical role in preparing the manuscript for publication after the review processes at RAND and at the Office of the Secretary of Defense were completed. My editor, Andrea Fellows, nimbly transformed a dense text into readable prose: Besides making numerous stylistic improvements to the manuscript, she created the bibliography, cleaned up the footnotes, and clarified scores of ambiguous locations that surfaced in the text. Patricia Bedrosian did a yeoman’s job typesetting hundreds of marked-up manuscript pages speedily and with incredible care; Bruce Cheeks transformed the graphics into printable files; Kristin Leuschner drafted the research brief that accompanies this volume; Judy Larson helped greatly in producing the briefing that summarized the arguments found in this book for several high-level audiences throughout the United States government; and Jeanne Heller, David Bolhuis, John Warren, and Jane Ryan oversaw the production and distribution of this volume with an efficiency that all RAND researchers now simply take for granted. Over the past two years, a variety of wonderful assistants at RAND—Joan Myers, Joanna
Alberdeston, Luetta Pope, Viki Halabuk, Natalie Ziegler, and especially Karen Echeverri—not only kept the flow of paper connected with this book moving efficiently but also helped me keep my sanity in the face of all the bureaucratic minutiae surrounding such a project.

A book on India’s nuclear posture simply could not have been written without the support of, and access to, numerous serving and retired officials in India who gave generously of their time during my many visits to New Delhi. Their thoughts, and particularly their writings, remain the raw material from which the substance of this book has been fashioned, even though they are not responsible—obviously—for any of the interpretations I may have overlaid on their arguments or the way in which I may have used their work to derive my own conclusions. At the political level, I am deeply grateful to Jaswant Singh, the Minister of External Affairs, and to George Fernandes, the Minister of Defence, who made generous time available to meet me and explain at some length the nature of India’s strategic concerns and policy preferences. K. C. Pant, the current Deputy Chairman of the Planning Commission; I. K. Gujral, the former Indian Prime Minister; and Pranab Mukherjee, a former Minister of External Affairs in a previous Congress government, were also helpful with their assessments.

Many officials in the senior bureaucracy were extraordinarily generous as well. Both the former Foreign Secretary, K. Raghunath, and the present incumbent, Lalit Mansingh, have been highly supportive of my research efforts, and both spent a great deal of time educating me about the attitudes and perceptions of India’s political leadership toward nuclear deterrence. I also owe Alok Prasad, Joint Secretary (Americas), Ministry of External Affairs, a great debt. During the two odd years that it took to complete this book, he spent considerable time with me—always pleasurable, I might add—and set up numerous meetings with key individuals in the Ministries of External Affairs, Defence, and Home, as well as in the Prime Minister’s Office. He remains a dear friend. I am also delighted to acknowledge the friendship, assistance, and intellectual support offered by Raminder Jassal when he was first Joint Secretary, Plans and Coordination, Ministry of Defence, and later the Principal Spokesman in the Ministry of External Affairs. Other Indian civil servants who have been helpful both professionally and personally include Satish Chandra,
Dilip Lahiri, Prabhat Shukla, Rakesh Sood, T.C.A. Rangachari, and Bambit Roy, all of whom spent several hours with me discussing the future of the emerging Indian deterrent and how this evolving capability might affect India’s strategic relations with key countries and with the international community. Only space limitations prevent me from more explicitly acknowledging their generous individual contributions.

I also had the good fortune to meet and interact with five key Indian officials located at the interstices of foreign and defense policy. K. Santhanam, Chief Adviser, Technologies, at the Defence Research and Development Organization; Raja Rammana, formerly Scientific Adviser to the Defence Minister and a former Minister of State for Defence; P. K. Iyengar, formerly Chairman of India’s Atomic Energy Commission; V. Arunachalam, formerly Scientific Adviser to the Defence Minister; and Arun Singh, formerly Minister of State for Defence, all spent much time and energy helping me appreciate India’s unique approach to the challenges embodied by nuclear weaponry. India’s nuclear capabilities today and the strategies for managing those capabilities owe a great deal to these five individuals, and it was a rewarding experience indeed to discuss the country’s emerging nuclear posture with those who were, in a manner of speaking, “present at the creation.”

Even though the Indian armed services have been some degrees removed from the creation of the country’s nuclear capability, several military officers took the time to discuss their perceptions of the strategic challenges facing New Delhi. I place on record my gratitude to several of them for their willingness to discuss a wide range of security issues that included, but was not limited to, nuclear weaponry. Generals V. P. Malik and S. Padmanabhan, Chiefs of Army Staff; Air Chief Marshal Anil Y. Tipnis, Chief of Air Staff; Admiral Sushil Kumar, Chief of Naval Staff; Lieutenant Generals R. K. Sawnhey and O. S. Lohchab, Directors General, Military Intelligence; Major General Shantanu Chaudhry, Additional Director General, Military Intelligence; Air Vice Marshal S. K. Tyagi, Assistant Chief of Air Staff (Operations); Brigadier P. K. Singh, Deputy Director General, Foreign Military Intelligence; Air Commodore R. V. Phadke; Commodore C. Uday Bhaskar; and Colonel Gurmeet Kanwal all gave graciously of their time and ideas.
This book could not have been completed without the generosity of many members of the Delhi intelligentsia. Although the pages of this text are filled with numerous citations referring to their work, many of them discussed my interest in India's nuclear capabilities and its grand strategy in much greater detail than is evident here. My deep gratitude goes first to K. Subrahmanyan, Air Commodore (retired) Jasjit Singh, M. K. Narayanan, P. R. Chari, Lieutenant General (retired) V. R. Raghavan, Brigadier (retired) Vijai Nair, C. Raja Mohan, Rear Admiral (retired) Raja Menon, Lieutenant General (retired) Satish Namibiar, and Kanti Bajpai, all of whom either met me repeatedly or hosted me in New Delhi—both professionally and socially—on several occasions. I also wish to thank G. Balachandran, Sanjaya Baru, Rahul Bedi, Raj Chengappa, Giri Deshingkar, J. N. Dixit, Sujit Dutta, Manoj Joshi, Air Vice Marshal (retired) Kapil Kak, Bharat Karnad, Bhashyam Kasturi, Amitabh Mattoo, Admiral K. K. Nayyar, Rahul Roy-Chaudhury, and Matin Zuberi for sharing ideas and information and generously indulging me even when they disagreed with my arguments.

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The burdens that an author faces are often best appreciated by those who live around him. My darling family—Snuffles, Arthur, Athena, and Dhun—has had to suffer my long abdication from familial duties during the last two years. And they not only put up with my restlessness, inattentiveness, and long hours of withdrawal with much more equanimity than I have a right to expect but also helped me survive the process of writing through their joyous presence even when I was little more than a distracted bore. It is to them that this book is gratefully dedicated.
<table>
<thead>
<tr>
<th>Acronym</th>
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<tbody>
<tr>
<td>ABM</td>
<td>Antiballistic missile</td>
</tr>
<tr>
<td>ACOAS</td>
<td>Assistant Chief of Air Staff</td>
</tr>
<tr>
<td>AD</td>
<td>Assured destruction, air defense</td>
</tr>
<tr>
<td>ADE</td>
<td>Aeronautics Development Establishment</td>
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<tr>
<td>ADGES</td>
<td>Air Defense Ground Environment System</td>
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<tr>
<td>ADRDE</td>
<td>Aerial Delivery Research and Development Establishment</td>
</tr>
<tr>
<td>AEC</td>
<td>Atomic Energy Commission</td>
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<tr>
<td>AEWC&amp;C</td>
<td>Airborne early-warning command and control</td>
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<tr>
<td>AOC-in-C</td>
<td>Air Officer Commanding-in-Chief</td>
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<tr>
<td>ARDE</td>
<td>Armament Research and Development Establishment</td>
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<tr>
<td>ARTRAC</td>
<td>[Indian] Army’s Training Command</td>
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<tr>
<td>ASAT</td>
<td>Antisatellite</td>
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<tr>
<td>ASLV</td>
<td>Advanced Satellite Launch Vehicle</td>
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<tr>
<td>ASTE</td>
<td>Aircraft System and Testing Establishment</td>
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<tr>
<td>ASW</td>
<td>Antisubmarine warfare</td>
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<tr>
<td>ATACM</td>
<td>Advanced Tactical Missile</td>
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<tr>
<td>Abbreviation</td>
<td>Full Form</td>
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<tr>
<td>ATBM</td>
<td>Anti-tactical ballistic missile</td>
</tr>
<tr>
<td>ATV</td>
<td>Advanced Technology Vessel</td>
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<tr>
<td>AVLIS</td>
<td>Atomic vapor laser isotope separation</td>
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<tr>
<td>AWACS</td>
<td>Airborne Warning and Control System</td>
</tr>
<tr>
<td>BAI</td>
<td>Battlefield air interdiction</td>
</tr>
<tr>
<td>BARC</td>
<td>Bhabha Atomic Research Center</td>
</tr>
<tr>
<td>BDA</td>
<td>Battle damage assessment</td>
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<tr>
<td>BJP</td>
<td>Bharatiya Janata Party</td>
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<tr>
<td>C³I</td>
<td>Command, control, communications, and intelligence</td>
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<tr>
<td>C⁴I²</td>
<td>Command, control, communications, computing, intelligence, and information</td>
</tr>
<tr>
<td>CANDU</td>
<td>Canada Deuterium Uranium [reactor]</td>
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<tr>
<td>CAP</td>
<td>Combat air patrol</td>
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<tr>
<td>CAS</td>
<td>Close air support</td>
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<tr>
<td>CCNS</td>
<td>Cabinet Committee on National Security</td>
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<tr>
<td>CDS</td>
<td>Chief of Defence Staff</td>
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<tr>
<td>CEP</td>
<td>Circular error probable</td>
</tr>
<tr>
<td>CID</td>
<td>Criminal Investigation Department</td>
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<tr>
<td>CIRUS</td>
<td>Canada-Indian Reactor–United States</td>
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<tr>
<td>CM</td>
<td>Cruise missile</td>
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<tr>
<td>COAS</td>
<td>Chief of Air Staff</td>
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<tr>
<td>CRS</td>
<td>Congressional Research Service</td>
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<tr>
<td>CSC</td>
<td>Chiefs of Staff Committee</td>
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<tr>
<td>CTBT</td>
<td>Comprehensive Test Ban Treaty</td>
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<tr>
<td>CWC</td>
<td>Chemical Weapons Convention</td>
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</table>
DAE  Department of Atomic Energy
DAMA  Demand assigned multiple access
DARIN  Display Attack and Ranging Inertial Navigation
DCNP  Defence Communication Network Project
DEFCON  Defense condition
DIT  Department of Information Technology
DM  Defence Minister
DOT  Department of Telecommunications
DRDE  Defence Research Development Establishment
DRDO  Defence Research and Development Organization
DSWA  Defense Special Weapons Agency
EAM  External Affairs Minister
ECM  Electronic countermeasure
ELINT  Electronic intelligence
EMP  Electromagnetic pulse
ENDC  Eighteen-Nation Disarmament Committee
ENDS  Enhanced nuclear detonation safety [system]
ESM  Electronic support measure
FLAG  Fiber Optical Link Around the Globe
FM  Finance Minister
FMCT  Fissile Material Cutoff Treaty
GEO  Geosynchronous [orbit]
GMPCS  Global mobile personal communications by satellite
GPS  Global Positioning System
<table>
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<tr>
<th>Abbreviation</th>
<th>Full Form</th>
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<tr>
<td>GSLV</td>
<td>Geosynchronous Satellite Launch Vehicle</td>
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<tr>
<td>GSQR</td>
<td>General Staff Quality Requirement</td>
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<tr>
<td>HEU</td>
<td>Highly enriched uranium</td>
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<tr>
<td>HF</td>
<td>High frequency</td>
</tr>
<tr>
<td>HM</td>
<td>Home Minister</td>
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<tr>
<td>H-NSC</td>
<td>Head, National Security Council</td>
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<tr>
<td>H-NSNC</td>
<td>Head, National Strategic Nuclear Command</td>
</tr>
<tr>
<td>HUD</td>
<td>Head-up display</td>
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<tr>
<td>HUMINT</td>
<td>Human intelligence</td>
</tr>
<tr>
<td>IAD</td>
<td>Integrated air defense</td>
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<tr>
<td>IADGES</td>
<td>Integrated Air Defense Ground Environment System</td>
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<tr>
<td>IAEA</td>
<td>International Atomic Energy Agency</td>
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<tr>
<td>IB</td>
<td>[Central] Intelligence Bureau</td>
</tr>
<tr>
<td>ICBM</td>
<td>Intercontinental ballistic missile</td>
</tr>
<tr>
<td>ICF</td>
<td>Inertial confinement fusion</td>
</tr>
<tr>
<td>IFF</td>
<td>Identification friend or foe</td>
</tr>
<tr>
<td>IGMDP</td>
<td>Integrated Guided Missile Development Programme</td>
</tr>
<tr>
<td>INS-RLG</td>
<td>Ring-laser gyro-based inertial navigation system</td>
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<tr>
<td>IRBM</td>
<td>Intermediate-range ballistic missile</td>
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<tr>
<td>IRS</td>
<td>Indian Remote Sensing</td>
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<tr>
<td>ISRO</td>
<td>Indian Space Research Organization</td>
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<tr>
<td>IT</td>
<td>Information technology</td>
</tr>
<tr>
<td>JIC</td>
<td>Joint Intelligence Committee</td>
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<tr>
<td>KRL</td>
<td>Khan Research Laboratories</td>
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<tr>
<td>Abbreviation</td>
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<tr>
<td>kt</td>
<td>Kiloton</td>
</tr>
<tr>
<td>LAC</td>
<td>Line of actual control</td>
</tr>
<tr>
<td>LANTIRN</td>
<td>Low-altitude navigation and targeting infrared for night</td>
</tr>
<tr>
<td>LEO</td>
<td>Low-earth orbit</td>
</tr>
<tr>
<td>LEU</td>
<td>Low enriched uranium</td>
</tr>
<tr>
<td>LF</td>
<td>Low frequency</td>
</tr>
<tr>
<td>MAD</td>
<td>Mutual assured destruction</td>
</tr>
<tr>
<td>MEECN</td>
<td>Minimum essential emergency communications network</td>
</tr>
<tr>
<td>MI</td>
<td>[Directorate of] Military Intelligence</td>
</tr>
<tr>
<td>MOD</td>
<td>Ministry of Defence</td>
</tr>
<tr>
<td>MOPP</td>
<td>Mission-oriented protective posture</td>
</tr>
<tr>
<td>MR/ASW</td>
<td>Maritime reconnaissance/antisubmarine warfare</td>
</tr>
<tr>
<td>MRTD</td>
<td>Monopolistic and Restrictive Trade Practices [Committee]</td>
</tr>
<tr>
<td>Mt</td>
<td>Megaton</td>
</tr>
<tr>
<td>MTE</td>
<td>Megaton equivalent</td>
</tr>
<tr>
<td>MUCD</td>
<td>Military Unit Cover Designator</td>
</tr>
<tr>
<td>NBC</td>
<td>Nuclear, biological, and chemical</td>
</tr>
<tr>
<td>NCA</td>
<td>National Command Authority</td>
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<td>NCP</td>
<td>National Command Post</td>
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<td>NDA</td>
<td>National Democratic Alliance</td>
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<tr>
<td>NDC</td>
<td>National Development Centre</td>
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<tr>
<td>NEACP</td>
<td>National Emergency Airborne Command Post</td>
</tr>
<tr>
<td>Abbreviation</td>
<td>Description</td>
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<td>--------------</td>
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<tr>
<td>NFU</td>
<td>No first use</td>
</tr>
<tr>
<td>NMCL</td>
<td>National Military Command Link</td>
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<tr>
<td>NMD</td>
<td>National missile defense</td>
</tr>
<tr>
<td>NORAD</td>
<td>Northern Region Air Defense</td>
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<tr>
<td>NPT</td>
<td>Non-Proliferation Treaty</td>
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<tr>
<td>NSA</td>
<td>National Security Adviser</td>
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<tr>
<td>NSAB</td>
<td>National Security Advisory Board</td>
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<tr>
<td>NSC</td>
<td>National Security Council</td>
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<tr>
<td>NSNC</td>
<td>National Strategic Nuclear Command</td>
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<tr>
<td>NUTS</td>
<td>Nuclear use theorists</td>
</tr>
<tr>
<td>OCP</td>
<td>Operations command post</td>
</tr>
<tr>
<td>OMT</td>
<td>Other military target</td>
</tr>
<tr>
<td>PAEC</td>
<td>Pakistan Atomic Energy Commission</td>
</tr>
<tr>
<td>PALS</td>
<td>Permissive action links</td>
</tr>
<tr>
<td>PHOTINT</td>
<td>Photographic intelligence</td>
</tr>
<tr>
<td>PLA</td>
<td>People’s Liberation Army</td>
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<tr>
<td>PLAAF</td>
<td>People’s Liberation Army Air Force</td>
</tr>
<tr>
<td>PM</td>
<td>Prime Minister</td>
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<tr>
<td>POC</td>
<td>Point of contact</td>
</tr>
<tr>
<td>PPBS</td>
<td>Planning Program Budgeting System</td>
</tr>
<tr>
<td>PR</td>
<td>Photo reconnaissance</td>
</tr>
<tr>
<td>PSLV</td>
<td>Polar Satellite Launch Vehicle</td>
</tr>
<tr>
<td>Pu</td>
<td>Plutonium</td>
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<tr>
<td>PWR</td>
<td>Pressurized water reactor</td>
</tr>
<tr>
<td>Acronym</td>
<td>Description</td>
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</tr>
<tr>
<td>RAW</td>
<td>Research and Analysis Wing</td>
</tr>
<tr>
<td>RDT&amp;E</td>
<td>Research, development, test, and evaluation</td>
</tr>
<tr>
<td>RMA</td>
<td>Revolution in military affairs</td>
</tr>
<tr>
<td>RSTA</td>
<td>Reconnaissance, surveillance, and target acquisition</td>
</tr>
<tr>
<td>RV</td>
<td>Reentry vehicle</td>
</tr>
<tr>
<td>RWR</td>
<td>Radar warning receiver</td>
</tr>
<tr>
<td>SAC</td>
<td>Strategic Air Command</td>
</tr>
<tr>
<td>SAFF</td>
<td>Safing, arming, fuzing, and firing</td>
</tr>
<tr>
<td>SAM</td>
<td>Surface-to-air missile</td>
</tr>
<tr>
<td>SC/ST</td>
<td>Scheduled Caste/Scheduled Tribe</td>
</tr>
<tr>
<td>SEAD</td>
<td>Suppression of Enemy Air Defense</td>
</tr>
<tr>
<td>SHF</td>
<td>Superhigh frequency</td>
</tr>
<tr>
<td>SIGINT</td>
<td>Signals intelligence</td>
</tr>
<tr>
<td>SIOP</td>
<td>Single Integrated Operations Plan</td>
</tr>
<tr>
<td>SLBM</td>
<td>Sea-launched ballistic missile</td>
</tr>
<tr>
<td>SLV</td>
<td>Satellite Launch Vehicle</td>
</tr>
<tr>
<td>SNEP</td>
<td>Subterranean Nuclear Explosion Project</td>
</tr>
<tr>
<td>SNL</td>
<td>Strategic Nuclear Link</td>
</tr>
<tr>
<td>SPG</td>
<td>Strategic Policy Group</td>
</tr>
<tr>
<td>SRBM</td>
<td>Short-range ballistic missile</td>
</tr>
<tr>
<td>SSBN</td>
<td>Nuclear-propelled ballistic missile submarine</td>
</tr>
<tr>
<td>SSGN</td>
<td>Nuclear-propelled guided missile submarine</td>
</tr>
<tr>
<td>SSM</td>
<td>Surface-to-surface missile</td>
</tr>
<tr>
<td>SUPARCO</td>
<td>Space and Upper Atmosphere Research Organization</td>
</tr>
<tr>
<td>Acronym</td>
<td>Description</td>
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</tr>
<tr>
<td>TACAMO</td>
<td>&quot;Take Charge and Move Out&quot;</td>
</tr>
<tr>
<td>TAR</td>
<td>Tibetan Autonomous Region</td>
</tr>
<tr>
<td>TEL</td>
<td>Transporter-erector-launcher</td>
</tr>
<tr>
<td>TES</td>
<td>Test Evaluation Satellite</td>
</tr>
<tr>
<td>TMD</td>
<td>Theater missile defense</td>
</tr>
<tr>
<td>TNW</td>
<td>Tactical nuclear weapon</td>
</tr>
<tr>
<td>TREE</td>
<td>Transient radiation effects on electronics</td>
</tr>
<tr>
<td>U</td>
<td>Uranium</td>
</tr>
<tr>
<td>UAV</td>
<td>Unmanned aerial vehicle</td>
</tr>
<tr>
<td>UF</td>
<td>United Front</td>
</tr>
<tr>
<td>UHF</td>
<td>Ultrahigh frequency</td>
</tr>
<tr>
<td>VCOAS</td>
<td>Vice-Chief of Air Staff</td>
</tr>
<tr>
<td>VLF</td>
<td>Very low frequency</td>
</tr>
<tr>
<td>VSAT</td>
<td>Very small aperture terminal</td>
</tr>
<tr>
<td>VSNL</td>
<td>Videsh Sanchar Nigam Ltd.</td>
</tr>
<tr>
<td>WLL</td>
<td>Wireless local loop</td>
</tr>
<tr>
<td>WWWCCS</td>
<td>World Wide Military Command and Control System</td>
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</table>
After a hiatus of almost 24 years, India once again startled the world by resuming nuclear testing at a time when the international community had solemnly expressed a desire, through the Comprehensive Test Ban Treaty (CTBT), to refrain from the field testing of nuclear explosives.\(^1\) On May 11, 1998, Indian Prime Minister Atal Bihari Vajpayee tersely announced that New Delhi had conducted three nuclear tests, one of which involved the detonation of a thermonuclear device. As a stunned global community struggled to respond to this development, India announced two days later that it had conducted two more detonations that purportedly "completed

\(^1\) The CTBT, by calling on every signatory state not to "carry out any nuclear weapon test explosion or any other nuclear explosion," is intended to be a "zero-yield" treaty. For a variety of reasons, however, the CTBT does not define what a "nuclear weapon test explosion or any other nuclear explosion" actually is—at least for the purpose of specifying in technical terms what is prohibited by the treaty. Thus, while the CTBT clearly prohibits nuclear explosions, it does not prohibit all activities involving a release of nuclear energy, including experiments using fast-burst or pulse reactors; experiments using pulse power facilities; inertial confinement fusion (ICF) and similar experiments; the research of material properties, including high-explosive and fissile materials; and hydrodynamic experiments, including subcritical experiments involving fissile materials. Since none of these activities necessarily constitute a nuclear explosion, they are not prohibited by the CTBT. For a useful analysis of what activities are regulated by the CTBT, see the Federation of American Scientists, "Article-by-Article Analysis of the Comprehensive Nuclear Test Ban Treaty," available at [http://www.fas.org/nuke/control/ctbt/text/arbyart/art01.htm](http://www.fas.org/nuke/control/ctbt/text/arbyart/art01.htm). Since the CTBT, as it currently stands, therefore allows for a variety of activities that contribute to the maintenance and possibly the development of nuclear weaponry (at least in theory), India opposed the treaty \textit{inter alia} on the grounds that the "technologies relating to subcritical testing, advanced computer simulation using extensive data relating to previous explosive testing, and weapon-related applications of laser ignition will lead to a fourth generation of nuclear weapons, even with a ban on explosive testing." Cited in Dinshaw Mistry, \textit{India and the Comprehensive Test Ban Treaty}, ACDIS Research Report (Urbana, IL: University of Illinois, September 1998), p. 19.
the planned series of underground tests.\textsuperscript{2} Dismayed by these developments, the United States responded by imposing economic sanctions on India in a manner consistent with its domestic laws while simultaneously engaging in diplomatic entreaties toward Pakistan, India's archrival, in the hopes of dissuading the latter from responding with nuclear tests of its own. This feverish activity, which dominated American diplomatic efforts for the better part of three weeks, unfortunately came to naught as Pakistan, seeking to validate its nuclear weapon designs, buttress the credibility of its deterrent vis-à-vis India, and appease its restive domestic polity, responded on May 28, 1998, with an announcement that it had conducted five nuclear tests of its own.\textsuperscript{3} This announcement was followed by claims of yet another two tests on May 30, 1998, suggesting that Pakistan's total of seven tests against India's history of six signaled Islamabad’s own political confidence and perhaps even its technological superiority.\textsuperscript{4}

Not surprisingly, the resumption of nuclear testing in India resulted in a highly charged regional atmosphere: Indian Defence Minister George Fernandes sought to elaborate on his earlier public claim that "China is potential threat No. 1";\textsuperscript{5} Indian Home Minister L. K. Advani threatened to “deal firmly” with Pakistan if it did not roll back its proxy war in Kashmir in light of “the change in the geostrategic situation in the region”;\textsuperscript{6} and Indian Minister of State for Science and Technology Murli Manohar Joshi announced that


\textsuperscript{4}The initial reports, which claimed seven tests, were later withdrawn, and the final Pakistani claim stood at six nuclear tests: five conducted on May 28, 1999, and the sixth on May 30, 1999. Assertions about the superiority of the Pakistani nuclear weapon program in general can be found in "Pakistan Used Sophisticated Technology, Says Qadeer," \textit{Dawn}, June 1, 1998; Pakistan: ‘Nuclear and Missile Superiority’ over India Claimed,” FBIS-TAC-98-169, June 18, 1998; and Pakistan: Gohar Ayub on Next India-Pakistan War,” FBIS-NES-98-228, August 16, 1998.

\textsuperscript{5}Manoj Joshi, “George in the China Shop,” \textit{India Today International}, May 18, 1998, p. 11.

India's missiles would be armed and deployed with the country's new nuclear weapons.\textsuperscript{7} This rhetoric was matched by that emerging from Pakistan: Former Prime Minister Benazir Bhutto fervently pleaded with the West for a preemptive military strike on India;\textsuperscript{8} then-Prime Minister Nawaz Sharif announced in a solemn television address on the day of Islamabad's tests that "today we have made history . . . we have settled the score with India";\textsuperscript{9} and senior Pakistani officials (including the creator of Pakistan's first uranium enrichment facility, Dr. A. Q. Khan), responding to rumors of an imminent Indian attack, claimed that Pakistan's new Ghauri intermediate-range ballistic missiles (IRBMs) would be immediately armed with nuclear warheads in the face of the manifest Indian threat.\textsuperscript{10} Altogether, a cacophony of rhetoric and unsubstantiated claims emerged from both India and Pakistan in the month of May, leading the South Asian correspondent of the Washington Post to conclude laconically but accurately that "confusion dominates [the] arms race" in South Asia.\textsuperscript{11} Amid all this excitement, however, Indian Prime Minister Vajpayee took the time to emphatically claim—in an overt challenge both to the global nonproliferation regime in general and to U.S. nonproliferation policy in particular—that "India is now a nuclear weapons state."\textsuperscript{12} Quite predictably, this claim was matched by that of Vajpayee's Pakistani counterpart, who also asserted that his country's nuclear tests demonstrated that "we have become a nuclear power."\textsuperscript{13}

\textsuperscript{7}“India Will Cap Missiles with Nuclear Warheads: Minister,” AFP Wire, May 12, 1998.

\textsuperscript{8}Benazir Bhutto, “Perspective on South Asia—Punishment: Make It Swift, Severe,” Los Angeles Times, May 17, 1998.


\textsuperscript{13}Burns, “Pakistan, Answering India, Carries Out Nuclear Tests.”
These developments, among many others, moved one of India’s leading strategic commentators to reflect on the momentous events of May 1998 in the following terms:

The world knew for quite some time that both India and Pakistan have been in possession of atomic weapons, although they were not formally recognized as nuclear weapon powers. The great powers have hoped that the anomalous nuclear standing of India and Pakistan in the international nuclear system could be fudged. They have striven hard to keep the Indian and Pakistani nuclear capabilities under wraps forever. But the hot summer of 1998 has finally vapourised [sic] the veil of nuclear ambiguity in the Indian subcontinent. As a consequence, the security situation in the subcontinent and the global nuclear order are unlikely to be the same ever again.\textsuperscript{14}

In the same time frame, another prominent Indian analyst concluded that the triple tests at Pokhran (the field site where the Indian nuclear tests took place) had brought to an end not only “three decades of nuclear debate, self-denial, and fence-sitting” but also the perception of Indian “weakness and hypocrisy.” In this analyst’s view, the nuclear tests had allowed India to become “a willing and active player in the international nuclear arms control regime,” but with a difference: “The difference now is that India seeks to play that role as a nuclear weapons power. This is the end of ambiguity—and hypocrisy” (italics added).\textsuperscript{15}

The notion that the 1998 South Asian nuclear tests not only altered the strategic environment in the region (and, perhaps, globally) but also transformed New Delhi into a “nuclear weapons power” of sorts standing appears repeatedly in Indian strategic and political analyses. Yet while the former proposition is arguable, the latter may be somewhat dubious—and the truth of the matter is much more complex than most Indian analysts believe. This volume will suggest that despite having demonstrated an ability to successfully undertake nuclear explosions—including nuclear weapon test explosions—India still has some way to go before it can acquire the


\textsuperscript{15}Shekhar Gupta, “Road to Resurgence,” \textit{Indian Express}, May 12, 1998.
capabilities that would make it a significant nuclear power. The analysis will further demonstrate that in many ways India remains at a crossroads with respect to its nuclear weapon program. In contrast to much of the superficial commentary that appeared in the wake of the May 1998 tests, however, it will argue that the challenges facing India are not as onerous as they are often assumed to be, although they will compel New Delhi to move—at least initially—in a direction quite different from that which most previous nuclear weapon states have taken. It will be posited that this nuclearization process will in all probability involve a large but finite number of steps that will occur covertly rather than overtly. In short, it will be argued that India’s emergence as a true nuclear weapon power will more likely be a slow, gradual, and distinctive process, thanks to a number of factors—including India’s traditional and highly publicized commitment to disarmament; its continuing economic and developmental constraints; its susceptibility to pressures emanating both from existing nuclear weapon states and from the global nonproliferation regime in general; its singular view of nuclear weapons as “pure deterrents” rather than as war-fighting instruments; its unique civil-military system, which has few parallels in the Third World; and, finally, the fact that its adversaries’ coercive capabilities, while significant, can be countered by a minimal, albeit perhaps not a token, deterrent.

This book will assess India’s emerging nuclear posture in the aftermath of the May 1998 tests. It focuses on India primarily because of its geopolitical weight and because New Delhi’s choices—and others’ perception of those choices—will remain among the key drivers influencing the future strategic environment in South Asia. Given this assumption, Pakistani and Chinese nuclear programs and capabilities will be addressed as well, but more with a view toward illuminating India’s strategic choices and future directions than as independent objects of analysis. At the same time, however, the as-

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16 In legal terms, India can never be a “nuclear weapon state” under the definition of that term enunciated in the Non-Proliferation Treaty (NPT). Whenever India is referred to as a nuclear weapon state in this book, however, the phrase is intended to convey not a legal status but merely a description of fact.

17 Other RAND research has assessed China’s nuclear, space, and information warfare capabilities in some detail. These findings are summarized in Zalmay M. Khalilzad, Abram N. Shulsky, Daniel Byman, Roger Cliff, David T. Orletsy, David Shlapak, and Ashley J. Tellis, The United States and a Rising China: Strategic and
essment of India's future nuclear posture requires a level of detail that is often lacking in such analyses, which generally treat "going nuclear" simply as synonymous with the ability to set off nuclear explosions. As early as 1977, Lewis Dunn and William Overholt persuasively argued that proliferation research should incorporate more analytically powerful frameworks that can discriminate between "the acquisition of increasing levels of nuclear capability,"\textsuperscript{18} such as that relating to the character of research on nuclear explosives or the procurement of specific weapon systems, or the development of command, control, and communications procedures or the enunciation of a strategic doctrine.

This book will investigate the issues outlined above by seeking a broader understanding of India's strategic interests, institutional structures, and security goals. Toward this end, it will attempt to reconstruct the logic of the choices India faces from New Delhi's perspective in efforts to discern which future courses of action appear most appealing to India's civilian security managers—i.e., India's elected political leadership and the senior bureaucrats who occupy critical institutions such as the Prime Minister's Office, the Cabinet Secretariat, and key ministerial departments (e.g., Finance, Defence, and Home [internal affairs]). It will then assess how such choices, if acted upon, would affect the United States and its strategic interests. This methodological decision was driven primarily by the objective of better understanding the worldview of India's security managers such that the U.S. policymaking and defense-planning communities may more effectively anticipate future developments in India's nuclear program in particular and its strategic capabilities in general.

This book is therefore divided into five chapters. Chapter Two surveys the strategic factors conditioning India's choices with respect to its future nuclear posture. Chapter Three analyzes five specific nuclear "end states" that India has debated since its independence in 1947 and that have acquired particular salience since New Delhi first demonstrated its nuclear capabilities in 1974; this analysis is in-

tended to assess both the extent of the shift in India’s nuclear posture after the recent tests and the implications of what the search for a “minimum credible deterrent”\(^{19}\) could entail in the years to come. Chapter Four describes the nuclear posture India is likely to adopt over the next decade or two; it explicates India’s evolving nuclear doctrine and describes how the force posture that is likely to be created will service this doctrine in the contexts of strategic needs that are specific to New Delhi. Chapter Five examines the operational capabilities India’s desired nuclear posture will demand in light of its technical achievements and limitations and ends by assessing the adequacy of the evolving Indian deterrent in terms of the criteria offered by various nuclear deterrence theories. The conclusion, Chapter Six briefly surveys the consequences of the anticipated changes in India’s nuclear posture for local security competition with Pakistan and China, the international nuclear proliferation regime, and the ongoing dialogue in U.S.-Indian relations.

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\(^{19}\) This phrase has been used repeatedly by Indian leaders to define their conception of the country’s future nuclear capabilities. See, for example, Mahesh Uniyal, “No Cap on Fissile Material, Says Vajpayee,” *India Abroad*, December 25, 1998.
Chapter Two

STRATEGIC FACTORS AFFECTING INDIA’S NUCLEAR POSTURE

In assessing the variables that have influenced India’s nuclear posture and the role these variables might play in shaping the country’s future choices, it is useful to begin by summarizing what India’s strategic posture has been for most of the postindependence period. Summarizing the complex evolution of Indian attitudes and capabilities during this time frame will necessitate the omission or oversimplification of certain historical details. This shortcoming can be tolerated, however, because the intention here is not to provide a comprehensive narrative describing the evolution of the Indian nuclear program given that such reconstructions are already widely available. ¹ Rather, the objective is to define a benchmark that will al-

low analysts to judge the degree of movement that India’s most recent policy shift—as exemplified by its nuclear tests and subsequent claims to nuclear status—represents when measured against the background condition of “nuclear ambiguity”\(^2\) that ended with its resumption of nuclear testing in May 1998.

EXPLAINING THE HERITAGE OF NUCLEAR AMBIGUITY

It is important to recognize that while the history of the Indian nuclear program predates the country’s independence in 1947, the strategic environment India faced for most of its independent life did not demand that any clear-cut decisions be made regarding its nuclear status. To be sure, the attitudes of India’s leadership toward nuclear weaponry evolved gradually over the years. Strident opposition to nuclear weapons and all forms of competition involving nuclear weaponry was most visible during the 1950s, when India, having recently emerged from the colonial era, sought to articulate on the global stage a highly moralistic brand of politics that emphasized comprehensive economic development and, toward that goal, the harnessing of atomic energy for peaceful purposes.\(^3\) India’s approach toward nuclear power during this period was in fact Janus-faced in that its fervid enthusiasm for nuclear energy as a cost-effective solution to its vast developmental problems was matched only by its repeatedly expressed repugnance toward nuclear weaponry of all kinds. This uncompromising opposition to nuclear weapons and to nuclear weaponry per se as instruments of “high politics,” subtly mutated during the 1960s when India—having become conscious both of the Chinese threat and of China’s nuclear prowess following its defeat in the Sino-Indian border war of 1962—

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\(^2\) The notion of “nuclear ambiguity” refers to the condition wherein the nuclear option was “kept open but in a state of suspended animation” such that the capacity to make nuclear weapons was “neither expressed nor foreclosed.” A good description of “nuclear ambiguity,” from which these quotes are derived, can be found in P. R. Chari, *Indo-Pak Nuclear Standoff: The Role of the United States* (New Delhi: Manohar, 1995), p. 102ff.

began to flirt with the possibility of extending civilian nuclear technology to defense applications through its Subterranean Nuclear Explosion Project (SNEP). In this attempt to exploit the civilian nuclear energy and research infrastructure for strategic purposes reached its peak in 1974, when India carried out its first atomic test. In efforts to ward off Western pressures in the wake of this test, however, India affirmed its right to engage in “peaceful nuclear explosions” while simultaneously reitering its opposition to nuclear weaponry. The uncomfortable ambiguity that arose from India’s demonstrated ability to make nuclear weapons, even as it persisted in its claims that it had no nuclear arsenal, continued throughout the 1980s and well into the 1990s. In fact, even in the aftermath of the May 1998 nuclear tests, India’s new claims to nuclear status did not elucidate whether India already possessed a ready inventory of nuclear warheads or whether it intended to create such an inventory, to be maintained and deployed at certain minimal standards of readiness.

All in all, India’s official attitude toward nuclear weapons evolved slowly over the years, but these shifts were insufficient to motivate the national leadership to make a deliberate decision favoring the acquisition of a nuclear arsenal or declaring India’s status to be that of a nuclear weapon state. This lack of movement in the direction of overt nuclearization ultimately stemmed from the perception that

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6In early 1983, for example, Indira Gandhi, in an interview with the French newspaper Le Monde, stated during a discussion about nuclear weaponry that “we have no intention of manufacturing them. We do not manufacture them and we will not utilise them.” Reproduced in Indira Gandhi, Statements on Foreign Policy, January–April 1983 (New Delhi: Government of India, Ministry of External Affairs, 1983), p. 27. In 1985, Rajiv Gandhi indirectly reiterated this theme when he noted that U.S. unwillingness to stop the Pakistani nuclear weapon program would result in “the introduction of nuclear weapons in our area, [which] will completely change the whole region.” See Maynard Parker, “Rajiv Gandhi’s Bipolar World,” Newsweek, June 3, 1985. Even as recently as 1996, then–Prime Minister I. K. Gujral, in an interview with a leading Indian newsmagazine, asserted that “at the moment, the agenda to weaponise our nuclear capability is not there.” See “Interview: I. K. Gujral,” India Today International, September 15, 1996, p. 78.

Despite all the strategic challenges it faced, the security environment India had confronted for most of the postindependence period had in general been benign. The political cover provided by American strength during the early part of the Cold War and by Soviet support during the later part of that epoch further buttressed New Delhi’s ambiguous attitude toward nuclear weaponry, as did India’s own advantages vis-à-vis Pakistan, China’s weakness as a regional adversary, and the relatively innocuous disposition of both superpowers toward India. The Nehruian legacy of suspicion about militarized power politics and its attendant distaste of nuclear weaponry as the “currency of global power” interacted with the older Gandhian moral synthesis, which emphasized “community” over “state” and “service” over “coercion,” to reinforce this ambiguous stance. Finally, even when the temptation to demonstrate an overt nuclear weapon capability became more alluring than usual—e.g., from the 1970s onward—India’s weakness as a center of power in international politics guaranteed that it would continue to show restraint out of fear that international pressures might impede the attainment of critical strategic objectives such as economic development.

Thanks to all these factors, India’s traditional nuclear posture continued to pivot simply on “keeping the option open.” And sustaining this posture involved, among other things, maintaining a large strategic establishment to produce fissile materials, design nuclear weaponry, and develop various delivery systems while simultaneously continuing to refrain from any public decision to create and

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8 B. M. Iain, *Nuclear Politics in South Asia* (New Delhi: Rawat Publications, 1994), pp. 53–77. It is important to note, however, that Nehru and perhaps even Gandhi, though not pronuclear by any means, were often ambivalent about whether nuclear weaponry would be required by Indian security interests in an anarchic international environment. A good analysis of Nehru’s ambivalence can be found in Kapur, *India’s Nuclear Option*, pp. 47–82, and in Perkovich, *India’s Nuclear Bomb*. For an interesting albeit controversial assessment of Gandhi’s attitude toward nuclear weaponry, see K. Subrahmanyam, “Hedging Against Hegemony: Gandhi’s Logic in the Nuclear Age,” *The Times of India*, June 16, 1998. An excellent summary that captures the complexity of Gandhi’s attitude toward nonviolence can be found in V. R. Mehta, *Foundations of Indian Political Thought* (New Delhi: Manohar, 1996), pp. 217–234.

9 The effect of foreign pressures on India’s nuclear choices during the 1970s and 1980s has been analyzed in detail in Perkovich, *India’s Nuclear Bomb*, pp. 190–292.

deploy a real nuclear arsenal—understood as an "organic ensemble" of weaponry, delivery capabilities, supporting infrastructure, and procedural and ideational systems—that would allow a variety of deliberate and perhaps even preplanned nuclear operations to be undertaken in an emergency. This peculiar approach, which consisted of developing some components of an arsenal while desisting from creating the arsenal itself—and, indeed, publicly denying the intention to create such an arsenal—derived from India's calculated assessment that "preserving the option," in the sense understood above, would provide deterrence advantages without imposing any of the costs and risks associated with actually deploying nuclear weaponry in the context of an overt assertion of India's nuclear status. Such a posture also had the advantage of underscoring India's sovereign right to create such an arsenal at some point in the future if national security considerations so warranted, while in the interim requiring that Indian strategic policy simply preserve, both legally and technically, the capability to formally deploy nuclear weapons should that become necessary.12

Not surprisingly, Indian strategic policy for much of the Cold War period and thereafter focused on attaining two sets of objectives. The first set of objectives—pursued mainly at the diplomatic level—consisted of espousing the global abolition of nuclear weaponry.13 These calls for abolition were often couched either in moralistic terms drawn from indigenous traditions or in the secular language of liberal internationalism, both of which, by imparting a strong "idealistic" flavor to Indian rhetoric, rendered such comments mis-


13 A concise survey of Indian initiatives in this regard can be found in Manpreet Sethi, "The Struggle for Nuclear Disarmament," in Jasjit Singh (ed.), Nuclear India (New Delhi: Knowledge World, 1998), pp. 75–95, and Disarmament: India’s Initiatives (New Delhi: Ministry of External Affairs, Government of India, 1988). The worldview that bred these initiatives can be found in India and Disarmament: An Anthology of Selected Writings and Speeches (New Delhi: Ministry of External Affairs, Government of India, 1988).
placed in the highly competitive arena of international politics. Yet while genuine idealism did in fact underlie India's calls for global denuclearization (especially in the early years of the Cold War), it would be a mistake to reduce India's motivations to altruistic impulses alone. In fact, these calls were equally grounded in a soberly realistic assessment of India's own condition—i.e., in the recognition that the global abolition of nuclear weaponry was essential precisely because only in a world without nuclear weapons would India be freed from the obligation to develop antidotes to possible nuclear threats at a time when it was both economically vulnerable and politically fragile. In short, New Delhi yearned to abolish the arms race because it was a race that India could not run—and did not wish to run—given its conspicuous internal weaknesses during most of the Cold War period. Because this objective could not be attained, however—thanks both to the logic of technology and to political resistance on the part of the established nuclear powers—India gradually settled for a fallback option: preventing any external political or legal restraints from encumbering its right to formally develop a nuclear arsenal when that might be required.14

These political goals were complemented by a second set of objectives geared toward sustaining India's capability to produce fissile materials for nuclear weapons as well as a wide range of delivery technologies that a full-fledged deterrent would require. Pursuing these objectives implied increased commitment on India's part

14 The desire to maintain India's autonomy with respect to its nuclear choices existed since the beginning of its nuclear program. This desire was manifestly demonstrated first during the international discussions over the International Atomic Energy Agency (IAEA) safeguards system, where official Indian attitudes clearly reflected the "desire to avoid international safeguards against India so that [its] military option could be developed if the need arose to start a weapons program." See Kapur, India's Nuclear Option, p. 107. This desire to preserve national autonomy would be confirmed again during the negotiations leading up to the NPT (where India took the position that a distinction could be made between nuclear explosions for peaceful purposes and nuclear weapon tests). See the statement by Representative Azim Husain in the Eighteen-Nation Disarmament Committee (ENDC), February 27, 1968, reproduced in Jain, Nuclear India, Vol. 2, pp. 332-335. Most recently, the desire to preserve Indian autonomy in nuclear matters was exhibited during the CTBT negotiations, where, after much internal debate, India finally blocked the CTBT in the Conference on Disarmament. For a good statement explicating the reasoning behind this action, see Arundhati Ghose, "Negotiating the CTBT: India's Security Concerns and Nuclear Disarmament," Journal of International Affairs, 51:1 (Summer 1997), pp. 239-261.
to domestic research-and-development organizations both in the atomic energy arena and in the defense arena in general. The desire to possess adequate fissile materials in turn resulted in the large-scale use of foreign technologies—acquired through direct purchase, licensed reproduction, or indigenous application of information from Western sources—to produce significant quantities of weapons-usable plutonium,\textsuperscript{15} and more recently, enriched uranium, tritium, beryllium, and other materials as well. The pursuit of adequate delivery systems resulted in a similar strategy that coupled domestic research and development with the outright purchase (sometimes involving coproduction), reverse-engineering, or modification of systems obtained from abroad—all married together through large and highly publicized domestic systems integration efforts.\textsuperscript{16} India's defense and space research organizations have all used some variant of the above strategy, yielding several successes along with many failures that have gone unacknowledged both by Indian technologists and by their supporters in the national bureaucracy.\textsuperscript{17} The pursuit of this strategy has in turn resulted in heightened resistance on India's part to international technology-control regimes, which are widely perceived as impediments that could prevent India from enhancing its strategic capability.

Although both objectives identified above have been actively pursued since India's independence, their success has clearly been mixed. Indian successes appear most conspicuous at the political level, where New Delhi—despite having failed to engineer any realistic international commitments to nuclear abolition—has at least succeeded in preventing external legal constraints from limiting its freedom of choice. India has not signed the Non-Proliferation Treaty (NPT)—and, despite having been one of its original votaries, has thus

\textsuperscript{15}For details, see Bhatia, \textit{India's Nuclear Bomb}; Wohlstetter, "The Buddha Smiles": Absent-Minded Peaceful Aid and the Indian Bomb; and David Hart, \textit{Nuclear Power in India} (Boston: G. Allen & Unwin, 1983).


far refused to sign the CTBT. Similarly, India remains committed in principle to supporting a Fissile Material Cutoff Treaty (FMCT), assuming that a suitable instrument can be negotiated, but is unlikely to sign any agreement that would require full transparency of past stockpiles. At a purely formal level, India's nuclear program therefore remains unconstrained by any legal obligations that would prevent it from developing a full-fledged nuclear arsenal in the future.

At a substantive level, however, such freedom of action has by no means gone unbridled. Through the indefinite extension of the NPT and the overwhelming consensus underlying the CTBT, the existing nuclear powers have substantially delegitimized the "natural right" of states to acquire any weaponry of their choice and have thus burdened holdouts like India with an inhospitable international environment within which future nuclear deployment decisions must be made. Furthermore, a variety of legislative constraints have arisen within the United States that in effect require that the U.S. government penalize—unilaterally if necessary—any state other than the Permanent Five that acquires new nuclear capabilities. The sanctions imposed on India and Pakistan in the aftermath of their recent nuclear tests were in fact mandated by one or more of these legislative constraints. Since the United States will remain the only hegemonic power in the international system for at least another two decades, its ability to inhibit foreign choices with respect to nuclear

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18 As a result of the protracted U.S.-Indian dialogue that followed the May 1998 nuclear tests, India has agreed in principle to sign the CTBT when a national consensus in support of such an action can be achieved. In practice, however, the prospect that India will become a signatory to the treaty is contingent on the extent of support it can secure from the United States in various issue areas of importance to New Delhi. Further, senior Indian officials have explicitly stated that signing the CTBT, if and when it occurs, does not automatically imply ratification and deposit of the signed instrument—a new political strategy developed in response to the U.S. Senate's decision to eschew treaty ratification. India's becoming a signatory, therefore, is merely a preliminary step, since the obligations imposed by the treaty will not fully constrain it until the deposit of the ratified instrument is finally concluded. See "India Not to Engage in a N-Arms Race: Jaswant," The Hindu, November 29, 1999.

decisionmaking cannot be underestimated and must in fact be recognized as an even more significant hindrance on any freedom of choice that India notionally enjoys. At the very least, this constraint could materialize in the form of a continuation of the stringent U.S. controls that currently restrict access to high technology and advanced weaponry. All things considered, therefore, India has secured and maintained its formal freedom of action with respect to its nuclear status, but such liberties are by no means untrammelled or cost-free.

A similar assessment holds with respect to India's technological achievements. India has certainly succeeded in maintaining the capacity to produce fissile materials—mostly weapons-usable plutonium—in the absence of external constraints. In fact, India today is probably at the point where it faces no technological constraints on its ability to produce any level of weapons-usable (including weapons-grade) plutonium it desires for the purposes of fabricating nuclear weaponry. Indeed, the principal constraints India faces in this context are efficiency constraints—and though these are by no means notional or illusory, the implication is that India has not been handicapped (as Pakistan traditionally was) by a lack of availability of fissile materials. Whether India did in fact stockpile ready nuclear weapons itself prior to May 1998 is anyone's guess. Most official U.S. estimates suggest that India could fabricate complete weapons at short notice, but the safety, efficiency and reliability of such weapons

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20 One U.S. official, Matthew P. Daley, has noted that "even if current problems following the Indian nuclear tests are resolved, India will not get access to nuclear aid and other high tech on the same basis as China so long as she does not sign the NPT." See "U.S. High Tech to Remain 'Out of Bounds' for India," Hindustan Times, January 15, 1999. Whether this conclusion continues to hold, of course, rests largely on American choices in the years ahead—choices that will be influenced in large part by competing concerns over limiting proliferation on the one hand while preserving the future balance of power in Asia on the other. If U.S. grand strategy comes around to viewing a strong and capable India as a necessary ingredient of a well-ordered Asian future, U.S.-Indian cooperation in the arena of strategic technology could well begin. Such a development would hearken back to U.S. debates in the early 1960s, when several elements of the U.S. government at least contemplated, if not argued for, supporting an Indian nuclear program in order to contain the Chinese. This chapter in the evolution of U.S. nonproliferation policy is detailed in Perkovich, India's Nuclear Bomb, pp. 86–105.

(even in the wake of the May 1998 tests) continue to be the subject of debate both within and outside India.\textsuperscript{22}

India has also steadily developed a variety of delivery systems. Some of these capabilities, however (e.g., aircraft), may have been more presumptive than real in that they were simply conventional platforms that could be—but by some public accounts have yet to be—configured for nuclear delivery.\textsuperscript{23} Even if some aircraft were configured for nuclear operations—as is likely the case—they would probably be effective against only one of India’s two competitors: Pakistan and not China. The other Indian delivery systems are even more notional at present; India’s long-range missile system, the Agni, is still in the engineering development phase, while its current shorter-range system, the Prithvi family of missiles, was originally not intended to play and will probably not have a nuclear delivery role, except perhaps in a grave emergency. Besides these inchoate capabilities at the level of weapons and delivery systems, there is no public evidence that India had developed either the supporting capabilities or the procedural and ideational frameworks that together would allow various individual components of a deterrent system to work coherently. On balance, therefore, India’s capabilities prior to the May 1998 tests seem to justify the conclusion that New Delhi possessed a “nuclear option” in the form of latent and, in some areas, rudimentary capabilities but had no effective nuclear arsenal, implying that—at least by traditional Cold War standards—it had no “credible deterrent.”\textsuperscript{24}

To be sure, this conclusion does not imply that India possessed no retaliatory capabilities whatsoever prior to May 1998 or that these capabilities were of necessity politically and militarily ineffective vis-à-vis its principal threats, Pakistan and China. Rather, it is meant to suggest that New Delhi’s latent deterrent capabilities were not—and


\textsuperscript{23} Dinesh Kumar, “IAF Still Lacks N-Capability,” The Times of India, October 19, 1998.

\textsuperscript{24} The best Indian source that affirms such a judgment is Chari, Indo-Pak Nuclear Standoff. The best concurring American assessment of India’s (and Pakistan’s) traditional nuclear posture can be found in Neil J. Joeck, Maintaining Nuclear Stability in South Asia, Adelphi Paper No. 312 (London: IISS, 1997).
perhaps are not—configured in a way that comports with the “classical” Cold War standard of what constitutes an “adequate” or a “credible” deterrent. During the Cold War, four generic criteria were advanced for deterrent adequacy and, by implication, strategic stability: the guaranteed presence of sufficient second-strike weapon reserves; a history of credible, communicated deterrent threats; the existence of survivable command, control, communications, and intelligence (C3I) assets and supporting infrastructure; and a multitude of preplanned nuclear employment options that could be executed as part of a retaliatory strike. Whether and to what extent these criteria are in fact appropriate to the South Asian region is a separate issue that will be discussed in some detail in Chapters Four and Five, but for the moment, the principal conclusion that bears restatement is that India’s traditional nuclear posture, wrapped as it was in deliberate ambiguity, sought to derive deterrence benefits from the possession of latent nuclear capabilities rather than from the flaunting of ready, deployed nuclear forces.

Since maintaining the “nuclear option” and eschewing the creation of a ready arsenal have thus been the product of a deliberate political choice that remained at least formally entrenched until May 1998, it must be admitted that New Delhi’s core political preferences prevailed throughout the Cold War era and beyond—at least in the main, if not in all the details. India preserved its legal freedom to develop a nuclear arsenal in the face of its failure to engineer the global abolition of nuclear weaponry, even as it concomitantly developed and maintained certain pockets of technical capability that would allow it to develop a deterrent of some kind in the future. The 1998 nuclear tests have, however, muddied this picture somewhat. Clearly, the tests themselves—assuming that they were as successful as India has claimed—have simply corroborated what most observers already believed to be true: that India was in fact capable of detonating nuclear explosives more or less successfully, as previously

demonstrated in 1974. Hence, India’s claim of being a nuclear weapon state may not alter any realities at the factual level but it certainly poses a political challenge for the global nonproliferation regime—for by claiming such status overtly through a series of nuclear detonations. India has in effect placed the existing nuclear weapon states on notice that their efforts to restrict the number of acknowledged nuclear powers to those that had “manufactured and exploded a nuclear weapon or other nuclear explosive device prior to January 1, 1967,” would not be accommodated without further bargaining over India’s own status in the global political order. Yet while this issue represents a serious matter in its own right, it has little bearing on the central concern of this research effort—i.e., what the claim “India is now a nuclear weapons state” implies for the country’s future deterrent. Before this issue is investigated in any detail, however, it is important to identify and assess those variables which are likely to have the most impact on India’s future decisions about the shape and orientation of its nuclear posture.

UNDERSTANDING THE VARIABLES AFFECTING INDIA’S NUCLEAR POSTURE

In general, there are four variables that will influence the direction, extent, and patterns of change in India’s nuclear posture over time: the character of the global nuclear regime; the demands imposed by regional security and, in particular, regional nuclear threats; the character of India’s bilateral relations with key powers in the international system; and the opportunities offered by indigenous performance and capabilities in the context of domestic political debates about nuclearization. Each of these factors merits closer examination.

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The Global Nuclear Regime

The character of the global nuclear regime is the first critical factor that will determine the direction, extent, and patterns of change in India’s nuclear posture. The global regime is important in the first instance simply because of India’s traditional position that the status of nuclear weaponry is a global rather than a regional problem.28 The rhetorical dimensions of this stance are, however, less significant than its strategic consequences, which imply that critical decisions relating to further “horizontal proliferation” in South Asia—that is to say, decisions bearing on both the number and kind of strategic technologies acquired—will ultimately be linked to larger Indian perceptions about issues relating to “vertical proliferation” and, by extension, the structure of the global nuclear regime in general.29 This in turn implies that as long as Indian decisionmakers perceive that the existing nuclear weapon states either will not or cannot move toward deeper stockpile reductions that will ultimately lead to nuclear abolition, India (and, by implication, Pakistan) will not countenance the prospect of rolling back its own nuclear programs. This obduracy is linked both to strategic concerns about perceived threats emerging from some of the nuclear weapon states—China in particular in the case of India—and to ideational fears about enshrining “discriminatory” organizational regimes such as the NPT in international politics.30

To be sure, the pace of India’s (and Pakistan’s) movement toward further nuclearization may be successfully moderated, assuming that a suitable combination of blandishments and penalties can be fashioned by some or all of the nuclear weapon states. However, this success will not extend to convincing either state to move in the direction of denuclearization so long as the existing international nuclear order remains structurally intact. Thanks to its size and geostrategic weight, India possesses the requisite autonomy to resist most if not

all political pressures that the existing nuclear weapon states might impose on it to roll back its nuclear program. While Pakistan, for its part, may not be similarly robust, its overwhelming fear of India more than suffices to ward off the worst political pressures imaginable; Pakistan will risk internal stagnation and decay if necessary but will not exacerbate its external vulnerability by succumbing to any pressures for denuclearization as long as India, its archrival, refuses to move in a similar direction first. India, of course, will in turn refuse to contemplate any such step as long as China, its principal long-range threat, remains a significant nuclear power—and China, it may be surmised, would decline to consider denuclearization as long as Russia and the United States, its strategic rivals, refuse to consider denuclearization themselves. Thanks to this long and extended chain of consequences, no movement toward denuclearization should be expected in South Asia within the policy-relevant future. This simple but consequential conclusion would not merit repetition but for the fact that in the aftermath of the May 1998 tests, there has been a renewed chorus of calls both within the United States and from abroad exhorting India and Pakistan to roll back their nuclear programs and sign the NPT as non-nuclear weapon states.

The current global nuclear regime therefore influences the future direction of India’s nuclear posture in at least one straightforward manner: It makes denuclearization impossible and, to the extent that it allows the existing nuclear weapon states to continually maintain and perhaps improve their arsenals even if only in qualitative terms, makes further Indian movement in the direction of nuclearization all the more likely. This assessment by no means implies that Indian

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(and Pakistani) policymakers are unaware of the changes that have occurred in the global nuclear order since 1991. They do recognize, for example, that "the nuclear arsenals of the two superpowers have shrunk several-fold"—but they simply consider these changes to be insufficient, at least as far as the impact on their own strategic condition is concerned.

The present global nuclear regime is in fact viewed within India as embodying a mixed blessing. Clearly, the salience of nuclear weapons as the "currency of global politics" has progressively declined over time, particularly with the passing of the Cold War. Both U.S. and Russian arsenals have, moreover, diminished considerably both in size and in terms of their strategic salience. In the United States in particular, the roles formerly allocated to nuclear weapons have in many instances been handed over to newer generations of improved conventional munitions, although the "repackaging" of some older nuclear weapons to perform those roles still lying beyond the capacity of improved conventional munitions points to the enduring importance of nuclear weaponry even in the context of the evolving "revolution in military affairs" (RMA). In general, however, the significance accorded to nuclear weapons has radically diminished since the end of the Cold War, and U.S. and Russian policymakers currently appear to be contemplating even steeper reductions in their strategic nuclear capabilities—reductions that will eventually bring the size of their arsenals down to a historic low of

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35 William M. Arkin, "What’s ‘New?’" Bulletin of the Atomic Scientists, 53:6 (November–December 1997), pp. 22–27. This argument has been amplified by many Indian analysts who use it, first, as evidence of the continuing addiction to nuclear weapons on the part of the established nuclear weapon states, and second, as a justification for the distension of their own country’s nuclear capabilities. See, for example, Vijai K. Nair, "Indian Nuclear Doctrine: Domestic and External Challenges," Agni, 4:2 (May 1999), pp. 10–28.
some 2000 warheads once the START III negotiations have successfully concluded.36

Such a movement toward a "low salience nuclear environment"37 is clearly perceived by Indian policymakers as being in their strategic interests. To the degree that superpower arms reductions help lessen nuclear competition worldwide and, in particular, decrease the incentives for subsidiary nuclear powers like China to continually augment their nuclear capabilities, they can only serve to increase India’s sense of security. For this reason, Indian strategists in general argue that the core arrangements governing U.S.-Russian arms reduction should be progressively broadened to include the smaller nuclear powers and eventually the threshold states as well as part of a progressive drive toward global nuclear abolition. The most recent such call in fact emanated from India in the aftermath of the May 1998 nuclear tests, when the Indian government called on "all nuclear weapons states . . . to join with it in opening early negotiations for a Nuclear Weapons Convention so that these weapons can be dealt with in a global, nondiscriminatory framework as other weapons of mass destruction have been . . . [dealt with in the past]."38 While this invitation appears self-serving, coming as it did on the heels of the 1998 nuclear tests, it was certainly consistent with India’s past proposals and represented a continuation of traditional Indian policy, which has always held out the threat of overt nuclearization so long as the global nuclear order remained unreformed.39

From New Delhi’s perspective, however, several critical impediments have materialized in the arena of global nuclear reform—despite all the other beneficial developments that have occurred in the aftermath of the Cold War. For example, neither Russia nor the smaller nuclear powers, the United Kingdom and France, appear


37This phrase appears in Michael McGwire, "Is There a Future for Nuclear Weapons?" International Affairs, 70:2 (April 1994), pp. 211–228.


39Perkovich, India’s Nuclear Bomb, pp. 444–468.
willing to contemplate reductions in nuclear capabilities as part of some larger process that will eventually culminate in nuclear abolition.40 Even the United States, where the debate about nuclear abolition has perhaps reached its most sophisticated level, seems to have demurred about carrying nuclear arms reduction to its logical terminus, preferring instead to pursue a “lead and hedge” policy well into the future.41 In every case, a number of considerations have been brought into play: Concerns about maintaining great-power status indefinitely, fear of the consequences of cheating, apprehension about prospective proliferation involving rogue states and perhaps nonstate actors, and old-fashioned considerations about security itself have combined to render comprehensive nuclear disarmament a remote and illusory goal.42 Indeed, even moral arguments—especially those emanating from both the Christian churches and secular institutions in the United States—have failed to demonstrate that nuclear abolition is a desirable objective that should be pursued in concert with the other nuclear weapon states.43 Taking their cue from such debates, Indian policymakers have concluded that preserving their nuclear option has become all the more necessary, since the principal condition that would enhance

40This reluctance centers on the desire to ensure permanent security in the first instance but in the final analysis is driven considerably by concerns about prestige, since given their current and projected economic standing, each of these countries would be hard-pressed to sustain its claims to great-power status in the absence of nuclear weaponry. Good discussions about how status and prestige figure in the British and French decisions to maintain a nuclear force can be found in Stuart Croft and Phil Williams, “The United Kingdom,” and in Klaus Schubert, “France,” in Regina Cowen Karp (ed.), Security with Nuclear Weapons? (Oxford, UK: Oxford University Press, 1991), pp. 145–186. In the case of Russia and China, nuclear weapons remain the principal source of security given that their conventional military capabilities are less than impressive. The increased Russian emphasis on its nuclear capabilities in the post–Cold War era is analyzed in the context of changing military doctrine in Mary C. FitzGerald, “Russia’s New Military Doctrine,” Naval War College Review, 46:2 (Spring 1993), pp. 24–44, while Chinese attitudes toward nuclear reductions are assessed in Michael D. Swaine and Aialik Aialik Johnston, “China and Arms Control Institutions,” in Elizabeth Economy and Michel Oksenberg (eds.), China Joins the World (New York: Council on Foreign Relations Press, 1999), pp. 90–135.


42For a good analysis of why comprehensive nuclear disarmament may be a bad thing, see Glaser, Analyzing Strategic Nuclear Policy, pp. 166–203.

Indian security—global reductions leading to abolition—will probably never be fulfilled at any point in the near or distant future.

It is in this context that the long-standing U.S. effort to curtail the proliferation of nuclear weapons in South Asia is viewed uneasily in New Delhi. Clearly, even India—which often appears to be an object of American nonproliferation efforts—has a vested interest in the overall success of U.S. nonproliferation policies. Indian policymakers certainly recognize that a world of “high-entropy” proliferation—i.e., a highly proliferated world with few “rules of the nuclear road” would be a dangerous one indeed as well as one in which Indian security would be reduced rather than enhanced. Consequently, there is no reason—in principle—why Indian interests and U.S. objectives with respect to proliferation should conflict. The primary reason for discord from New Delhi’s perspective, however, arises not from principle but rather from practice. This is because Indian strategic managers believe that American nonproliferation policies, although laudable for all the benefits they could confer, should not apply to India because its difficult strategic environment—defined among other things by its close proximity to one nuclear weapon state and to another de facto nuclear state—as well as its general political conservatism, historic restraint with respect to the use of force, democratic character, and strategic importance to the United States (especially with respect to the issue of stability in Asia writ large), justify its treatment as the singular exception to the nonproliferation regime.

The heart of New Delhi’s opposition to the U.S. nonproliferation policy is therefore directed more toward that policy’s application

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45Ibid.
46This argument was most cogently articulated by the former Indian Foreign Secretary, Maharajakrishna Rasgotra, at the RAND-RGICS Workshop on U.S.-South Asian Relations held at Jawahar Bhawan, New Delhi, February 28–29, 1996. It can also be found in Jasjit Singh, “South Asian Nuclear Scene,” The Times of India, May 2, 1994, and in Maharajakrishna Rasgotra, “Nuclear India Must Engage the U.S.” The Times of India, May 29, 1998. The most authoritative affirmation of this argument can be found in “Address by Prime Minister Atal Bihari Vajpayee to the Joint Session of the United States Congress,” Washington, D.C., September 14, 2000, available at http://www.meadeve.gov.in/speeches/j-session.htm.
than toward its general logic. The discomfort with its logic arises only to the degree that the policy implicitly encodes a permanent, discriminatory hierarchy in international politics. While the Nehruvian tradition in Indian policymaking might find this effect disconcerting, the more dominant realist strains today accept the reality of a twotiered, "have/have not" system—at least as far as nuclear issues are concerned. Consequently, their principal worry centers on which side of the divide India would be locked into given its belief that nuclear weapons do enhance the security of some states and therefore cannot be either wished or abolished away.47

Since this logic cannot be applied to India without reference to Pakistan, Indian policymakers have increasingly been willing to concede that Pakistan too should be exempted from the burdens of U.S. nonproliferation efforts, albeit for different reasons. While India views Pakistan as a hostile and often irresponsible state, this volatile behavior is now acknowledged to be as much a product of Pakistan’s insecurity as it is a fruit of its mendacity—although many Indians argue that mendacity will continue to dominate Islamabad’s decisionmaking toward India by virtue of the peculiar internal political structures of the Pakistani state. However, to the extent that Pakistan’s hostility is rooted in its perceptions of irredeemable vulnerability vis-à-vis India, the acquisition of nuclear weapons by Islamabad should serve to boost Pakistan’s confidence about its security and, by implication, offer the best hope for stabilized relations with India.48 Because attaining this goal remains fundamental to achieving peace and security in the region, most Indian policymakers today would argue that Pakistan’s acquisition of nuclear weapons should also be condoned by the United States as a means of enhancing strategic stability in South Asia.

47 This issue became particularly critical during the negotiations leading up to the CTBT as seen, for example, in J. N. Dixit, "The Indian Dilemma," Indian Express, January 9, 1996.

The ideal Indian rank-ordering of preferences would thus take the following form:

- The first preference would be a nuclear-capable India but not a nuclear-capable Pakistan. Under this preference, the United States would seek to prevent Pakistan from acquiring effective nuclear capabilities, thereby allowing India to provide a modicum of hegemonic stability to the subcontinent.

- The second preference would be a nuclear-capable India and a nuclear-capable Pakistan. Under this preference, the United States would ideally tolerate nuclear capabilities on both sides and perhaps even assist their management, since Indian nuclear capabilities serve to safeguard a regionally important power against both Pakistan and China while Pakistani nuclear capabilities serve to secure a weaker and more volatile state against the worst depredations that might be imagined to emerge from India. The Indian leadership certainly recognizes that one consequence of accepting Pakistan’s nuclear capabilities would be an increased propensity on Islamabad’s part to engage in nuclear brinkmanship through low-intensity conflicts with India. The only truly effective antidote to such Pakistani behavior—in Indian reasoning—lies in the United States’ choosing to pursue some variant of the first preference. However, since Washington is unlikely to choose this alternative for both historical and political reasons, New Delhi appears resigned to the idea that its second preference—with all its disadvantages—will define the reality with which it must cope in the future. Given this fact, Indian policymakers have sought to persuade Washington that although Pakistan’s nuclear capabilities ought to be tolerated as such, Islamabad’s egregious political adventurism should nonetheless be sanctioned by a variety of political means.

- The third and fourth alternatives, respectively—no nuclear weapons in India and Pakistan, and no nuclear weapons in India but nuclear weapons in Pakistan—are deemed to be beyond the pale of consideration and hence are not treated seriously by Indian policymakers and analysts in general.

The bottom line, therefore, is that Indian commentators are often willing to countenance nuclear capabilities in Pakistan if such ca-
pabilities imply the removal of U.S. political pressures on India coupled with a recognition on the part of the United States that India’s independent foreign policy and its emergence as a regional hegemon are ultimately beneficial to U.S. global interests. These considerations invariably underlie all New Delhi’s efforts to convince Washington that a nuclearized subcontinent remains the desirable exception to its otherwise-stringent nonproliferation policy. The tensions that may arise in the process of accommodating such exceptions, especially at the level of U.S. declaratory policy, are rarely examined by Indians in any detail, leaving the impression that since nonproliferation is an American cause, managing its contradictions is best left to the Americans as well. In these circumstances, Indian security managers seek only to ensure that the global nuclear regime does not place India at a permanent disadvantage, even if they have given up all hope that it will benefit India through the outcome of complete abolition.

While the global nuclear order thus has the immediate effect of reinforcing Indian decisions against denuclearization, it affects the future Indian nuclear posture in other derivative but nonetheless important ways.

To begin with, the composition of the global order serves to define India’s threat environment insofar as it provides the medium for identifying both present challenges and future threats. Mercifully, India’s current readings of its nuclear threat environment, although tinged with some uncertainty when the distant future is taken into account, are relatively limited. Of the eight nuclear weapon states in the global system, four—Russia, Israel, the United Kingdom, and France—are generally regarded as posing no nuclear threat to India. Russia continues to remain an important source of military equipment, and New Delhi longs for the day when a revitalized Moscow will again be a source of political and strategic support.49 Israel has in recent years become an increasingly important source of critical military technologies as well, and its own preoccupation with the Arab states, some of which are friendly toward Pakistan, has created a “checkerboard pattern” of strategic alignments that makes Israeli

and Indian objectives more compatible than they are competitive. Both the United Kingdom and France, despite being allies of the United States, are viewed as having a somewhat independent foreign policy where India is concerned: Both remain important sources of military equipment, with France steadily becoming more important than Great Britain, especially as a supplier of strategic technologies; each has either historical or ideological ties with India; and both have strategic concerns that, being sufficiently removed from India's, do not lock them into any directly competitive relationship with New Delhi.

In stark contrast to the four states above, which do not figure into any Indian threat assessment worth naming, two other states—China and Pakistan—will continue to be regarded as straightforward nuclear threats well into the distant future. This is because both states have fought wars with India in the past; both target India with nuclear and conventional weapons; both have a variety of border disputes with New Delhi that are unlikely to be resolved soon; and each, in different ways, is likely to persist as a political rival to India as far as physical security and political eminence are concerned. This leaves the United States, the world’s foremost political power, in a category by itself. Clearly, India’s strategic managers—in contradistinction to some of New Delhi’s vociferous elites—do not view the United States as posing a nuclear threat to India today. To be sure, U.S.-Indian relations have often been fraught with suspicion, but this discord has never reached the point at which the United States has been perceived as a real military threat—a condition that probably held even during the tempestuous days of 1971. The 1971 Indo-Pakistani war certainly represented the nadir of U.S.-Indian relations, and President Nixon’s gunboat diplomacy, as exemplified by the steaming of the USS Enterprise into the Bay of Bengal, still ran-


bles many Indians. Indeed, it has even been argued that this event may have had some bearing on Indira Gandhi's later decision to authorize India's first nuclear explosion, and it certainly provided significant impetus for the major Indian naval modernization that began in 1978. Yet even this exercise of gunboat diplomacy was viewed by most Indian policymakers—as opposed to Indian commentators, the general public, and the Indian Navy—as more a symbolic affront than an operational challenge, albeit one that justified the creation of some strategic deterrent against the threat of extraregional intervention in the affairs of the subcontinent.

In short, for much of the time since 1964, India has doubtless perceived the United States as an overbearing power—a perception influenced both by Washington's policies and by its overwhelming strength. Rarely, however, has New Delhi viewed the United States as a true nuclear threat. Indeed, even during the late 1970s and early 1980s, when India's concerns about the U.S. presence in the Indian Ocean reached their zenith, New Delhi's criticisms of American naval operations were driven primarily by the fear that these activities had precipitated a competitive Soviet response, thereby resulting in an unwelcome proliferation of extraregional navies close to the Indian peninsula. It is unlikely that New Delhi ever believed that U.S. naval operations either were intended to pose or actually posed a direct nuclear threat to the Indian heartland, although numerous Indian ideologues were happy to level just such charges whenever U.S.-Indian relations became problematic. It is also unlikely that India will view the United States as a nuclear opponent in the future, even though India will at some point acquire the capability to target U.S. facilities and forces at various sites along the Asian periphery. Whether India actually acts in accordance with its capabilities here

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54Not surprisingly, the Indian Navy in particular perceived the political challenge of deterring such extraregional intervention in highly operational terms that are described in some detail in Ashley J. Tellis, "Securing the Barrack: The Logic, Structure and Objectives of India's Naval Expansion," Parts I and II, Naval War College Review, 43:3 and 43:4 (Summer and Autumn 1990), pp. 77–97 and 31–57.
will therefore be determined by New Delhi’s perception of U.S. attitudes toward India and, more particularly, by its assessment of America’s willingness and desire to intervene militarily in South Asian affairs to India’s detriment. To the degree that India concludes that such intervention is likely or even possible over the long term, it will be given sufficient incentive to develop a range of strategic capabilities that guard against this possibility. Throughout the 1980s, for example, Indian strategic literature focused on how naval instruments could be employed to “raise the cost” of potential superpower

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55 This issue is of critical concern to most Indian elites because the Indo-Pakistani dispute over Kashmir is often seen as providing the United States with just such an opportunity for unwelcome intervention. These fears are only exacerbated by Pakistan’s persistent desire to involve Washington in resolving the Kashmir dispute. The possibility that the United States might some day choose to intervene in internal South Asian disputes conditions India’s responses to all American interventionary efforts worldwide. Thus, one Indian diplomat, commenting on New Delhi’s fierce criticism of the U.S.-led NATO campaign in Kosovo, noted that “the Indian reaction to Kosovo has been conditioned by its own problem of containing separatism in Kashmir. Both issues involve separatist insurgencies encouraged and supported from outside in areas where the majority of the population is Muslim.” See A.N.D. Hakr, “Parallel Seen Between Kosovo Crisis and Kashmir,” India Abroad, May 21, 1999.

While the Indian condemnation of NATO military efforts has therefore been based largely on the fear that a hegemonic United States might use the violation of human rights as a pretext for “external intervention in affairs of other countries grappling with regional disaffection,” several Indian commentators have concluded that the only way to immunize India against similar American depredations in the future is to develop a “strong defence,” which includes, among other things, nuclear weapons and long-range ballistic missiles. See, for example, Saumitra Mohan, “The Agni Sermon,” The Pioneer, May 1, 1999.

Even the current Indian Chief of Air Staff, Air Chief Marshal Ashok Yashwant Tipnis—noting that “assertive diplomacy is becoming prominent and there is talk of how extraregional influences could be used here [meaning South Asia]”—has stated that “he would like the IAF to take possession of the indigenously developed Agni intermediate-range ballistic missile” in addition to the larger numbers of long-range Sukhoi-30s and Mirage-2000 multirole fighters already on order. He has further asserted that the Indian Air Force will “build up both offensive and defensive capabilities to counter extraregional influences,” thus confirming the anxiety felt by Indian security managers who have attempted to defend the Pokhran tests “in the light of developments in Kosovo.” See “Don’t Justify Nuclear Plan, Urges China,” Hindustan Times, May 19, 1999. Tipnis’ extended statement can be found in Dinesh Kumar, “Let’s Be Stronger and Smarter, Says IAF Chief,” The Times of India, May 16, 1999.

Many of these concerns about possible U.S. intervention diminished after the 1999 Kargil crisis, when, to the surprise of many Indian policymakers and the general public, Washington publicly rejected both Pakistani rationalizations about its role in precipitating the conflict and Islamabad’s invitation to intervene in order to resolve the Kashmir dispute.
intervention. All things considered, there is no reason why aircraft- and missile-delivered nuclear weapons could not be envisaged for a similar role in the future, especially if the United States were perceived to be both hostile to India and unchallenged in its global hegemony. Clearly, treating the United States as a strategic threat to be countered through Indian nuclear responses is only a remote possibility at present, but because it cannot be discounted altogether, it is in the United States' interest to condition both the political and technical choices available to India so as to prevent this from coming to pass.

While the character of the global regime thus affects India's future nuclear posture in the first instance by providing opportunities for threat definition (against which evolving Indian nuclear capabilities would have to be metered), it also affects these capabilities to the extent that it produces "positive externalities" that various weaker states, including India, could exploit. The existence of such positive externalities derives from the fact that first, nuclear deterrence in many instances exhibits the characteristics of a "public good," and second, interlocking political competition in a world of nuclear multipolarity provides significant opportunities for second- and third-tier states to remain secure even if they possess less-than-adequate deterrents of the sort that would be required under conditions of pure bipolarity. These processes were in fact exploited by the British, French, and Chinese throughout the Cold War, when each of these states remained content with having minimal nuclear capabilities (despite possessing no alliance commitments, for example, in the case of China) simply because they benefited from the vast U.S. efforts at deterring the Soviet Union. Further, these states could rest


57 Many Indian as well as U.S. commentators argue that the best solution for dealing with any misperceptions in this regard is to develop a joint U.S.-Indian understanding of the role New Delhi's nuclear weapons can play in the evolving Asian balance of power. Part of this process may include orchestrating a "grand bargain" whereby India eschews the development of certain nuclear capabilities in exchange for preferential access to American resources, technology, and political support. For different versions of this solution, see Selig S. Harrison, "Cut a Regional Deal," *Foreign Policy*, 62 (Spring 1986), pp. 126–147; Selig S. Harrison, "The United States and South Asia: Trapped by the Past?" *Current History*, 96:614 (December 1997), pp. 401–406; and C. Raja Mohan, "Nuclear Balance in Asia," *The Hindu*, June 11, 1998.
assured that their loss to the Soviets would place the United States at a severe disadvantage in the regional and global balances of power and that therefore their defense against Soviet depredations was guaranteed purely on the basis of U.S. self-interest even if they possessed no nuclear weapons whatsoever.\textsuperscript{58} This phenomenon, which many theorists have concluded could lead to "free riding" by alliance partners,\textsuperscript{59} could also be exploited by India at some point in the future, irrespective of whether India develops a close relationship with the United States.

The benefits of deterrence externalities would best obtain, however, if China were to emerge over time as a strategic rival of the United States in Asia and beyond. Should such a condition arise, U.S. efforts to deter China will inevitably provide a measure of safety to the various smaller states in Asia, including India—none of which may actually contribute to the sustenance of that larger goal. Since the United States would most likely seek to preserve the security of these states in the face of Chinese blandishments or aggression in efforts to prevent the balance of power in Asia from deteriorating to its disadvantage, it is possible that states like India would not find it necessary to develop the panoply of deterrent capabilities they might otherwise have had to cultivate. Thus, the configuration of the global nuclear order and the character of the competitive relationships between the most important states in that order will greatly influence India’s future nuclear posture. To be sure, the externalities flowing from these “superpower” relationships will not result in India's outright abdication of nuclear arms because a country of India’s size and geopolitical weight is seen to require some minimum deterrent to independently deter Pakistan, to ensure its own freedom of action vis-à-vis China and the United States, and to ensure the possibility of interventionalist responses by other countries to possible Chinese aggression. Such factors will, however, influence India’s decisions relating to the size, structure, and orientation of its nuclear arsenal.

\textsuperscript{58}This calculation in fact underwrote in part the Swedish decision to give up its nuclear program. See Paul M. Cole, \textit{Sweden Without the Bomb: The Conduct of a Nuclear-Capable Nation Without Nuclear Weapons}, MR-460 (Santa Monica: RAND, 1994).

This influence will be most clearly evident (as it was in the case of China during the Cold War years) not in decisions relating to initial force architecture but rather in the subsequent choices relating to force improvement and modernization that will arise as a result of progress in its adversaries' nuclear capabilities over time. The pressure to respond nervously to every improvement in China's nuclear arsenal may simply be muted if New Delhi perceives that the commonality of interests it shares with the United States vis-à-vis China allows it to "free ride" off the counterresponses that would most probably be undertaken by the United States as the key hegemonic power in international politics.  

60Obviously, the types of counterresponses that the United States launches to the potential Chinese threat—if such a threat should emerge over time—would play a critical role at least with respect to the manner in which U.S. defensive efforts could influence New Delhi's future nuclear architecture and force posture. If, for example, Washington were to concentrate on developing a purely ground-based terminal defense system aimed primarily at protecting the continental United States, such a force architecture is likely to provide few positive externalities that countries such as India could exploit. The deployment of other capabilities, however—such as airborne or space-based boost-phase interceptors, airborne lasers, and sea-based theater missile defenses—could make a significant political difference to countries like India not because protection by such systems would be assured but because a potentially aggressive Chinese regime could not assume that these capabilities would not be made available to the rimland Asian powers in an emergency. Because these systems need not be either politically or physically transferred to the protectee (and may not even need to be deployed on the protectee's territory) in order for them to be effective, their deployment by the United States could allow Washington to credibly influence proliferation decisions in many countries, including some current U.S. allies, over the long term.

All such capabilities, however, bring along difficult strategic dilemmas. Besides the obvious challenges posed to the nature of the global nuclear regime as a result of such technological innovations, the potential protectees will also face painful predicaments of their own. The acquisition of strategic defenses by the United States may, for example, provide positive externalities that can be exploited by third parties, including small nuclear powers, but the latter will have to face the prospect that their own limited arsenals might become even more insignificant than would otherwise be the case—first because the major nuclear powers would be tempted to further expand their own arsenals to cope with American strategic defenses, and second because the United States itself could use its strategic defenses—in tandem with its conventional and offensive nuclear capabilities—to drastically attenuate the threat posed by many small nuclear forces around the world.

Thanks to these factors, most small nuclear powers, including India, are likely to exploit American strategic defenses, if available, to the degree they can politically while always seeking to maintain the most effective offensive nuclear force possible within their circumstances. Since India is most likely to follow this path—especially in the context of a rising, potentially aggressive China—it implies the return of one more
While the character of the global nuclear order and the relationships between the principal actors within that order thus offer opportunities for the exploitation of deterrence externalities, they also affect India’s future nuclear posture in another way: by influencing the nature of the nuclear deterrence regime. The current nuclear deterrence regime is an “offense-dominant” one whose stability is ultimately grounded in the capacity of a nuclear power to readily inflict horrific damage on the population centers of an adversary. 61 This condition, which is enshrined in the concept of “mutual assured destruction” (MAD), holds even in the context of limited nuclear use, since the “limited nuclear options” proposed by “nuclear use theorists” (NUTS), generally remain—after all is said and done—attempts at strategic bargaining in order to enforce war termination on favorable terms at the earliest opportunity. 62 Indeed, nuclear weapons of the sort currently possessed by the superpowers embody such fierce some potency that their actual use could rapidly escalate to the large-scale employment of central strategic systems which, even if used purely in a counterforce mode, would wreak such catastrophic damage as to trivialize the distinction between strategic counterforce and strategic countervalue attacks. Even nuclear-use theorists would therefore be forced to concede that “deterrence by denial” in the nuclear realm remains a modest innovation that is still firmly embedded in the larger reality of “deterrence by punishment.” 63


62 This insight was first explored systematically in Morton Kaplan, The Strategy of Limited Retaliation, Policy Memorandum No. 19 (Princeton, NJ: Woodrow Wilson School of Public and International Affairs, 1959).

The advantage of an offense-dominant regime is that it requires only modest nuclear arsenals for purposes of deterrence, especially on the part of emerging nuclear powers, since relatively small nuclear forces can hold at risk a large number of their adversaries' population centers. So long as the delivery force is relatively survivable and the warhead yields significant enough, a horrendous amount of damage can be inflicted even with relatively modest nuclear capabilities. Small nuclear forces can therefore function as highly credible deterrents in an offense-dominant regime. As long as the present regime, which ultimately derives its efficacy from MAD, remains intact, it is therefore likely that the future Indian nuclear arsenal would remain relatively modest, at least by the standards of the Cold War—although it would stay within the same order of magnitude, at least as far as numbers go, as those of the other second-tier nuclear powers. The problem, however, is that MAD, while remaining an effective background condition, is generally a poor (and perhaps even an immoral) strategy in the face of deterrence breakdown. Consequently, repeated efforts have been made over the years, especially within the United States, to shift nuclear strategy in the direction of a "defense-dominant" regime in which potential nuclear aggression is contained not by the threat of assured retaliation but by assured neutralization of the adversary's nuclear attack.  

The instruments of such neutralization consist of various forms of strategic defense. The character and phenomenology of these systems are, however, less relevant than their consequences. A shift to a defense-dominant regime by the United States, even if undertaken

64 The main reason this outcome did not obtain during the Cold War was that the United States and the Soviet Union sought to use their nuclear forces for purposes other than simply dyadic deterrence. Once nuclear weapons were seen as having utility for extended deterrence and conventionalized "denial" strategies, the resulting emphasis on nuclear war fighting ultimately led to the creation of large and diversified nuclear arsenals. Good analyses of the factors leading to this outcome can be found in William H. Kincaide, "The United States: Nuclear Decision Making, 1939-49"; Robert J. Art, "The United States: Nuclear Weapons and Grand Strategy"; Allen Lynch, "The Soviet Union: Nuclear Weapons and Their Role in Security Policy"; and Sergey Koulik, "The Soviet Union: Domestic and Strategic Aspects of Nuclear Weapon Policy," in Regina Cowen Karp (ed.), Security with Nuclear Weapons? (Oxford, UK: Oxford University Press, 1991), pp. 21–56, 57–99, 100–123, and 124–144.

65 For arguments in defense of such a shift on both strategic and moral grounds, see Colin Gray, "Strategic Defense, Deterrence, and the Prospects for Peace," Ethics, 95:3 (April 1985), pp. 659–672.
only in certain peripheral areas for purposes of safeguarding power projection forces, could lead to an expansion of the nuclear forces maintained by all other nuclear competitors. This dynamic will in turn affect the size and configuration of India’s nuclear arsenal because New Delhi will be forced to respond to the expansion of those nuclear forces which, while intended mainly to enhance penetrativity in the face of an American defensive umbrella, will nonetheless result in an expanded nuclear threat leveled at the Indian heartland. While this dynamic will in all probability manifest itself only vis-à-vis China, the underlying principle will remain the same: If the global nuclear deterrence regime, led by the United States, were to shift incrementally in the direction of a defense-dominant posture, the emerging Indian nuclear arsenal would end up being much larger than most current estimates anticipate. Under such conditions, Indian policymakers would seek to increase the number, kind, and diversity of their delivery systems, boost the quantity of their fissile-material stockpile, and place increased emphasis on denial and deception operations, penetrating aids, and the like in efforts to ensure minimally effective standards of penetrativity in the face of a pure defense-dominant regime as well as a minimal force size in the face of a mixed offense-defense regime.66

India’s security managers have already signaled their concern about these developments. In private conversations, they have revealed great interest in understanding the intent, scope, and timelines surrounding ongoing U.S. efforts to develop a thin national missile defense (NMD) system and a localized theater missile defense (TMD) system that may be deployed first in East Asia and then elsewhere. Their concern about these systems is driven not by an interest in U.S. strategic planning per se but rather by a desire to anticipate China’s strategic responses to such developments. This issue is perceived to be critical because Beijing’s responses to Washington’s strategic defense initiatives affect India’s local strategic environment and, by implication, its own future deterrence requirements.

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66 Highlighting precisely these consequences, one prominent Indian hawk has argued, for example, that “India will have to arm its ballistic missiles with decoys and other countermeasures.” Further, he notes, “The Agni-2 . . . can only be a stepping stone to other policy choices . . . how long can India do without cruise missiles that have emerged as the favored instruments of combat and precision strike?” See Brahma Chellaney, “Playing with Fire,” Hindustan Times, March 10, 1999.
as well. This private concern is now being articulated at a public level, albeit elliptically. In contrast to the early notions expressed in the aftermath of the May 1998 tests—that the very presence of Indian nuclear weapons somehow assured successful deterrence—more recent statements suggest greater sensitivity to the challenges posed by the quality of the strategic environment. Thus, the Indian Foreign Minister noted in a recent interview that the eventual size of India’s nuclear arsenal would be determined largely by the overall “strategic environment, technological imperatives, and national security needs,” with the second phrase—technological imperatives—assumed to connote the critical importance placed on ensuring not only the survivability of India’s nuclear assets but also the penetrativity of its strategic systems in the face of possible changes in the character of the evolving nuclear regime.

All in all, then, the global nuclear order will affect India’s future nuclear posture in significant ways. It will define the potential for further nuclearization or denuclearization and, more specifically, will determine the character of the threat; may provide opportunities for exploiting deterrence externalities; and will certainly influence the extent, structure, and diversity of the future Indian arsenal.

The Regional Nuclear Threat Environment

As stated previously, Indian policymakers view the global nuclear regime as something of a mixed bag in that the benefits accruing from the progressive reduction of the most important nuclear arsenals worldwide coincide uneasily both with the de facto refusal by the Permanent Five to consider the complete abolition of nuclear weaponry and with continuing uncertainties about the identity of future nuclear threats, the prospects for exploiting deterrence externalities, and the evolving nature of the deterrence regime. In contrast, Indian policymakers view the character of the regional nuclear environment to be considerably more ominous.

Pakistan. To begin with, India’s traditional challenger, Pakistan, is now clearly a nuclear weapon power. Whatever uncertainties may

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68“India Not to Engage in a N-Arms Race; Jaswant.”
have existed about Islamabad’s nuclear capabilities in the subcontinent and beyond were permanently laid to rest in May 1998, when Pakistan demonstrated that it possessed nuclear devices that were capable of producing militarily significant yields. In the eyes of Indian policymakers, this represented a qualitative change from the situation that existed a little over a decade ago, when Pakistan’s nuclear capabilities were uncertain and its ability to mount serious threats was for all practical purposes nonexistent.

To be sure, several Indian officials—especially those associated with the civilian atomic energy establishment—argue to this day that Pakistan’s nuclear capabilities remain only modest.69 Indeed, even after Islamabad’s nuclear tests on May 28, 1998, many prominent individuals associated with India’s atomic program expressed doubts about Pakistan’s technological prowess. Shortly after these tests were conducted, for example, P. K. Iyengar, former Chairman of India’s Atomic Energy Commission (AEC), flatly declared that “Pakistan doesn’t have an indigenous capability to design and fabricate nuclear weapons,”70 while Raja Ramanna, another former Chairman of India’s AEC and currently a member of the same body, asked rhetorically, “Where is the hydrogen bomb?” and concluded that “the two tests [conducted by India and Pakistan] are not comparable at all.”71 This skepticism about Pakistan’s nuclear capabilities has also found voice elsewhere: One distinguished expatriate military analyst, for example, commenting on Islamabad’s nuclear tests, astonishingly declared that Pakistan’s “ability to explode a crude device has no military significance.” This analyst went on to say, “Frankly, I did not think Pakistan could stage even one test—not because it lacked the expertise to undertake the explosions, but because of the lack of fissile material. I did not believe, and still do not, that Pakistan was able to obtain weapon-grade uranium from its Kahuta centrifuge project.”72 Other Indian commentators concurred: A major Indian

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71 Ibid.
newspaper, in an editorial titled "Pak Pinpricks," claimed that "seismological data points to the failure of at least three of the five tests allegedly conducted on May 26 [sic],"\(^73\) and another leading Indian analyst of nuclear weapon issues, Brigadier (retired) Vijai Nair, who earlier had done extensive work on nuclear requirements for the Indian Army, concluded that "Pakistan’s failure to come forth with instant technical details of the five nuclear explosions on May 28, unlike India, have [sic] strengthened the experts’ assessment that in technological terms Pakistan lags behind India, and it would need quite some time to achieve the requisite expertise for nuclear weaponization."\(^74\) All in all, then, significant portions of the Indian strategic community—including India’s nuclear scientists—have argued that Pakistan’s nuclear capabilities have been exaggerated primarily to secure political advantages.

Such attitudes, however, are not shared by the Indian military. Since the early 1980s, Indian military thinkers, particularly individuals like General K. Sundarji, former Chief of Staff of the Indian Army, have focused on the challenge of prosecuting conventional operations in the context of "nuclear asymmetry"\(^75\)—that is, a situation involving war-fighting operations between a nuclear-armed adversary and a conventionally armed force. Yet while studies of this sort continue to this day, they are restricted for the most part to the military’s command schools and service headquarters. Indeed, the armed services as a combat force have not prepared in any significant way for war-fighting operations in a nuclear environment despite several reports to the contrary,\(^76\) as they do not have the equipment, training, or doctrine that would allow for the conduct of military operations on a nuclear battlefield. One Indian analyst has argued, however,


\(^75\) The best publicly available analysis emerging from Sundarji’s early efforts remains Effects of Nuclear Asymmetry on Conventional Deterrence, Combat Paper No. 1 (Mhow, India: College of Combat, 1981) and Nuclear Weapons in a Third World Context, Combat Paper No. 2 (Mhow, India: College of Combat, 1981). Sundarji continued this analytical effort while he served as Chief of Army Staff, but the products emerging from this work are not publicly available.

that since the early 1980s the Indian military has "indeed geared up psychologically and to some extent technically to operate in an NBC [nuclear, biological, and chemical] environment." The principal evidence addduced for this claim is the fact that the Indian Army in particular focused on acquiring armored vehicles with integral NBC protection while steadily moving toward maneuver doctrines in place of the attrition-intensive strategies that dominated earlier. However, both pieces of evidence are at best ambiguous, and when scrutinized closely it is hard to sustain the claim that the Indian Army in particular and the Indian armed services in general seriously prepared themselves for operations in an NBC environment. The

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78 The claim that the Indian Army's desire to acquire modern armored fighting vehicles with NBC protection suggests preparation for nuclear battlefield operations is simply an exaggeration. Most modern armored vehicles, both tanks and infantry/cavalry fighting vehicles, are designed with integral (passive) NBC protection (as are all modern warships). The fact that the Indian Army specified such protection as a requirement in its new mechanized acquisitions simply suggests that the service sought to acquire technologies that would enable it to remain current. In fact, the Indian Army possessed this technology before the 1980s, since its T-55 and P-76 tanks, which have been in service since the late 1960s, were already equipped with integral NBC protection; consequently, the desire to retain these capabilities in follow-on systems does not permit the inference that the Indian Army was now preparing for operations on a nuclear battlefield any more than the fact that the older T-55s came equipped with this technology justifies the inference that the Indian Army has been preparing for nuclear war-fighting operations since the late 1960s. If the Army was in fact serious about combat operations in an NBC environment, it would have acquired many other kinds of technologies that, in contrast to the views of Badri-Maharaj, it did not acquire and still does not possess in any significant quantities to this day—including mission-oriented protective posture (MOPP) gear for all troops at least in the Strike Corps; fixed decontamination equipment at the brigade level; and portable decontamination capabilities at the regimental level.

The other claim—that a shift to a maneuver doctrine suggests a desire to prepare for operations in an NBC environment—is also overstated. The Indian Army has no doubt struggled to develop and institutionalize a maneuver war-fighting doctrine since the early 1980s, but this development was driven primarily by the recognition that India may not have the luxury of overwhelming its adversaries through superior numbers or pervasively superior technology in the context of a "no-notice" short war. The shift to a maneuver doctrine was thus driven by the need to resolve critical conventional war-fighting challenges—brought about in part by the Indian Army's desire to extend the subcontinental battlefield to new geographic areas that were hospitable to the large-scale employment of armored forces, such as the deserts of Rajasthan and
discussion in Chapter Four will in fact demonstrate that India’s civilian security managers are extremely reluctant to support any nuclear war-fighting strategies programmatically, and it is not at all clear that acquiring any operational capabilities other than the minimum required to preserve the integrity of an Indian military force in

Sind—rather than as a solution to addressing the challenges of a nuclear battlefield. For the genesis and logic of the shift to a maneuver doctrine, see Ashley J. Tellis, India: Assessing Strategy and Military Capabilities in the Year 2000, P-7978 (Santa Monica: RAND, 1996).

Clearly, the ability to successfully operate maneuver forces provides some benefits for nuclear war-fighting operations that no doubt place a premium on the possession of high degrees of self-protection and the ability to engage in relentless movement. Operations on a nuclear battlefield, however, require much more than the ability to engage in maneuver operations. To the contrary, they require an organizational structure differing from the current “triangular” formations employed by the Indian Army; a highly decentralized command style that is alien to current Indian Army practices; a heavy investment in real-time C3I within maneuver formations, coupled with a substantial increase in the firepower of battle groups compared to what the regimental level currently possesses in the field; an entirely different logistical structure compared to that which currently services army field combat operations; and, finally, repeated exercises that focus on perfecting the “accordion” effect of cyclic dispersal and concentration, which the Indian Army has never practiced hitherto, except cosmetically as part of its routine training cycle.

Since the 1998 nuclear tests, the Indian Army has begun to pay increasing attention to the challenges of operating on a nuclear-shadowed battlefield, and it is reasonable to expect that future Army exercises will systematically incorporate new and more demanding routines designed to increase the survivability of deployed conventional forces in the face of possible nuclear attacks. Several elements of this effort are significant. First, Indian military exercises that seriously incorporate nuclear threats in order to devise new solutions for both force protection and the preservation of operational coherence in the face of adversary nuclear attacks are a new development in the Indian Army’s training regimen, and these innovations are by no means either complete or institutionalized throughout the war-fighting formations of the service as a whole. Second, the emphasis—as evidenced in both Indian military exercises and the statements of senior Indian Army leaders—is primarily on force protection and the preservation of operational coherence in the face of an adversary’s nuclear threat, not on integrating “theater” and “tactical” nuclear fire support in furtherance of either offensive or exploitative battlefield military operations. Third, a critical objective of the Army’s emerging interest in the nuclear environment is to understand the research and development, acquisition, and integration requirements pertaining to the various new technologies that the service must acquire if it is to successfully preserve its conventional war-fighting capability in the face of potential nuclear use by an adversary. Pursuing such conservative objectives is a far cry from the expansive nuclear ambitions and capabilities sometimes attributed to the Indian Army as it struggles to cope with the challenges of maintaining its effectiveness in the new nuclear environment. For more on this issue, see Rahul Bedi, “Interview: Gen. Sunderajan Padmanabhan, India’s Chief of Army Staff,” Jane’s Defence Weekly, January 17, 2001, and Raj Chengappa, “Pakistan Threatened India with Nuclear Attack During Kargil War: Army Chief,” The Newspaper Today, January 12, 2001.
the face of an adversary's nuclear attack and to mount an adequate retaliatory response after absorbing such an attack is actually favored by the current senior leadership of India's armed services.79 Indeed, if the historical record is anything to go by, the senior Indian military leadership has for the most part focused its attention on demanding that the country not employ its combat forces under conditions of strategic disadvantage.80 As several service chiefs have publicly indicated, this has mainly involved pleading with civilian decisionmakers for the development of a national deterrent in the hope that the uniformed services may somehow be formally integrated into the country's grand strategy at the highest level. In consonance with these invocations, a recent Chief of Staff of the Indian Army, speaking in the aftermath of Pakistan's test of its new Ghauri IRBM, formally reiterated the need for "a 'strategic deterrence' capability to counter the emerging 'nuclear and missile challenges' to India's security,"81 while the current Chief of Staff reassuringly stated that "the Army will be prepared to tackle [the] nuclear threat."82

79 See Chengappa, "Pakistan Threatened India with Nuclear Attack During Kargil War: Army Chief."


82 "Army Will Be Prepared to Tackle Nuclear Threat," Hindustan Times, September 29, 2000. Specifying precisely what this entails, the current Chief of Army Staff, General S. Padmanabhan, asserted that

I am looking at the whole range that constitutes the spectrum. You have the low-level conflict on the one end and on the other end you have the nuclear war scenario. In between this spectrum is a whole amount of strategic space. This is the space in the middle for conventional operations. As and when we come to the other end of the spectrum [i.e., the nuclear-shadowed battlefield] our tactics will change, our main systems will change. Our logistics will have to undergo a considerable change. Even your communications philosophy will have to undergo a change. There will be subtle changes as well on depth and range of our strikes. What objective we move for will change. How we manoeuvre in the battlefield . . . these are things that we are looking at. I am not for one moment suggesting that we are going to be indulging in nuclear war fighting. Nuclear war fighting is perhaps the last thing in anybody's mind. What we are looking at is to get an optimal return from conventional warfare [italics added].
Given the many nuclear-related developments in Pakistan during the last decade, Indian policymakers have slowly come around to adopting a stance more closely allied with that of the senior leadership of its armed services. When confronted by disagreements between civilian scientists and uniformed experts about the extent of Pakistan's nuclear capabilities, for example, India's security managers have simply chosen to presume that Pakistan's nuclear capability exists at some significant level, even if many disputes have arisen about the particulars of that capability. From this presumption, they have concluded that India does in fact face a nuclear threat of some magnitude from Pakistan. This threat significantly circumscribes India's political and military freedom of action on the one hand, but it also justifies the need for continued development of India's nuclear and strategic capabilities on the other.\footnote{An early justification of this conclusion can be found in "Pakistan Nuclear Development Leaves India No Choices," \textit{The Times of India}, November 5, 1986.} Thus, after a decade of some hesitation and ambiguity, India's civilian leadership has clearly accepted and affirmed the emergence of Pakistan's evolving nuclear capabilities even if many uncertainties remain about what that implies in terms of the balance of power vis-à-vis India.\footnote{See Chengappa, "Pakistan Threatened India with Nuclear Attack During Kargil War: Army Chief."}

Pakistan's nuclear potential, as exemplified both by its weaponry and by the plethora of delivery systems it is developing or has already acquired, is certainly problematic in that for the first time in India's postindependence history, its immediate—and weaker—rival has acquired the ability to hold at risk significant national assets such as major population and industrial centers, critical military facilities, and strategic infrastructure assets located great distances from the frontier. This new vulnerability to standoff attack by weapons of mass destruction represents a dramatic change in the strategic balance vis-à-vis Pakistan. Whatever the minutiae relating to this balance traditionally may have been, the one single and incontrovertible manifestation of New Delhi's superiority was India's

ability—however notional—to threaten assets throughout the depth of Pakistan's territory while remaining immune to any comparable attack directed against India. To the degree that Pakistan could mount any credible threats at all, these were restricted to challenges leveled at the frontiers, with the vast depth of India's heartland remaining a protected sanctuary lying beyond Pakistan's reach. The addition of long-range missile-delivered nuclear weapons to Pakistan's arsenal, however, has overturned this traditional Indian advantage. In the process, it has also altered the larger strategic equations in the greater South Asian region: India still cannot reach Chinese strategic targets, although it remains abundantly vulnerable to Beijing's coercive reach, while Pakistan has now extended its strategic reach to the depths of the Indian heartland, thereby forever erasing the last bastion of immunity that New Delhi once enjoyed.\(^{85}\)

In effect, then, Pakistan—the traditionally weaker adversary—has now neutralized India's conventional and geostrategic advantages, while India remains weaker than its other major adversary, China, by most indices of strategic capability—including geopolitical importance, economic growth, and nuclear capacity.

The Sino-Pakistani connection, which has steadily strengthened since the early 1980s, is seen in this context as placing Islamabad at an additional advantage. According to authoritative sources in the West, China has been involved in a significant degree of nuclear cooperation with Pakistan.\(^{86}\) Whether Indian intelligence discerned the extent and significance of this cooperation early on is uncertain, but its task was certainly eased by the U.S. nonproliferation community's scrutiny of the Sino-Pakistani relationship. Thanks to the work of this interest group, it has been widely reported that China has provided Pakistan with specific technologies such as ring magnets, diagnostic equipment, and special furnaces; special nuclear materials such as

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\(^{85}\)This point is underscored in Brahma Chellaney, "India's Strategic Depth Lies Shattered," *The Pioneer*, April 14, 1998.

heavy water, highly enriched uranium, and tritium; integrated nuclear facilities, including the Khushab research reactor, for the production of weapons-grade plutonium; and, most problematically of all, complete nuclear weapon designs, including one design that is reported to have involved a 20- to 25-kiloton (kt) solid-core implosion device derived from China’s fourth nuclear test.\textsuperscript{87}

China has also helped Pakistan acquire reasonably efficient missile delivery systems—weapons that Islamabad had always desired because of the high degree of assured penetrativity they represented in the face of India’s relatively superior air defense network.\textsuperscript{88} Indeed, Chinese assistance is suspected even in the development of Pakistan’s first indigenous missiles, the Hatf-1 and Hatf-2, both of which derived from the sounding rocket technologies imported from France by Pakistan’s Space and Upper Atmosphere Research Organization (SUPARCO) in the 1960s. This assistance reached its high point in 1992 or thereabouts, when Beijing sold 34 M-11 ballistic missiles to Islamabad.\textsuperscript{89} These missiles, which are capable of a range of 300 km while carrying an 800-kg payload (or 250 km with a 1000-kg payload), represented the first Pakistani missile system that was capable of carrying nuclear weapons. Given Islamabad’s perceptions of its hostile threat environment, it is therefore not surprising that U.S. intelligence agencies reportedly concluded in 1996 that Pakistan probably “had finished developing nuclear warheads for these mis-


siles." Smith, "Report Cites China-Pakistan Missile Links."


In fact, even after the Ghauri’s test firing was displayed on national television, Indian analysts refused to believe that a live test had occurred—a judgment influenced by the fact that Indian early-warning radars apparently did not detect it. See David C. Wright, "An Analysis of the Pakistani Ghauri Missile Test of April 6, 1998," Science and Global Security, 7:2 (1998), pp. 227–234. In the West, too, the test firing of the Ghauri gave rise to some preposterous reporting even by otherwise-respectable sources. One report in Jane’s Missiles & Rockets, for example, claimed that "officials in Pakistan faked pictures and the date of the Ghauri intermediate range ballistic missile launch." The date of the test was allegedly fudged "because a deal had been struck between Washington and Islamabad to delay the launch date until after the Indian elections" so as to prevent giving the Bharatiya Janata Party (BJP) "a larger mandate" than it would have received. See Paul Beaver, "Pakistan ‘Faked Ghauri Missile Picture,’" Jane’s Missiles & Rockets, 2:6 (June 1998), p. 4.

sessed the Ghauri began to sink in, however, there was a hasty rush to judgment: The Indian Defence Minister, articulating a widespread belief in India, claimed that “China is the mother of this missile,” and a chorus of Indian opinion makers followed suit. Later Western reporting, corroborating the judgment of India’s premier strategic analyst, revealed conclusively that the missile was a Nodong that had been sold by the North Korean Changgwang Sinyong Corporation to Pakistan’s Khan Research Laboratories (KRL) in what appeared to have been a private transaction between the two entities. While the extent of Chinese involvement in this transaction is still unclear, the fact remains that the Ghauri signaled Pakistan’s growing ability to strike deep at strategic levels along the Indian landmass. In the aftermath of the May 1998 tests, the head of Pakistan’s Atomic Energy Commission disclosed the presence of a new 700-km solid-fueled missile, the Shaheen-1, which was supposedly “on the launch pad” awaiting a political decision before being field tested. The same report also suggested that a newer, longer-range (2000-km) version of the same missile—dubbed the Shaheen-2—might be available within a year.

Between KRL and the Pakistan Atomic Energy Commission (PAEC)–SUPARCO–National Development Centre (NDC) complex, Pakistan now appears to have at least two long-range missiles, the Ghauri and the Shaheen-1, ready at hand, with many more even longer-range systems—the Ghaznavi, the Shaheen-2, and the Abid Ali—said to be in the pipeline. The Shaheen-1, which was finally tested in April 1999, is probably the same missile that one U.S. official has identified as the Tarmuk, but the truth about the other

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95 For a good example of such claims, see Chintamani Mahapatra, “The U.S., China and the Ghauri Missile,” Strategic Analysis, 22:3 (June 1998), pp. 363–372.
missiles is difficult to discern, given both organizations’ interest in competitively touting their wares. Even if some of these systems turn out to be largely fictitious, however, the fact remains that the capabilities represented by the M-11/Shaheen and the Ghauri families are already formidable enough. Pakistan has acquired the ability to reliably target most Indian fixed assets at great distances from the frontier, and this capability will only grow over the years, thereby reducing the size of the Indian sanctuary even further.100 This growing strategic reach—coupled with the fact that a high degree of integration exists between the Pakistani armed services (the end users) and the civilian-led but military-supervised nuclear and missile establishments (the producers)—bequeaths a certain coherence to Islamabad’s strategic planning that renders it significant as a nuclear adversary. Both nuclear weapons and ballistic missiles are treated seriously as military instruments of deterrence in Pakistan because Islamabad’s fears about Indian intentions and its dread of the large and diversified Indian military-industrial complex are seen as leaving it no other choice but to urgently develop a range of war-fighting systems that possess both high survivability and high penetrativity vis-à-vis its principal adversary, India.

In contrast, India’s traditional reliance on air-breathing systems for nuclear delivery, its robust separation between the uniformed military and the civilian nuclear establishment, its insular decision-making with respect to the nuclear program, and its lack of institutionalized mechanisms for managing nuclear strategy are viewed by many knowledgeable analysts as placing New Delhi at somewhat of a disadvantage with respect to Islamabad.101 These problems notwithstanding, many Indian commentators still judge the emergence of Pakistan’s nuclear capabilities to be a manageable problem, at least in the short run. In no small measure, this is simply a matter of pride. For many Indians, admitting that Pakistan—a weak, smaller, and defeated neighbor—might pose an irresolvable threat to Indian security is tantamount to admitting a political equivalence that could


negate all of New Delhi's claims to preeminence in the region. Not surprisingly, many Indian analysts—especially those connected with the nuclear establishment, the armed forces, and some sections of the media—simply tend to dismiss the Pakistani threat as inconsequential even while admitting many of the details that should otherwise serve to undercut that judgment.102

When hubris is not the issue, however, the claim regarding Pakistan's insignificance can be seen as having been asserted on other, perhaps more tenable grounds. To begin with, India is believed to possess greater nuclear weapon potential even if it may not be as far along as Pakistan where weaponization is concerned. This belief is grounded in the fact that India has a larger and more diversified nuclear and defense research establishment, probably possesses more sophisticated nuclear weapon designs (including, perhaps, some advanced weapon designs) and a larger stockpile of fissile materials, and could develop a greater range of indigenous delivery systems over time.103 All these potentialities taken together would enable India, in the words of one analyst, to develop the requisite capabilities "to administer retribution of a magnitude that would demolish the national fabric of [Pakistan]."104

More significantly, however, claims about Pakistan's relative insignificance are often rooted in the existing asymmetry in relative vulnerability between the two states. This asymmetry effectively implies that any security competition which leads to a nuclear exchange would ultimately result in the complete destruction of Pakistan but in only limited, albeit grave, damage to India. As if confirming this judgment, one analyst has noted that the destruction of just seven dams and barrages in Pakistan even by conventional weapons would lead to "the total disruption of control over irrigation

in the Indus Valley”¹⁰⁵ and, by implication, the destruction of the most important parts of the Pakistani state.

Further, the asymmetry in postconflict reconstitution capability, which favors India, is viewed as setting additional limits on Pakistan’s ability to bear risks, thereby rendering Islamabad’s nuclear capabilities manageable, at least in the short term. As one analyst laconically put it, “In the event of nuclear aggression, India’s size and resources place it in a favourable situation in relation to its neighbours. The political leadership must realise this.”¹⁰⁶ Such arguments in effect imply that India’s greater size, resources, and level of industrialization would allow it to recover from nuclear attacks much more rapidly and coherently than could Pakistan, thus enabling it to survive the post–nuclear attack environment better than would its smaller adversary.

Finally, of course, many Indian analysts’ rhetorically sanguine attitudes toward Pakistan’s nuclear capabilities are rooted in an awareness that India has little reason to undertake any political-military action that would imperil Islamabad to the point at which the latter would be forced to bring its currently significant nuclear capabilities into play.¹⁰⁷ Since New Delhi has long held that neither subjugating nor fractionating Pakistan is in its strategic interests, Indian policymakers could claim to be reassured by the fact that nothing they do could lead Pakistan to nuclear use—and, as such, these policymakers might seem less than impelled to respond to Pakistan’s nuclear achievements with a corresponding increase in their own nuclear readiness.¹⁰⁸

¹⁰⁵Ibid., p. 141.
¹⁰⁷K. Subrahmanyam, “Dealing with Pakistan,” The Times of India, June 26, 1990. This argument may be correct as it goes, but its weakness derives from the premise that Pakistan would use nuclear weapons only in response to certain Indian actions and never as a result of causes such as adventurism on the part of Islamabad; preemptive Pakistani action precipitated by miscalculation or misperception; or a state breakdown or regime collapse in Pakistan.
¹⁰⁸The growing disenchantment with Pakistan arising from its continued support for the Kashmiri insurgency has led various commentators to argue for a new Indian policy that includes cross-border operations aimed at making Pakistan “pay the price” for its misadventures. See Gurmeet Kanwal, “Pay-Back Time on the LOC,” Indian Ex-
These four considerations are usually interpreted to mean that while Pakistan constitutes a nuclear threat to India, it is not an overwhelming one at this point. Here again, there is some truth to this judgment—but as always, the devil lurks in the details. Unfortunately, none of these details can be discussed here at any length. It may be noted, however, that whatever India's advantages may be in the realms of nuclear potential, postconflict reconstitution, and political initiative with respect to conflict, the advantages India currently enjoys in relative vulnerability over Pakistan will slowly decay over time as Islamabad develops a larger nuclear arsenal and progressively longer-range delivery systems—and at some stage, there will come a point where Pakistan, despite its relative disadvantage in size, will be able to comprehensively target the Indian landmass and inflict such horrific levels of damage as to make any distinction in relative vulnerability more or less academic. For this reason, it is likely that—however dismissive Indian commentators may be today—India's security managers will treat Pakistan's nuclear capabilities more and more seriously over time. They will, for example, seek to avoid overt forms of political provocation; will attempt to develop a superior nuclear deterrent to the degree possible; will continue to focus substantial resources on conventional military modernization vis-à-vis Pakistan; and will pursue the acquisition of the best technical antidotes available to them in the form of anti–tactical ballistic missile (ATBM) and integrated air defense (IAD) systems. Unlike the newly enfranchised strategic community in and around New Delhi, the Indian government is responsible for the security of its citizenry, and to the degree that even modest Pakistani nuclear capabilities could place those obligations at risk, India's security managers will demonstrate more respect for those capabilities than even their rhetoric may on occasion suggest.

Given this judgment, it is clear that for at least two reasons, India will move further in the direction of nuclearization based on the Pakistan threat alone. The first reason is grounded not in Pakistan's nuclear capabilities per se but in how it is perceived to be using those capabilities with respect to India. A sturdy, nuclear-capable Pakistan

press, June 27, 2000, and Satish Nambiar, "Make the Army Fighting Fit, Paddy," Hindustan Times, August 20, 2000. Should such sentiments come to dominate Indian policymaking toward Pakistan, they are likely to propel greater movement in the direction of nuclearization.
that focuses on economic renewal to the neglect of security competition with India represents an outcome that would cause New Delhi little grief. This may in fact be the best outcome possible, because insofar as nuclear weapons bequeath on Pakistan the security it has sought since its founding but could never be attained through external alliances, such weapons will have served the desirable purpose of reducing Pakistan’s vulnerability, thus making stability in South Asia possible. If the record of the past decade is any indication, however, nuclear weapons can also have the opposite effect—that is, they could embolden Pakistan to carry on active security competition with India not through the medium of direct high-intensity conventional wars but rather through low-intensity conflicts waged by proxy that, in effect, challenge India’s core objective: preserving a stable multiethnic state with claims to greatness.109

If Pakistan perceives its nuclear capabilities as providing, among other things, the requisite strategic cover with which to immunize it against any military counteraction in the context of some ongoing unconventional conflict with India, New Delhi will face strong pressure to shift its overall nuclear posture to cope with the challenges of nuclear coercion. This revision would not necessarily be predicated on the desire to achieve a “splendid first strike” capability, although that might suggest itself as an attractive proposition in some instances, but would likely be based instead on the need to develop an arsenal that is sufficiently effective to prevent strategic coercion by Islamabad, enable India to engage in “tit-for-tat” strategies of subconventional retaliation, and allow India’s conventional forces the freedom of action they need to complete both counterinsurgency and, possibly, cross-border operations without fear of paralyzing counterthreats. In other words, to the degree that continued Pakistani support for Indian insurgencies results in high burdens for

New Delhi, there is every possibility that India’s nuclear posture will shift in the direction of developing a more ambitious and complex nuclear capability. Such a reorientation—which could include having a diverse nuclear arsenal composed of different kinds of warheads, various discrete and limited-use options, and greater integration between civilian authority and military users—would be seen as progressively more necessary in the context of possible armed responses to Pakistani “needling” even if the same was otherwise unwarranted in the context of a purely nominal nuclear standoff with Islamabad. The Indian nuclear posture, even in such circumstances, would not be oriented toward nuclear war-fighting operations but would instead be aimed at developing a capability that would allow New Delhi to plan for and mount sophisticated counterthreats at varying levels of violence so as to circumvent the actual use of any nuclear weapons in favor of other kinds of subconventional or conventional military strategies.  

Just as Indian policymakers would be inclined to slowly transform their present strategic posture if the incidence of nuclear-shadowed proxy wars waged by Pakistan were to increase, so too are they likely to expand their nuclear capabilities if Islamabad dramatically distends its own nuclear production potential. This is the second reason India could move slowly in the direction of expanded capabilities over time. India’s traditionally relaxed attitude toward Pakistan’s nuclear capabilities derived in great measure from the belief that Islamabad’s stockpile of fissile materials, and consequently its notional-weapon inventory, was rather small. Most public estimates assess Pakistan’s inventory of fissile materials circa 1995 as being in the region of 200 kg of uranium 235. Assuming that 15 kg of highly enriched uranium (HEU) are used to produce a single weapon, this inventory would suffice to produce some 13 fission bombs of a nominal 10- to 20-kt yield. India’s inventory of fissile materials circa 1995, in contrast, was assessed to be roughly 450 kg of weapons-grade plutonium.

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111 All the figures in this paragraph are based on Chow et al., *The Proposed Fissile-Material Production Cut-Off*, pp. 9–15.
tonium (Pu). At a rate of 5 kg of Pu\(^{239}\) per weapon, the notional Indian stockpile would thus consist of approximately 90 fission bombs of a nominal 10- to 20-kt yield. Calculating these data for circa 1999 is more complicated, especially for Pakistan, since it is unclear whether Pakistan simply terminated enrichment at the Kahuta facility in the post-1991 period or whether it continued to produce an intermediate product consisting of medium-enriched uranium in order to substantiate its promise to the United States of not producing weapons-grade material.\(^{112}\)

Since India is presumed by many of the sources cited below to produce about 30 kg of weapons-grade plutonium annually, it could have possessed an additional 120 kg of weapons-grade plutonium circa 1999 to yield a total of some 570 kg. This is sufficient to produce approximately 115 fission bombs of a nominal 10- to 20-kt yield. If Pakistan produced medium-enriched uranium during its post-1991 moratorium at Kahuta, as is likely, it could resume HEU production rapidly enough to produce an additional 175 to 200 kg of HEU in a matter of weeks. These levels would give Pakistan a notional arsenal of some 23 to 26 fission bombs of a nominal 10- to 20-kt yield, also suggesting in the process that the moratorium on HEU production that has ostensibly been in place since 1991 would have little effect on the size of Pakistan’s weapons stockpile over the long term.\(^{113}\) This uranium inventory will be further supplemented over time by weapons-grade plutonium produced by the new unsafeguarded re-

\(^{112}\) By most authoritative Pakistani claims, Islamabad’s fissile-material production program was never “frozen,” at least in the ordinary sense of the term. See Pakistan: Beg Says Nuclear Program “Never Frozen,” FBIS-NES-96-165, August 22, 1996. More recent Pakistani reports clearly indicate that Islamabad continued to produce either low-enriched or medium-enriched uranium even after 1991, thus allowing it to rapidly increase the quantity of weapons-grade fissile materials in the future. See “Pakistan, India to Sign CTBT This Month,” The Muslim, August 12, 1998. Despite some problems with the estimates therein, a good analysis of the factors involved in fissile-material production in South Asia can be found in A. H. Nayyar, A. H. Toor, and Zia Mian, “Fissile Material Production Potential in South Asia,” Science & Global Security, 6 (1997), pp. 189–203. For Pakistan specifically, see David Albright and Kevin O’Neill, “ISIS Technical Assessment: Pakistan’s Stock of Weapon-Grade Uranium,” June 1, 1998, available at http://www.isis-online.org/.

\(^{113}\) Nayyar et al., for example, correctly note that it would take Pakistan between five and ten weeks to produce an additional 200 kg of weapons-grade uranium if the feed material was already enriched to the 20 percent levels that are the upper limits at which the material is still classified as low enriched uranium (LEU). See Nayyar et al., “Fissile Material Production Potential in South Asia,” p. 201.
actor at Khushab, which was commissioned in April 1998 and is believed to be capable of producing between 10 and 15 kg of weapons-grade plutonium, sufficient to produce two to three additional weapons per year. When the cumulative fissile-material stocks and weapon potentials of both countries are thus considered as a whole, the commonly assumed Indian lead as far as the weapon stockpile is concerned could fall off dramatically within the decade as the new Pakistani production capabilities come on line. One U.S. analyst thus concluded that “although India is estimated, as of early 1998, to possess seven times more nuclear weapons than Pakistan, . . . Pakistan could reduce that margin to a factor of less than two over the next eight years. If India wanted to maintain a significant lead over Pakistan, it would be forced to dramatically increase its fissile material production. Pakistan, however, is capable of matching such an increase.”114

Despite this otherwise correct conclusion, it must be remembered that all the numbers relating to the size of Indian and Pakistani fissile-material inventories and nuclear weapon stockpiles are inherently speculative. After various production inefficiencies and internal program decisions are taken into account, it is likely that—at least where India is concerned—New Delhi’s inventory of weapons-grade material is much smaller than the generally higher estimates circulating in the public domain.115 Consequently, the size of the notional-weapon stockpile is probably smaller than the numbers derived from these estimates. In the case of India particularly, three different factors account for this outcome: First, the separation of weapons-grade plutonium from reactor discharges has proceeded at


115The most widely circulated public estimates remain Chow et al., The Proposed Fissile-Material Cut-Off, pp. 9-15, and David Albright, William Walker, and Frans Berkhout, Plutonium and Highly Enriched Uranium 1996: World Inventories, Capabilities and Policies (Oxford, UK: Oxford University Press, 1997). Authoritative Pakistani assessments of the Indian fissile stockpile tend to be even more exaggerated than the numbers produced by Western analysts: former PAEC Chairman Munir Ahmed Khan, for example, claimed that in 1990 India had 400 kg of weapons-grade plutonium—enough to make 50 to 70 nuclear bombs—and that its stockpile of plutonium the following year had reached a total of 1300 kg. See Rauf Siddiqi, “Khan Says India Has Plutonium to Make 50-70 Atom Bombs Anytime,” Nucleonics Week, June 20, 1991, pp. 10–19.
a much slower pace than is usually assumed. Second, production inefficiencies, structural bottlenecks, and other nuclear research endeavors have resulted in a smaller inventory of readily available weapons-grade materials. Finally, of all the numerous plutonium-producing facilities that are up and running, only the outputs of the Canada-Indian Reactor-United States (CIRUS) and Dhruva reactors, if that, are used for the weapon program. The bottom line, therefore, is that historically India has not felt compelled to rapidly accelerate the expansion of its weapons-grade plutonium inventory, first because the number of notional Pakistani weapons itself was believed to be small, and second because the ratio of existing relative capabilities implied an asymmetry that was clearly to India’s advantage. As Pakistan changes this balance by expanding the size of its fissile-material inventory, either by increasing the number of centrifuges operating at Kahuta, Sihala, and Golra Sharif or by initiating the reprocessing of spent fuel from its new dedicated plutonium production reactor at Khushab, the traditional Indian calculations that justified its slow pace in nuclear materials production are likely to be rendered anachronistic. In fact, as Pakistan moves toward producing the arsenal of 70-odd weapons that its strategic managers are supposed to have concluded is necessary for its national safety, the Indian government is certain to shift toward more concerted efforts at bolstering both its materials inventory and its overall nuclear posture.

China. While Pakistan’s exploitation of its nuclear capability and growth in the size of its arsenal would be two critical factors affecting India’s traditional nuclear posture, strategic developments in China—India’s larger and more significant nuclear rival—will have even more consequential effects. There is little doubt that Chinese

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nuclear capabilities are significant. Beijing already possesses a rudimentary strategic triad consisting of long-range bombers, one nuclear ballistic missile submarine, and several classes of nuclear-armed ballistic missiles ranging from theater to intercontinental systems. The bombers and the sea-based nuclear force, however, represent capabilities that should be of minimal concern to India. The Chinese bomber fleet, consisting mostly of antiquated H-6 bombers carrying gravity weapons, will be incapable of penetrating Indian air defense systems, when alerted, along the Sino-Indian border. This force lacks the technology and training to fly nap-of-the-earth profiles, the only operating regime that would allow it to exploit the shadow zones in the Indian early-warning radar chain in order to proceed unmolested to its targets. Currently, the Chinese ballistic missile submarine, too, is of suspect capability. Its principal battery, the CSS-N-3, would be unable to interdict any of the desired Indian targets from its notional patrol areas in the East China Sea, and while operating in the Indian Ocean remains a theoretical possibility, it is unlikely that China would deploy its sole subsurface strategic capability in waters with which it has little familiarity simply to interdict a target set that could be amply covered by its many land-based systems.

It is China’s land-based ballistic missile force, together with the kinds of warheads this component can assuredly carry to target, that remains India’s principal concern in the near term. The exact nature of this threat, however, seems to have been misconstrued by Indian policymakers and analysts who claim that it derives, among other things, from Chinese IRBMs deployed in Tibet. As early as 1988, a senior Indian military officer analyzed in some detail how the Chinese missile deployments supposedly occurring in Tibet could

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122 This reality will not change until China’s new tactical bomber, the B-7, is fully operational sometime early in the 21st century, and it is simply unclear today whether the other tactical aircraft in the Chinese inventory—such as the Q/A-5—actually have a nuclear mission worth the name.
undercut larger Indian defense strategies in the region.\textsuperscript{123} The following year, then-Indian Defence Minister K. C. Pant affirmed that China had in fact deployed missiles in Tibet oriented primarily against India.\textsuperscript{124} In the week prior to the May 1998 nuclear tests, the present Indian Defence Minister reiterated the position that “China has deployed missiles with nuclear warheads in Tibet targeting India,”\textsuperscript{125} while former Indian Foreign Secretary J. N. Dixit, writing in the same time frame, confirmed that Indian policymakers “have been generally aware of the ‘tactical’ missiles in Tibet.”\textsuperscript{126} One knowledgeable Indian military officer, in a piece written several years earlier that relied on the campaign literature of Western supporters of Tibet, emphatically asserted that “China has medium-range, intermediate-range, and intercontinental ballistic missiles [ICBMs] deployed on the Tibetan Plateau at Da Qaidam (37.50N, 95.18E), Xiao Qaidam (37.26N, 95.08E), and Delingha (37.6N, 97.12E), and along the Qinghai-Sichuan border.”\textsuperscript{127} This description, which apparently relies on the Indian conception of “historical” Tibet, includes both the present Tibetan autonomous region and Qinghai Province, located between Tibet and Xinjiang, to substantiate the charge that the Chinese nuclear threat to India emanates from deployments—including both missile and tactical nuclear weapons in some readings—in the Tibetan region.\textsuperscript{128}


\textsuperscript{126}Ibid.


\textsuperscript{128}Many Tibetan writers have also claimed the same. See Dawa Norbu, “Strategic Developments in Tibet: Implications for its Neighbors,” \textit{Asian Survey}, 19:3 (March 1979), pp. 245–259. Reviewing some of these claims, one Indian analyst correctly noted that a great deal of confusion has arisen because of the “lack of clarity by what is meant by ‘Tibet.’ It has been used interchangeably both for the Tibetan Autonomous Region (TAR) and the Tibetan plateau. The Tibetan plateau is a much larger geographic area, encompassing parts of other adjoining provinces such as Qinghai, Sichuan, and Yunnan. The TAR represents Inner Tibet earlier under the Dalai Lama. Lack of a clear delineation in Indian minds has often caused avoidable confusion.” See Dipankar Banerjee, “The New Strategic Environment,” in Amitabh
Such claims, however, have generally been greeted with skepticism in the West. One scholar, in fact, flatly asserted that “there is no Chinese nuclear threat to India, and no plan to create one.”\textsuperscript{129} This assertion, deriving from the fact that the Chinese DF-25, a 1700-km-range missile, was canceled prior to 1996, led to the following conclusion:

The demise of the Dong Feng 25 says a lot about the state of China’s strategic planning and where India figures in it. China considered developing the missile, which would have had precisely the range needed to strike key targets in India, and decided not to. The implication is that China no longer formulates strategic military plans with India in mind. . . . In abandoning the Dong Feng 25, the Chinese government has effectively reiterated that nuclear missile forces are irrelevant to Sino-Indian relations and to Chinese military planning. The 3A, the missile that the 25 would have replaced, is obsolete, and no other Chinese missiles can reach major targets in India—China’s strategic missiles would overshoot them, and the M-9 and M-11 would fall short—even if they were based in Tibet, which is unlikely.\textsuperscript{130}

This claim is problematic because it is based, among other things, on the premise that long-range ballistic missiles cannot be targeted at aim points short of their maximum range—a problem compounded by the speculation that Chinese M-9s and M-11s are in fact the relevant embodiments of threat vis-à-vis New Delhi.

Other analysts have been more measured in their conclusions. Although all agree that “there is no hard evidence that . . . China has placed IRBMs in Tibet,” one thoughtful Australian analyst concluded that “China . . . can target India’s heartland from existing locations near Chengdu in Sichuan, whereas India would need an ICBM capability [which it currently does not possess] to reach China’s industrial heartland.”\textsuperscript{131} Two other U.S. analysts, in a fairly detailed as-


\textsuperscript{130} Ibid., pp. 53–54.

\textsuperscript{131} Gordon, “Capping South Asia’s Nuclear Weapons Programs,” p. 666.
sessment of China’s strategic missile order of battle, have identified five brigades at Base 56 at Xining, Qinghai Province, and at Base 53 in Kunming, Yunnan Province, as having nuclear targeting responsibilities vis-à-vis India.\textsuperscript{132} This assessment has been confirmed by Bates Gill and James Mulvenon in their more recent work on China’s strategic forces, which concludes that the location of these bases and the types of missiles deployed therein, together with other indicators, strongly suggest that China targets India with nuclear missiles—just as it does many other potential adversaries, including nonnuclear states like Japan along its periphery and competitors beyond distant shores like the United States.\textsuperscript{133}

Based on the detailed reconstruction of Chinese missile deployments summarized in Table 1,\textsuperscript{134} Gill and Mulvenon conclude that from the locations of these bases and the ranges of their deployed missiles, several inferences can be drawn about the likely target for these missiles. The DF-3s and DF-21s of Base 80301 are likely targeted on Japan, Korea, Okinawa, or the Russian Far East. The DF-15s of Base 80302 are almost certainly aimed at Taiwan. The DF-3s and DF-21s of Base 80303 are likely targeted against countries south and southwest of China, including the Philippines, Vietnam, and India. The DF-5s of Base 80304 are the major CONUS-oriented systems, while the DF-4s of both Base 80304 and Base 80305 might be aimed at Hawaii. Finally, the DF-3s and DF-4s of Base 80306 are targeted at sites in the former Soviet Union, including Moscow, or possibly India.\textsuperscript{135}

This conclusion has been further corroborated by news reports that, drawing on leaked American intelligence documents, have described in detail how China’s missile forces are committed even

\textsuperscript{132} Allen and Gorg, “Nuclear Weapons and Sino-Indian Relations.”


\textsuperscript{134} This table is reproduced from Gill and Mulvenon, “The Chinese Strategic Rocket Forces: Transition to Credible Deterrence,” p. 39. The authors note that reports also cite the following launch sites: DF-5—Jiuquan (war reserves) and Wuzhai (war reserves).

\textsuperscript{135} Ibid., pp. 39–40.
Table 1
Suspected Chinese Strategic Missile Bases

<table>
<thead>
<tr>
<th>Base Number</th>
<th>Base MUCD</th>
<th>Base and Selected Brigade Locations</th>
<th>Reported Missile Types</th>
</tr>
</thead>
<tbody>
<tr>
<td>51</td>
<td>80301</td>
<td>Headquarters: Shenyang, Jilin Province, Tonghua (DF-3 and DF-21), Dengshahe (DF-3)</td>
<td>DF-3 (CSS-2), DF-21 (CSS-5)</td>
</tr>
<tr>
<td>52</td>
<td>80302</td>
<td>Headquarters: Huangshan (Tunxi), Anhui Province, Leping (DF-15), Lianxiwang (DF-3)</td>
<td>DF-15 (CSS-6), DF-3 (CSS-2)</td>
</tr>
<tr>
<td>53</td>
<td>80303</td>
<td>Headquarters: Kunming, Yunnan Province, Chuxiong (DF-21), Jianshui (DF-3)</td>
<td>DF-3 (CSS-2), DF-21 (CSS-5)</td>
</tr>
<tr>
<td>54</td>
<td>80304</td>
<td>Headquarters: Luoyang, Henan Province, Luoning (DF-5), Sundian (DF-4)</td>
<td>DF-4 (CSS-3), DF-5 (CSS-4)</td>
</tr>
<tr>
<td>55</td>
<td>80305</td>
<td>Headquarters: Huaihua, Hunan Province, Tongdao (two brigades of DF-4)</td>
<td>DF-4 (CSS-3)</td>
</tr>
<tr>
<td>56</td>
<td>80306</td>
<td>Headquarters: Xining, Qinghai Province, Datong (DF-3), Delingha (DF-4), Da Qaidam (DF-4), Liujiuhou (DF-3)</td>
<td>DF-3 (CSS-2), DF-4 (CSS-3)</td>
</tr>
<tr>
<td>N/A</td>
<td>80310</td>
<td>Headquarters: Baoji, Shanxi Province</td>
<td>N/A</td>
</tr>
<tr>
<td>N/A</td>
<td>N/A</td>
<td>Headquarters: Yidu, Hebei or Shandong Province</td>
<td>DF-3 (CSS-2)</td>
</tr>
</tbody>
</table>

*MUCD = Military Unit Cover Designator.

bThe Liujiuhou brigade was not listed with the other brigades of Base 80306, but its proximity to Qinghai suggests that it should be part of this base.

in peacetime to servicing a fairly extensive target set throughout continental and maritime Asia, Europe, and the United States—commitments that render irrelevant the narrow and misleading debate about whether China actually deploys any ballistic missiles in “Tibet.”

This debate is particularly meaningless from a technical point of view in light of the fact that, of the several missile systems deployed by China, the three that have been identified as systems employed

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for the nuclear targeting of India—the CSS-2, CSS-5, and CSS-3—are all sufficiently long-range to preclude their deployment from inhospitable, sparsely developed, and possibly vulnerable bases in the Tibetan autonomous region (see Maps 1a–f).137

China is reputed to possess 38-odd "movable" CSS-2 IRBMs, each armed with a 1- to 3-megaton (Mt) warhead and capable of interdicting targets out to a range of 2800 km. The eight-odd CSS-5 IRBMs are shorter-range weapons that are capable of interdicting targets at a range of about 1800 km, but unlike the CSS-2, they are true mobile missiles armed with a warhead of at least 200 to 300 kt and are capable of cold launch from a transporter-erector-launcher (TEL).

Map 1a—CSS-2 Coverage from Jianshu

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to their deployment at the sites identified previously, both of these missile systems are capable of covering most of the principal Indian targets of interest to any Chinese planner. Even those targets which are located along the southern tip of India and which lie beyond the range of the CSS-2 and CSS-5 can be covered by the ten-plus CSS-3s known to exist in the Chinese inventory. The CSS-3, which has an enormous range of 4750 km or more and is armed with a 1- to 3-Mt warhead, in effect ensures complete targeting coverage of the Indian subcontinent.\footnote{Details about the capabilities and range of the Chinese strategic weapons of relevance to South Asia have been drawn from Gertz, "New Chinese Missiles Target All of East Asia"; Gertz, "China Targets Nukes at U.S."; Allen and Gorg, "Nuclear Weapons and Sino-Indian Relations"; Caldwell and Lennon, "China's Nuclear Modernization Program"; Gill and Mulvenon, "The Chinese Strategic Rocket Forces: Transition to Credible Deterrence," pp. 38–45; and The Military Balance, 1997–98 (Oxford, UK: Oxford University Press/ISS, 1997), p. 176.} One news report, based almost entirely on a leaked
American intelligence assessment of China's medium-range missile force, has described in quite astonishing detail how the CSS-2s and the CSS-5s have been deployed in targeting India. The report further reveals that, despite the fact that the CSS-2 is scheduled to be replaced by the CSS-5, small numbers of CSS-2s continue to be maintained in the interior of the country because of their range advantages vis-à-vis India. It is also asserted that these batteries are likely to remain in service until around 2002, when they will be replaced by the longer-range CSS-5 Mod 1s and Mod 2s, which would allow for the targeting of the Indian heartland despite their deployment in rearward Chinese bases.\(^{139}\) The weight of the evidence thus appears to confirm the judgment offered by one Indian commentator that

\(^{139}\)Gertz, "New Chinese Missiles Target All of East Asia."
"China has currently a comprehensive nuclear weapon capability against India."140

Given the range, diversity, and lethality of these capabilities, it is not surprising to find many Indian strategic (especially military) analysts listing China as the principal security threat facing India both today and in the long term. Irrespective of whether one concurs with this judgment, the fact remains that China's current nuclear capabilities eclipse those of India. The relatively significant size of the Chinese land-based missile force is already sufficient to ensure coverage of critical Indian targets even after all the other competing target sets—relating to Russia, Japan, Taiwan, the continental United States, and American facilities in Asia—are accounted for. The diverse character of the missile force also ensures that China has an appropriate weapon for each target located within a given range.

circle, and the current deployment pattern of the CSS-2, -3 and -5 missiles fully ensures that the principal Indian targets can be readily interdicted if necessary. The high kiloton-to-megaton yields of the warheads deployed aboard these missiles additionally ensures that a wide range of damage requirements can readily be satisfied, and the fact that these warheads have been repeatedly tested bequeaths to them a reliability that the current Indian nuclear stockpile does not possess. At the highest end, the yields of several Chinese warheads are large enough to enable true “single bomb–single city” busting capabilities. Moreover, their carriage by tested ballistic missiles implies assured penetrativity: qualities that India’s nuclear weaponry, with its relatively low-kiloton yields—which would presumably be delivered by relatively vulnerable, short-legged, air-breathing systems—simply cannot match in the near term. What rankles Indian analysts, therefore, is not the fact that a modest proportion of the
Chinese land-based missile force effectively targets India, but that New Delhi currently has no comparable deterrent whatsoever.\footnote{In attempting to discredit this conclusion, Eric Arnett has argued that “India's Soviet-supplied Tupolev bombers are capable of flying anywhere in China with little fear of interception, but they are assigned instead to fly patrols over the Indian Ocean.” See Arnett, “What Threat?” p. 54. This claim is misleading. The Tu-142s currently operated by India are dedicated long-range maritime reconnaissance/antisubmarine warfare (MR/ASW) platforms that are neither designed nor optimized for attack operations deep inside enemy airspace. The avionics, sensors, and weapons carried by these aircraft are radically different from the Tu-95 strategic bomber variants currently in service with Russian strategic aviation. Given the kinds of Chinese early-warning systems and fighter aircraft that would be deployed in the western and southwestern portions of the country in an emergency involving India, it is unlikely that the Indian Tu-142s would survive for more than a few tens of minutes if they were ever employed in strategic strike missions against China.}

All these realities add up in many Indian eyes to one simple conclusion: Where nuclear weapons are concerned, India is essentially defenseless, and consequently the “China threat” exists here and
now. What is more disconcerting from this perspective is that the Chinese missile threat will only increase over time as newer, more sophisticated, land-based systems like the DF-31 and DF-41 are inducted into China’s arsenal to bolster all the other connectivity, penetrativity, and survivability improvements that are already under way. That these improvements are ongoing even though the principal nuclear threats to China have themselves abated in recent years gives Indian analysts some reason for pause.

Thus far, however, Indian policymakers have not responded to the ongoing modernization of Chinese nuclear systems in particular and its conventional capabilities in general by launching any dramatic countermodernization efforts of their own. In part, this is because the current Chinese modernization effort merely represents a continuation of the latent threat that India has lived with since 1964. The more important reason, however, has simply been India’s desire to avoid alienating China at a time when it can do without increased security competition along its northern frontier. Indeed, the steady improvement that has characterized Sino-Indian relations since 1979—notwithstanding the momentary disruptions that occurred around the time of the Indian nuclear tests—has only reinforced New Delhi’s proclivity to adopt a muted response to China’s nuclear modernization. This improvement has led both sides to make deliberate efforts to avoid publicly alienating one another. For example, the resolution of local border disputes has been put off until some undefined future point, and both China and India have carefully adopted positions that limit their support for domestic challengers in each other’s territory, whether in Xinjiang, Tibet, or Kashmir.

Such a pattern of engagement suits both sides perfectly at this point, since each party currently seeks in its own way to create the

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144 This dynamic has been well described in Surjit Mansingh, “India-China Relations in the Post–Cold War Era,” Asian Survey, 34: 3 (March 1994), pp. 285–300.
requisite breathing room that will allow its program of national economic renewal to be brought to completion without any enervating military distractions. Both China and India stand to benefit from ensuring at least transient local tranquillity, since in doing so China has one less landward sector to worry about as it shifts its strategic focus to more pressing maritime challenges relating to Taiwan and the South China Sea, while India enjoys the liberty of actually redeploying forces from border defense operations in the northeast to counterinsurgency duties elsewhere in India, including Kashmir. Consequently, India’s security managers—despite their disquiet about China’s growing military capabilities, Beijing’s covert assistance to Pakistan, and China’s increased presence along India’s periphery—have continued to maintain a muted political response that, in the eyes of many local commentators, appears to border on strategic paralysis. The highly publicized statement by India’s outspoken Defence Minister, George Fernandes, that “China is potential threat No. 1” represents the exception to this rule—an exception not because the sentiments it expressed are uncommon among Indian political leaders but because such sentiments were articulated publicly and in such a direct fashion.

Not surprisingly, subsequent statements by the Indian leadership, including Prime Minister Vajpayee himself, appear to have shifted in tone to something approaching the previous norm: steady composure in New Delhi’s public statements about China coupled with lingering suspicion of Beijing in private. This equanimity at the public level has only been reinforced as China’s initial furor over India’s resumption of nuclear testing has slowly died down. Beijing’s refusal to support Islamabad’s rather blatant attempt at changing the status quo in Kargil further underscored the value of returning to the more nuanced policy India had sought to pursue vis-à-vis China since 1988. Indeed, India’s subtlety toward Beijing has now reached

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145 As one Indian Army officer argued, “We simply cannot afford to antagonize the Chinese at this point. . . . We are fully stretched in combating insurgency in the country, and if we have to deal with renewed tension on the Line of Actual Control (LAC), the army could well break down.” Quoted in Joshi, “George in the China Shop,” p. 15.

146 Joshi, “George in the China Shop,” p. 12.

147 For more on these developments, see Mark W. Frazier, “China-India Relations Since Pokhran-II: Assessing Sources of Conflict and Cooperation,” *Asia Review*, 3:2 (July 2000), pp. 5–35.
the point where, even with respect to nuclear weaponry, New Delhi has artfully shifted its position from that articulated during the May 1998 tests. Instead of restating the argument that India's resumption of testing was motivated by the fear of China—an argument contained in Prime Minister Vajpayee's official letter to President Clinton—the revised Indian position now rather blandly asserts that "these tests were not intended to threaten any country but to address the security concerns of the Indian people and provide them with necessary assurance."148

This polite attitude toward China is not unique to India. Rather, it characterizes the public diplomacy of many of China's neighbors, who generally presume that naming enemies makes enemies. In India's case, this politeness is driven particularly by the perception that for all of China's power capabilities, including those in the nuclear realm, the window of vulnerability from New Delhi's perspective is less open today than it could be tomorrow. This concern about future vulnerability derives from the recognition that with every passing day, the relative balance of power between China and India appears to change even more dramatically in favor of the former, thanks to China's high levels of sustained economic growth. This, in turn, implies that when the contested border issues—which are postponed at the moment—are eventually revisited, such visitation will take place at a time when the relative balance of power has clearly and unambiguously shifted in favor of China.149 The general trend toward asymmetry in Sino-Indian power, which many Indian elites fear represents the face of the future, becomes all the more disturbing in light of the fact that it could extend to the one arena where India has a clear advantage today: the balance of conventional capability along the contested Sino-Indian border. For this reason, growing Chinese capabilities not simply in the nuclear realm but more significantly in the conventional arena are being watched closely in India, at times with consternation. This is because the trends suggest a variety of significant changes in combat technology,


149 C. Raja Mohan, "India, China Power Equations Changing," The Hindu, December 2, 1996. As one insightful Indian analysis argued, "Indian policymakers do not see China as a threat [today], but the big question is what kind of China will emerge 10 or 20 years from now and what are its implications for India." See "SAPRA Backgrounder: The China Poser," SAPRA India Monthly Bulletin, April–May 1996, pp. 1–6.
operational doctrine, and logistical structure that could result in increased Chinese war-fighting capabilities in the Himalayan region during the 2010-plus time frame—changes that would cause India grave concern because they would undercut its present strategy for dealing with a superior nuclear-armed power like China.\footnote{These issues are insightfully explored in Bhashyam Kasturi, “The Looming Chinese Threat,” The Pioneer, August 19, 1995. See also William W. Bain, “Sino-Indian Military Modernization: The Potential for Destabilization,” Asian Affairs, 21:3 (Fall 1994), pp. 131–147.}

India’s strategy for dealing with a nuclear China today consists simply of maintaining superior conventional capabilities along the contested border. These capabilities encompass several well-equipped and highly trained mountain divisions manning a series of carefully prepared positional defenses, all backed by superior tactical airpower.\footnote{A summary description of these capabilities can be found in K. Subrahmanyam, “India’s Security: The North and North-East Dimension,” Conflict Studies, 215 (London: Centre for Security and Conflict Studies, 1988), pp. 18–22.} Indian strategists believe that a robust forward defense of this sort provides the best means of defending their territorial interests in that it can prevent China from making any significant territorial gains and, to the degree that such a defense is successful in the context of a conflict, can place the onus for initiating nuclear use—either to prevent defeat or to break up entrenched Indian defenses by other means—squarely on Chinese shoulders. Given China’s present nuclear capabilities, a nuclear-use decision could involve a variety of options ranging from the discrete use of tactical nuclear weapons at the low end all the way to strategic countervalue attacks at the high end.\footnote{Subrahmanyam, “India: Keeping the Option Open,” pp. 117–120.} While the latter would be improbable given the stakes involved in the border dispute, Indian security planners have concluded that only a nuclear deterrent of some kind would suffice to prevent both the possibility of Chinese blackmail and actual nuclear use. This is because whatever the incentives for the other nuclear powers to checkmate any blatant Chinese effort at coercion, India simply cannot “rel[y] on the actions of other states to resolve its nuclear dilemmas”\footnote{Mohan, “India, China Power Equations Changing.”} in perpetuity. Accordingly, the continued success of the current conventional deterrence strategy requires that India acquire a range of nuclear capabilities comparable to those of...
China or at least pursue the "ambivalent deterrence [capability that] could develop in a few years when India has missiles of 2500-km range which are under development."\textsuperscript{154}

The more capable China envisaged in the future is seen to make a robust Indian nuclear posture even more necessary. If increased Chinese capabilities imply a vigorous modernization of China's conventional forces such that India's current advantages along the border are significantly diminished, the necessity for a ready Indian nuclear reserve might be seen as the only means by which this unfavorable battlefield situation could be redressed. Alternatively, if Chinese nuclear modernization involves the deployment of tactical weapons along the Himalayan battlefronts—implying that Chinese nuclear options in the face of a robust Indian conventional defense would not now require those incredible countervalue threats that New Delhi could either discount or use to secure external support—India would be pressed to accelerate its shifting nuclear posture into something that more clearly resembles a capacity for proportionate response. This is because Chinese tactical nuclear capabilities would allow Beijing to issue battlefield nuclear-use threats that would force India—if it lacked comparable capabilities—to submit to the threat of such nuclear use, absorb the attacks irrespective of their cost without comparable retaliation, or respond by issuing the same kinds of countervalue threats (assuming it had the delivery capabilities) that today would be deemed incredible if issued by the Chinese. None of these three outcomes would appear to be particularly attractive to New Delhi.\textsuperscript{155}

A shift toward a more capable and transparent Indian nuclear posture could also come about simply as a result of the same contingency referred to earlier, but discounted in this analysis: a Chinese countervalue capability that is used for purposes of nuclear coercion in a manner similar to, or different from, the present Pakistani exploitation of its limited nuclear capabilities. These countervalue

\textsuperscript{154}Subrahmanyan, "India's Security: The North and North-East Dimension," p. 20.

capabilities—which exist today—matter less so long as China remains politically quiescent. In such circumstances, India could steadily move toward altering its nuclear capabilities at a relatively slow pace and without much fanfare—as it seems to be doing today. Should this situation change in the future, however, either because China chooses to resurrect its support for the insurgencies in the Indian northeast\textsuperscript{156} or because India, succumbing to the pressures of the increasingly restive community of Tibetan exiles in India, begins to support Tibetan independence,\textsuperscript{157} the pressures on New Delhi to develop a nuclear posture that embodies flexible response capabilities would only increase.

It can therefore be concluded that the steady transformation of India's nuclear posture in the direction of continued weaponization will be driven to a significant extent by the growing perception among Indian policymakers that while Pakistan represents a "clear and present danger" to Indian security today, China could readily evolve into a similar threat over the next two decades. At the moment, the rationale for the current shift in India's strategic posture is grounded primarily in a prudential reasoning that seeks to create a deterrent aimed at insulating India against either Pakistani or Chinese nuclear coercion. However, the pressures on India to create a large and diversified deterrent may well prove overwhelming if the future behavior of both Pakistan and China is transformed in the direction of active militancy with respect to their territorial claims; if New Delhi perceives even greater Sino-Pakistani collusion than is the case at present; if Sino-U.S. relations are perceived as developing rapidly at India's expense; if Sino-Indian interests begin to manifestly clash in the Asian region at large; or if China's strategic modernization results in significant changes in the relative balance of conventional capability, the deployment of tactical nuclear weapons in the Himalayan borderlands, or the conspicuous expansion of China's present strategic nuclear capabilities.

\textsuperscript{156}The history of Chinese support for Indian insurgencies is explored in Subrahmanyan, "India's Security: The North and North-East Dimension," pp. 11–18.

\textsuperscript{157}For a good analysis of the angst experienced by Tibetan exiles in India, see Sudeep Chakravarti, "Restless Rage," \textit{India Today International}, May 18, 1998, pp. 18–21.
Relations with Key Countries

While developments in the regional security arena relating principally to China and Pakistan would be the most important factors underlying any further alterations in India’s nuclear posture, this movement would by no means depend on the local environment alone. Rather, the burdens imposed by the regional situation would be assessed in the context of a larger set of considerations, the most important being the state of India’s relations with key actors in the international arena. The two critical actors here will be the United States and Russia, although other Asian centers of power, such as Japan and the various Southeast Asian states, will also factor into India’s calculations. In all instances, New Delhi will accommodate the preferences of these key countries only to the degree that each is seen as being sensitive both to India’s security concerns and to its desire for great-power status while also offering opportunities for a relationship based on friendship and sympathy toward Indian aims.

It is important to recognize, however, what can and cannot be expected to result from the maintenance of good relations with these countries. India’s preference for a “credible minimum deterrent” of some sort is simply nonnegotiable. In fact, if India’s 1998 nuclear tests reveal anything at all, it is that New Delhi did not consider the generally good relations it enjoyed with most major countries to be a good enough substitute for ensuring India’s strategic autonomy. Even previous non-BJP governments in New Delhi, while avoiding testing, were adamant about retaining India’s nuclear capabilities. Consequently, India is unlikely to entertain any suggestions that lead to the divestiture of its nuclear weapon program, and it is also unlikely to be persuaded to permanently forgo any technical options that impinge on its ability to maintain a limited deterrent. That having been said, however, the direction India takes in pursuing weaponization, the pace at which this process is undertaken, and the kinds of force postures India develops can all be influenced by the relationships New Delhi enjoys with these key states. It is thus possible, for example, that improved relations with the United States

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158 This was true even of unquestionably moderate regimes like the United Front. See the remarks of the former Prime Minister, I. K. Gujral, in *India: Gujral Says Indians Cannot Give Up Nuclear Option*, FBIS-TAC-97-002, December 2, 1996.
could lead India to sign the CTBT at some point so long as conforming to this regime is not perceived as undercutting India’s ability to sustain its deterrent capability. There is clearly a floor below which no policy options can be conditioned or negotiated away, and this floor is defined by whatever it takes to maintain a “minimum credible deterrent” of one sort or another. Above this floor, however, lies significant room for maneuver, and New Delhi might be willing to accommodate external preferences if such preferences are viewed as providing sufficient compensating benefits.

In many ways, developing a nuclear arsenal remains a constrained preference for India—which is to say that if New Delhi could avoid acquiring this capability in any maximal form, it would probably do so. In part, this is because of India’s long-standing obsession with universal disarmament. Yet concerns about the requirements of a comprehensive nuclear arsenal also derive from more pressing considerations. Indian policymakers harbor no illusions about what the financial costs of such a strategic choice would be, notwithstanding the soothing estimates of numerous local nuclear weapon devotees. At a time when India is preparing to consolidate its long-awaited and much-postponed economic “takeoff,” Indian security managers in general would prefer to minimize defense expenditures—including spending on a nuclear arsenal—to the maximum extent possible, since many development objectives affecting large portions of the populace have yet to be attained.159

At the same time, India’s preference for these dual objectives—creating a minimum deterrent while minimizing defense expenditures—has been placed under increasing stress as a result of pressures emerging both from dissidents within the country (sometimes within the government itself) and from unfavorable external circumstances. The serious neglect of India’s conventional forces since the early 1990s, the high levels of war wastage that resulted from the limited war with Pakistan in Kargil in 1999, and the continuing toll imposed by relentless counterinsurgency operations in various parts of the country—particularly in Kashmir—have already resulted in a sharp spike in defense expenditures in FY 2000. Whether such in-

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increases will be sustained in the years to come is difficult to predict, as India’s traditional defense expenditure patterns are almost as cyclic as those of the United States—but Indian policymakers are acutely conscious of the financial burdens that investments in nuclear weaponry will impose on the competing obligations of conventional modernization and economic development. At a time of increasing criticism both from “hawks” outside the government and from within the government itself over poor performance in various contingencies (e.g., the intelligence failure at Kargil and the poor crisis response during the hijacking of an Indian Airlines jet at Kandahar in December 1999), these policymakers have responded by increasing budgetary allocations on what they deem is unavoidable—maintaining superior conventional capabilities—while remaining cautious with regard to their spending on emerging strategic capabilities. Critical to this strategy of minimizing resource expenditures on strategic programs until truly necessary is a pervasive ambiguity about India’s nuclear development and acquisition efforts, its current and future force levels, and its organizational structures. Indian policymakers believe that the less that is said about these issues publicly, the better, as this quiescent posture allows them to maintain some semblance of moderation that may immunize them against pressures from the hawks at home while simultaneously serving to defuse external anxieties that might arise were they compelled to expand either the size or the pace of their strategic weapon programs.

Consequently, India’s first preference would be to retain a minimal nuclear capability that is still ambiguous in many of its details while relying as much as it could on the possibility of “strategic coordination” with other important states—thereby avoiding those additional expenditures that it would incur if it had to develop a fully transparent and diversified nuclear arsenal that is both invulnerable.

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160 The bulk of the sharp defense increases in the FY 2000 budget, for example, was allocated to conventional modernization, fuel, spares, and paramilitary forces rather than to strategic projects, leading one commentator to note that “limited funding for Research and Development . . . has raised eyebrows here as the Defence Research and Development Organization (DRDO) is spearheading the missile and nuclear submarine programme, the key to India’s acquisition of a credible minimum nuclear deterrent.” See Atul Aneja, “Army Gets Lion’s Share of Funds,” The Hindu, March 1, 2000. See also “More Allocation for Para-Military Forces,” The Hindu, March 1, 2000.
and maintained at high levels of operational readiness. To the degree that India could secure additional margins of safety through close relations with important states in the international system—relations that would yield increased political cover, preferential access to high technology and advanced conventional weaponry, and greater recognition of its status—New Delhi might be willing to trade in its pursuit of *marginal* nuclear capabilities. Such a trade, far from being automatic, would involve extensive negotiations, but it would nonetheless be feasible provided that the right combination of blandishments and incentives could be fashioned by the major states of importance to India.\(^{161}\)

Clearly, this possibility of a trade arises only because preserving the existing nuclear order is not a “zero-sum” affair when viewed in game theoretic terms.\(^{162}\) Neither the existing great powers nor India (nor, for that matter, Pakistan) has an interest in any “corner solutions” that involve the complete “defeat” of the other. To the contrary, the great powers, who possess the largest stakes in preserving the existing nuclear order, simply lack the inclination (and perhaps the wherewithal) to bring India to heel by rolling back its nuclear program, especially after the events of May 1998. India, in turn, can comprehensively threaten the global nonproliferation order through its actions but lacks the incentive to do so if its own security concerns can be accommodated. These divergent but not fundamentally opposed interests create a “solution space” that could enable India to maintain a certain nuclear posture without wrecking the global nuclear regime as well as to receive various political, economic, and technological considerations from the great powers in return. This kind of solution is exactly what the present BJP-dominated National Democratic Alliance (NDA) government in New Delhi has been seeking in the aftermath of its nuclear tests. Previous Indian governments sought similar considerations as well, but being more risk-averse, they had hoped that these considerations would be forthcoming.

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simply as a reward for India’s traditional restraint in the realm of nuclear testing. The new NDA government, being more risk-acceptant in the face of India’s perceived failure to secure these considerations, appears willing to actively bargain for them using the threat of further weaponization to achieve its larger objectives.

United States. This dynamic will be most clearly evident in India’s relations with the United States because New Delhi perceives the latter as possessing most of the resources India desires, even if it is unwilling to freely part with them. “Bargaining” with the United States is therefore seen to be necessary, since “engaging” it has simply not yielded the kinds of returns that New Delhi expected early on. In the waning years of the Cold War, India responded eagerly to American overtures to cement a new relationship between the two countries. This enthusiasm was initially driven by India’s desire to moderate its dependence on the Soviet Union but was later colored by the reality of the Soviet collapse. In any case, it was hoped that a deepening association with the United States across multiple dimensions—growing economic interaction, enhanced political understanding, increasing intelligence exchanges, and greater military-to-military ties—would provide India with a high level of strategic reassurance that would minimize the need for “go it alone” strategies, including the necessity for dramatic changes in India’s nuclear posture. Clearly, if American perceptions of China as a potential threat moved in the direction of greater congruity with that of India, the need for a significant shift in Indian nuclear strategy might have become less urgent, among other things, because New Delhi could have benefited from the positive externalities generated by any efforts the United States might have made to penalize China for hostile actions—just as China benefited from U.S. containment of the Soviet Union during the Cold War.


165 This opportunity presented itself in concrete fashion when U.S. intelligence agencies reported China’s sale of M-11s to Pakistan. By refusing to penalize China for this act in accordance with the requirements of its own law, the United States unwittingly communicated an insensitivity about Indian security concerns that contributed in part to the “go it alone” strategies represented by the nuclear tests in May 1998.
India’s economic reforms, begun in 1991, were also seen to provide a significant opportunity for enhancing U.S.-Indian relations. Indian calculations, in fact, centered on this phenomenon, as it was hoped that expanded American trade and investments would amplify the U.S. stake in Indian security and stability. In this context, India’s elites actually viewed increased economic intercourse as an opportunity to strike some strategic bargains: to convince the United States to relax its restrictive policies on transferring sophisticated technologies that might have civilian, dual-use, or straightforward military applications; to make the United States comfortable with the idea of assisting the Indian military in reforming its force structure and supporting capabilities as well as helping it develop proficiency in certain critical war-fighting competencies; and, finally, to persuade the United States to view a strong, capable, and independent India with an autonomous managerial role in South Asia as something that is not simply inevitable but actually desirable within the framework of American global interests.  

Although the U.S.-Indian relationship certainly moved in this general direction following the end of the Cold War, the pace of change was not swift enough from New Delhi’s perspective. In part, this was because both India and the United States, despite engaging one another, sought to service divergent interests from inherently different levels of strength. The United States, appropriately enough, viewed its evolving relationship with India from the perspective of a global power; it sought to acquaint itself with India as a regionally influential state that might some day become more powerful and, to the degree possible, sought to incorporate India into its vision of furthering regional stability in Asia. Toward that end, it gradually distanced itself from the overly militarized relationship it had previously cultivated with Pakistan but simultaneously pressed India to adhere to the international nonproliferation regimes managed by the United States. Moreover, while on balance relations with India did improve, Washington did not feel any compulsion to accelerate this change beyond the levels that the traffic could bear, largely because India was perceived to be less important today than it could be in the

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future. As a consequence, the United States’ efforts to improve relations with New Delhi inevitably took the form of an evolutionary process that was to be cemented piecemeal over an extended period of time. This incremental approach was viewed in Washington as a means of offering the United States time to gradually adjust its own policies to accommodate India’s regional primacy—policies that had implications for U.S. relations with both Pakistan and China as well as for its ability to accommodate India’s claims to great-power status—as well as to clarify what the overarching strategic necessity for improved U.S.-Indian relations actually was. In the meantime, modest arms sales and technology transfers, occasional military exercises, and a limited “strategic dialogue” would come to represent the official component of improved U.S.-Indian relations.

While these relations rapidly became “privatized”\textsuperscript{167} in that growing society-to-society interactions conducted in the arenas of trade and investment gradually became the dominant component of U.S.-Indian familiarity, New Delhi was disappointed to discover that increased private economic relations with the United States did not automatically translate into political benefits in the issue areas that mattered most to India. The fact that the American state was highly autonomous in the national security arena, for example, implied that the U.S. government would not comply with New Delhi’s implicit (and sometimes explicit) demands for anti-Pakistani and anti-Chinese policies merely by virtue of its growing commercial contact with India. The same held true for India’s increasingly vocal demands for great-power status, especially as manifested in its desire for a permanent seat on the U.N. Security Council: All these demands could be serviced, but only if they were congruent with America’s own interests over time. Since such a congruence did not exist, however, it is not surprising that on many strategic issues of importance to New Delhi—such as China’s transfers of nuclear and missile technologies to Pakistan—Washington simply did not respond in the manner that India had hoped it would. In short, given the “getting to know you” premise underlying America’s original overtures to India, Washington did not feel compelled to open its floodgates of high technology; recognize New Delhi’s managerial status in South Asia

\textsuperscript{167}This term has been used by Richard Haass and appears in Sidhu, \textit{Enhancing Indo-U.S. Strategic Cooperation}, p. 70.
before its time; or harshly penalize India’s competitors for their infractions of U.S. nonproliferation policies when imposing such penalties may not have been in Washington’s larger interests. This reticence was only reinforced by what was perceived to be India’s own obduracy in the nuclear and missile realms. Taken together, then, Washington’s policies vis-à-vis New Delhi undercut the latter’s desire to quickly acquire advanced technological and military capabilities and, far from exemplifying the rapid and revolutionary transformation in bilateral relations that India had sought as means of acquiring great-power status, yielded a cautious approach in which the United States sought to preserve good relations both with India and with its neighbors simultaneously.

Although such an approach made sense from America’s point of view given that its relations with many of India’s neighbors, especially China, were of greater importance than that with India, New Delhi read this policy as implying a lack of sensitivity to India’s concerns. In essence, Indian policymakers took it to mean that they were essentially on their own. Thus, while several Indian governments toyed with the idea of altering India’s nuclear posture only to be stymied by their fear of U.S. pressure, the first risk-acceptant party to attain power in Delhi changed that posture decisively through the nuclear tests conducted in May 1998. India’s nuclear decisions henceforth can be moderated, at least with respect to their pace and direction, but such alterations will have to be negotiated and will involve the use of those positive incentives which the United States may have been unwilling to consider thus far. The principal instruments in the American tool kit continue to be its advanced technology and its ability to bestow political recognition in a way that yields strategic benefits. Whether the United States is willing to trade some of these assets for certain desired changes in India’s future nuclear posture remains to be seen, but this is clearly one

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168 As noted earlier, this issue really became significant in the context of Washington’s unwillingness to chastise China for transferring M-11 missiles to Pakistan. See the trenchant Indian comments on this question in K. Subrahmanyan, “Missile Proliferation: U.S. Must Hear India’s Concerns,” The Times of India, July 13, 1995, and Jasjit Singh, “Pakistan’s Missiles: U.S. Turning a Nelson’s Eye,” The Times of India, July 19, 1995.

169 The history of Indian dalliances with nuclear testing during the early to mid-1990s is detailed in Perkovich, India’s Nuclear Bomb, pp. 318–377.
variable that will condition New Delhi’s future strategic choices. To be sure, Indian elites, being aware of all these possibilities and mindful of the strategic uncertainties of the future, will continue to seek improved relations with the United States because deepened ties promise benefits whether India chooses to further develop its nuclear arsenal or not—so long as neither U.S.-Indian relations nor critical Indian strategic capabilities are sacrificed in the interim.

Russia. Maintaining a secure relationship with Russia is motivated by similar calculations. Because Russia is a pale shadow of its former incarnation, the Soviet Union, India’s links with Russia do not and cannot have the same political content as its old Indo-Soviet tie. Yet Indian analysts are acutely aware that for simple geopolitical reasons, “Russia, in the long run, will remain a natural strategic partner of India.” This judgment is driven by the perception that countries like Russia and Japan share certain common interests with India vis-à-vis China and that while both relate differently to Beijing today—Russia as a major arms supplier and Japan as a major foreign investor—neither can afford to be indifferent to the growth of Chinese power over time. For this reason, India’s cultivation of close relations with both states is deemed to be critical, and the Russian connection is viewed to be particularly important even though it is acknowledged that Moscow will remain closely linked with the West and that Indo-Russian economic relations will be driven entirely by the laws and logic of the market.

It is this latter reality, however, that makes Russia so interesting in the near term. For while Moscow has become increasingly sensitive to the problem of nuclear proliferation, its own precarious economic condition and its willingness to treat India as different from other proliferators (for both geopolitical and historical reasons) have given New Delhi critical opportunities to acquire Russian technology in support of its future nuclear posture. Unlike other bilateral relationships, Delhi’s Russian connection can thus be seen as vital in that it

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directly advances the development of India's strategic capabilities and, by implication, determines the kind of nuclear force architecture that India could develop over time. Russian technology here is not used in the production of nuclear weapons per se, although changes could occur in this realm as well over time. Rather, Moscow's technology is currently used largely to develop the delivery systems that could carry either conventional or nuclear payloads as the situation requires. In this context, Russian assistance has been publicly identified as supporting the development of the Indian nuclear submarine program, its indigenous sea-based cruise missile, and perhaps both its land- and sea-based ballistic missile programs. In each of these programs, Russian technology transfers have not taken the form of direct sales but have instead occurred through the provision of technical assistance in support of India's own indigenous development efforts. This kind of technology transfer is more difficult to detect, since knowledge transfers conducted through personnel exchanges, linkages between specific research institutions, and mutual review and assessment of ongoing R&D work are inherently less visible than direct arms transfers but ultimately more consequential in the long run.

India's relationship with Russia also allows for direct sales, but these would most likely occur in the realm of conventional weaponry, where international technology-control regimes may not apply. Some of these sales, however, will directly affect India's future strategic posture, as would be the case if current discussions between New Delhi and Moscow for Russian ATBM systems like the S-300V-Antey 2500 as well as other components for developing an Indian IAD network bear fruit. A future Indian decision to purchase a long-range theater bomber like the TU-22M3 or the Su-34, which is based on the successful Su-27 design, would have a similar effect.

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174 Precisely because of this fact, the ongoing U.S.-Indian dialogue about institutionalizing a restraint regime in South Asia has included discussions about "virtual technology transfers" occurring through scientific exchanges, professional meetings, and the like.

Since Russia's penury coincides with its military sophistication thanks to its inheritance of the former Soviet Union's industrial base, it is likely that numerous weapon technologies will continue to be available to India, at least in the near term. In many cases in which direct sales are not at issue, these technologies will be transferred in the form of subsystems and specific assemblies, or they may take the form of knowledge transfers between private and governmental institutions in Russia and private firms or governmental research agencies in India.

In fact, some Indian analysts have berated their government for not exploiting Russia's military technology resources more systematically, noting that while "China was quick to tap the new cash-and-carry opportunities... India's ability to exploit the remaining though limited opportunities remains seriously constrained due to its proverbial red tape, preference for government-to-government contracts, and a defense budget with a paltry provision for capital expenditure."\textsuperscript{176} Whatever the merits of this criticism, it is clear that India's interests will in the near term consist principally of securing continued access to Russian high-technology weaponry, which is relatively inexpensive in comparison to that of other suppliers and with which the Indian armed forces are already familiar.\textsuperscript{177} A loss of access either for economic reasons (because the Indian economy sputters or the costs of Russian equipment simply become prohibitive) or for political reasons (Russia loses interest in supplying advanced weapons to India because of constraints imposed by potentially bigger customers such as China) would have devastating effects. It would result in the steady enervation of India's conventional military capabilities, which in turn would make the imperative...

\textsuperscript{176}Chellaney, "Shoring Up Indo-Russian Ties."

\textsuperscript{177}It is worth noting that India's interest in Russian strategic technology is accompanied by a growing interest in French and Israeli technology. The parallelism in these cases is fascinating: All three states are seen as repositories of critical strategic technologies of interest to India; all three states are seen to be sufficiently independent of U.S. political pressures as far as transferring many technologies to India is concerned; and all three states are perceived to be driven more by commercial considerations than by ideological interests, and even these, to the degree that they exist, are viewed as aligned with rather than opposed to Indian perceptions. Consequently, it is not unreasonable to expect that India's strategic ties with each of these countries will grow both in connection with its strategic programs and otherwise.
of developing a larger but more transparent nuclear arsenal even more pressing.\textsuperscript{178}

Beyond such immediate concerns, India remains reluctant to jettison the political dimensions of ties with Russia mainly for long-term security reasons. In fact, the potential rise of China itself is seen as an issue that would effectively engage Russian security interests, and to the degree that Russian nuclear capabilities vis-à-vis China remain sufficiently robust, close Indo-Russian relations are seen as having the potential to provide New Delhi with certain positive externalities that would prove most useful in restraining China from pursuing objectives that may be inimical to India. This does not imply, however, that India would seek extended deterrence guarantees either from Russia or, for that matter, from the United States. A strong and prosperous India would in all probability seek to maintain its political autonomy in much the same way that it did throughout the Cold War. The success of India’s economic transformation, then, has become more crucial than ever because it will determine the degree of political autonomy that India can maintain in the face of other competing centers of power in the international system. A strong and capable India would have both a lesser need for extended nuclear guarantees from others and a diminished incentive to develop an extensive nuclear arsenal intended for war-fighting purposes as a substitute for weakened conventional forces. By contrast, an infirm India not only would have a greater need for extended security guarantees but would also experience strong pressure to develop such an arsenal in order to prevent a total loss of political autonomy in the face of growing conventional weaknesses.

**Maritime Asia.** It is in the context of developing comprehensive Indian strength that New Delhi’s relations with the countries of mar-

\textsuperscript{178}Despite all the sentiments expressed in India after the collapse of the Soviet Union, India today is no more autonomous with respect to critical high-value conventional weapon systems than it was during the Soviet era. In fact, this dependency might even increase if the ten-year defense deal concluded with Russia yields all the equipment desired by the Indian military. See Rahul Bedi, "India to Sign New 10-Year Defence Deal with Russia," *Jane's Defence Weekly*, July 1, 1996, p. 16, and Sadanand Dhume, "Arming India," *Far Eastern Economic Review*, October 12, 2000, p. 20.
In time Asia become particularly important. The most significant of these countries is Japan, which is already the most important economic power in Asia and is currently India's largest aid donor. Inasmuch as Japan is viewed as having the potential to become a nuclear weapon power like India and remains China's most conspicuous regional adversary, the Indo-Japanese relationship could become a significant variable affecting India's strategic direction in the long term. For this reason, New Delhi has sought to maintain correct relations with Tokyo. Despite the latter's displeasure with India's 1998 nuclear tests, for example, New Delhi—treating this reaction, among other things, as a product of U.S. pressures—has attempted to encourage Japan to continue its private investments in India while struggling for a way to make the latent convergence of interests in the political realm more manifest in bilateral terms. In the immediate future, India simply seeks more commercial interaction in order that Japanese innovation and investment may contribute to growing Indian economic prowess. Japan's willingness to steeply increase its investments in a reforming India is seen as inexorably motivating greater Indo-Japanese strategic interaction, where concerns over China's growing conventional and nuclear capabilities, the problems of freedom of navigation in the Indian Ocean, and the dependence of both countries on the Persian Gulf for energy supplies could, taken together, result in a greater appreciation of India's nuclear capabilities as serving a common interest. A similar set of considerations drives India's efforts to improve ties with other East Asian states, including Indonesia, Singapore, Malaysia, and the Philippines. Clearly, then, India's recent "look East" initiatives have both economic and political components.

Even when considered as a whole, however, it is clear that India's elites do not view their country's international relationships with key countries like the United States, Russia, and the states of maritime Asia as a substitute for the political autonomy that is ultimately


undergirded by the possession of adequate military capabilities.\textsuperscript{181} They readily admit, however, that a wide range of models encoding different levels of nuclear readiness are compatible with the need to maintain adequate military capabilities. The necessity for any one particular nuclear architecture will therefore be determined first by the nature of the specific threats facing the country and second by the available alternatives to that architecture. These alternatives will have to include some consideration of the relationships India enjoys with key states in the international system. These relationships will not \textit{a priori} offer a perfect substitute for credible nuclear capabilities, but they will certainly influence the character of the capabilities required and the urgency with which these capabilities are procured. After due consideration of the costs and benefits associated with the various alternative nuclear postures, they may also determine \textit{a posteriori} the necessity for procuring something that resembles an overt, transparent, and full-fledged nuclear arsenal.\textsuperscript{182}

**Domestic Politics and National Economic Performance**

The fourth and final variable that will influence India's decision to pursue further changes in its nuclear posture centers on the pressures emanating from domestic politics in the context of the country's overall economic performance. In contrast to the other three factors examined earlier—all of which relate in some way to the international environment and as such, constitute the external drivers influencing Indian policymakers' decisions—the network of bureaucratic organizations involved in producing India's nuclear capabilities, the major political parties and key elements of the civil services, popular preferences at large, and national economic performance together constitute the internal drivers that will determine India's future nuclear posture. Each of these constituent elements merits brief examination.

**Strategic Enclaves.** Although India's nuclear capabilities are still primitive by the standards of the nuclear weapon states, these capabilities have been created by a fairly large and powerful bureau-

\textsuperscript{181}Mohan, "Nuclear Balance in Asia."

\textsuperscript{182}For an Indian perspective that speaks to some of these issues, see C. Raja Mohan, "India and the Nuclear Oligarchy," \textit{The Hindu}, June 6, 1998.
ocratic structure centering on three principal complexes. These complexes—the atomic energy establishment, the defense research and development organizations, and the space research program—have been termed "strategic enclaves" because they focus on producing the most advanced technological devices necessary for national security in an environment that is "institutionally, spatially, and legally . . . distinct and different from the existing structure of the Indian military-security complex." These enclaves are distinguished from the rest of the military-security complex by their concentration on developing "high-leverage" technological systems; their relatively flexible internal organizational structures; the high degree of cross-connectivity they enjoy across institutions; their ability to garner privileged political and budgetary support from India’s state managers; and their minimal accountability to the body politic at large. Since these enclaves had their origins in Jawaharlal Nehru’s dream of science providing the sinews of the modern state, they have slowly come to dominate both India’s attempts at economic modernization and its efforts to achieve autonomous security. Thanks to the importance accorded to the latter objective, these complexes have also become important centers of power in their own right; indeed, their monopoly over technical knowledge pertaining to India’s strategic capabilities, the lack of comparable expertise on the part of their civilian masters, and the extraordinarily small set of political managers tasked with regulating their activities all combine to make India’s strategic enclaves a force to reckon with. Not surprisingly, they have acquired interests distinct and apart from other critical institutions of state, including the armed forces—which, at least historically, have been cast in the role of hapless consumers unable to control in any significant way the development of those systems.

184 Ibid., p. 233.
185 Ibid.
that they will be ultimately responsible for using. Any assessment of India’s future nuclear posture must therefore take into account the interests and contributions of its three strategic enclaves.

Atomic Energy Establishment. The first complex—the atomic energy establishment—consists of a vast array of nuclear facilities that includes power and research reactors; uranium mining, processing, and enrichment facilities; plutonium-reprocessing plants; and heavy water production facilities. While these physical capabilities bear on the ability to produce nuclear weapons, the key elements affecting India’s future nuclear posture reside mainly at or around the Bhabha Atomic Research Center (BARC) in Bombay. India’s nuclear design teams are reportedly located at this facility, and according to published reports, the “physics package” for the weapons used in the 1998 nuclear tests was fabricated here as well. The contributions of this complex to the future Indian nuclear posture will in all probability be silent but significant. They will be silent because the process of producing weapon cores is essentially a covert endeavor, and barring any information released by India itself or acquired by others through clandestine means, the exact nature of India’s nuclear devices will continue to remain free from scrutiny. These silent artifacts are nonetheless significant, however, because their type, quality, reliability, number, size, and yield ultimately form the basis of India’s nuclear deterrent.

Given this fact, the nuclear weapon enclave is likely to push for three distinct policies that will have a significant impact on India’s future posture. First, it will press for continued research and development on weapon designs. This effort will focus on developing a small number of distinctly different types of nuclear weapons, each of a different class of yields and capable of carriage by a variety of

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189 A useful though jaundiced survey of India’s atomic energy establishment can be found in Dhirendra Sharma, India’s Nuclear Estate (New Delhi: Lancer’s, 1983). See also Spector et al., Tracking Nuclear Proliferation.

delivery systems. The former head of India’s AEC, R. Chidambaram, has claimed that India currently possesses “three robust bomb designs”\(^{191}\) that presumably remain the nucleus of its strategic deterrent. Irrespective of whether this claim is true, continued work on advanced nuclear designs—primarily boosted fission and thermonuclear weapons—will be high on the list of R&D priorities, since these devices were not tested at full yield (and perhaps were even tested unsuccessfully) during the May 1998 tests.\(^{192}\)

Second, the enclave will press for a continuation of different kinds of nuclear tests. Since the “peaceful nuclear explosion” carried out in 1974, the nuclear design establishment has been at the forefront of internal debates arguing for a resumption of hot testing. While the May 1998 test series met those demands in some measure, it is unclear whether this establishment will be truly satisfied with a permanent moratorium on hot testing, particularly if India’s advanced designs are actually to be certified (via a process analogous to the General Staff Quality Requirement [GSQR] currently used for conventional weapons) as fit for integration into the arsenal.\(^{193}\) This problem can be mitigated to some extent if India acquires good simulation capabilities, but in the absence of full-up testing it is uncertain whether the weapon establishment could acquire full confidence in its more sophisticated designs.\(^{194}\) Consequently, no matter what the inclinations of India’s political leadership may be, it is likely that this community—and its supporters in the press—will


\(^{193}\)See the views of P. K. Iyengar, former Chairman of India’s AEC, in Bharat Karnad, “Policy on CTBT,” *Hindustan Times*, November 4, 1999; Iyengar has argued—in Karnad’s words—that “because reliable performance of weapons is the key to nuclear deterrence, testing is essential for every new type or genus of weapon.” See also P. K. Iyengar, “Nuclear Nuances,” *The Times of India*, August 22, 2000. For the views of other Department of Atomic Energy (DAE) scientists endorsing the need for explosive tests in the future, see Srinivas Laxman, “India Should Retain Option to Carry Out More N-Tests,” *The Times of India*, November 1, 2000.

\(^{194}\)On this point, see Srinivasan, “CTBT: A Phony Consensus?”
advocate further hot tests of nuclear weaponry in addition to pursuing other types of subcritical and hydronuclear testing. 195

Third, the enclave will press India to continue its refusal to comply with the U.S. request for a moratorium on the production of fissile material pending the conclusion of an FMCT. 196 Given that the

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195 Since late 1998, senior Indian scientists, including the Scientific Adviser to the Defence Minister, Dr. A.P.J. Kalam, have repeatedly stated that India could do without further hot tests. See “No Contradiction with Kalam’s Views,” The Hindu, September 24, 1998. Throughout 1999, the former Chairman of India’s AEC, R. Chidambaram, also repeatedly affirmed that “as a result of these [May 1998] tests, we have now generated a very valuable scientific database on which we have a credible nuclear deterrent. . . . That is why we advised the Government that it could now declare a moratorium on further testing.” See “Signing CTBT Will Not Weaken Country,” Indian Express, May 10, 1999. See also Nirmala George, “India Now Within CTBT Rules: Chidambaram,” Indian Express, April 22, 1999. Indian National Security Adviser Brajesh Mishra further claimed that India had acquired so much data as a result of its five nuclear tests in May 1998 that it actually aborted a planned sixth test, since it “did not need any more data to strengthen the nation’s nuclear capability.” See “India Aborted 6th N-Test: Mishra,” The Pioneer, October 4, 1999. Irrespective of what one makes of Mishra’s claim, Chidambaram’s assertion is indeed interesting because the moratorium on testing announced on May 13, 1998 (the day on which India undertook its second round of tests), was offered far too quickly for India’s nuclear scientists to have reached a considered determination that their tests did in fact satisfactorily bequeath the kind of “valuable scientific database” that would obviate the need for further testing. In all likelihood, therefore, the Indian nuclear research establishment would still jump at the chance to conduct further nuclear tests if it were offered that alternative, but mindful of the political pressures on the government of India from the United States and elsewhere, this establishment has perhaps found it convenient to endorse the government’s desire to sign the CTBT so long as sufficient funding is made available to pursue other developmental alternatives to full-up hot testing. In the aftermath of the May 1998 tests, the budgetary allocations to the nuclear program have in fact risen considerably—perhaps in recognition of the fact that the decision to forgo further hot testing requires additional investments in theoretical research, computer simulation, cold testing, and subcritical experiments as well as a sop to the Indian nuclear establishment for its “expert” support of the government’s political decision to continue with the current moratorium on hot testing.

196 When publicly questioned about the sufficiency of India’s fissile-material stockpile, the Indian atomic energy establishment has generally declined to provide any quantitative information, arguing instead that it is “a political question.” See “What More Do You Want? We’ve Got All the Scientific Data We Needed,” Indian Express, December 4, 1999. Separately, however, India’s political leadership has intimated on several occasions that India will not enforce an immediate moratorium on the production of fissile materials “even if [the legitimate nuclear powers and Pakistan] agreed to the proposition.” See “Fissile Material: India Against Moratorium Now,” The Hindu, April 2, 1999.
extraction of weapons-grade plutonium from irradiated reactor fuel has proceeded much more slowly in India than outside observers usually recognize, the nuclear weapon enclave will argue strongly against any domestic inclination to terminate the production of fissile materials. While this stance is aimed primarily at developing the stockpile necessary to create the arsenal India may require in the future, it is also driven by the bureaucratic necessity of keeping several institutional components of the nuclear establishment in business. In any event, the enclave's strong preference for less-than-full accounting of past reprocessing and extraction efforts will remain the country's international position as the fissile-material cutoff negotiations get under way.

*Defense Research and Development Organizations.* The second complex, consisting of the defense research and development organizations, is in many ways similar to the nuclear enclave. Although it consists of some 50 separate defense laboratories and institutions engaged in developmental activities relating to aeronautics, electronics, weapon systems, naval technologies, engineering equipment, material sciences, life sciences, and systems analysis, training, and information, most of these institutions are oriented toward producing a wide range of conventional technologies required by India's armed forces. A much smaller subset of institutions within this complex, however, is tasked with developing the specific safing, arming, fuzing, and firing (SAFF) systems necessary to make nuclear devices into usable weapons. This subset shares responsibility with the nuclear weapon enclave for ensuring that the completed warhead can adequately mate with the delivery systems ultimately chosen for serial production, while a much larger subset of the defense research and development complex will be responsible for designing and developing (and, whenever necessary, modifying) those delivery systems thought to be necessary for a future Indian arsenal. Other elements of this complex are tasked with developing the technical sub-systems required for effective command and control, including

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physical safety devices, special communications links, and other associated technologies. 198

So long as India’s nuclear posture consisted of simple ambiguity, the defense research and development complex could continue its efforts at a languid pace. The decision to become a declared nuclear state, however, imposes new obligations on India, and these will be manifested in many different ways in the future. First, this complex will focus on continuing to develop a range of delivery systems that are resistant to interception. This implies a renewed effort in the area of long-range ballistic and cruise missiles aimed primarily at China but secondarily at Pakistan as well. India’s achievements in these areas have thus far been modest, and consequently, the defense research complex will push for long-term development and testing of such systems if the country is to satisfy its desire for a limited nuclear deterrent of some sort in the future. 199

Second, this complex will continue to modify India’s ground attack aircraft to carry nuclear weapons if such efforts have not already been completed. This step would provide a modest deterrent capability immediately, and unless the deployment and operating procedures relating to these weapon carriers are changed, such modifications would probably go unnoticed on the outside. As newer delivery platforms are integrated into service, this complex will be tasked with modifying these new entrants as well while continuing to oversee all the other upgrades that will be necessary to ensure that India’s manned strike platforms are capable of carrying out their nuclear strike mission in the face of a changing threat environment. 200

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198 Some of these institutions are identified in India: India’s Nuclear Weapons Plan Examined, FBIS-NES-98-190, July 9, 1998.

199 This will necessarily be the case given “the consistent [historical] failure of the Indian defence research establishment to put into production any significant weapons systems that it develops.” Gupta, India Redefines Its Role, p. 44.

200 These activities come under the purview of the Chief Adviser (Technologies), DRDO, who oversees the Directorate of Aeronautics and its key institutions, the Aerial Delivery Research and Development Establishment (ADRDE), the Aircraft System and Testing Establishment (ASTE), and the Aeronautics Development Establishment (ADE), as well as the Special Adviser to the Chief of Air Staff, who is formally responsible for all liaison with the Indian Air Force. See http://www.drdo.org.
Third, this complex will embark on a series of development efforts associated with the construction of a nuclear arsenal. Many of these initiatives will relate to specific components such as safety systems. However, the most important activities will pertain to re-creating existing nuclear designs for carriage by specific delivery systems—and toward this end, the growing symbiosis between selected subsets of the defense research and the nuclear weapon communities will continue. The general changes in India’s nuclear posture presaged by the 1998 tests only imply that the defense research community, which traditionally played second fiddle to the nuclear establishment, is likely to supplant the latter in importance over time. In many ways, this is because that community still has the bulk of its work cut out for it and, unlikely to complete these tasks anytime soon, will continue to garner both resources and national attention as its efforts slowly begin to bear fruit.\footnote{There is already some evidence that the growing attention enjoyed by the defense research establishment has become an object of some concern within the atomic research complex. See Pallava Bagla, “Pokharan: DRDO Limelight Hurt DAE,” \textit{Indian Express}, December 10, 1998.}

\textit{Space Research Programs.} The third complex, the space research organizations, is responsible for overseeing India’s space programs, which consist of developing a variety of launch vehicles; acquiring systems engineering expertise; producing remote sensing, communications, and meteorological satellites; and maintaining the organizational and technical infrastructure for controlling its space assets.\footnote{Useful surveys of India’s space capabilities can be found in Anita Bhatia, “India’s Space Program,” \textit{Asian Survey}, 25:10 (October 1985), pp. 1013–1030; Dinshaw Mistry, “India’s Emerging Space Program,” \textit{Pacific Affairs}, 71:2 (Summer 1998), pp. 151–174; \textit{India, Its Space Program, and Opportunities for Collaboration with NASA} (Arlington, VA: ANSER, 1999); and Deborah J. Foster, “The Indian Space Program,” in John C. Baker, Kevin M. O’Connell, and Ray A. Williamson (eds.), \textit{Commercial Observation Satellites: At the Leading Edge of Global Transparency}, MR-1229 (Santa Monica: RAND/ASPRS, 2001), pp. 247–262.} For a variety of historical reasons, most associated with the emphasis placed on economic development by its founding father Vikram Sarabhai, the Indian space community has shied away from institutional participation in any of the country’s military programs and to this day carefully maintains formal firewalls separating it from the strategic activities of the other two complexes. This separation, already reinforced by the normal processes of bureaucratic competi-
tion, takes on more urgency because the increasing international collaboration pursued by the space research complex would be imperiled if its relationship with India’s nuclear and defense research establishments were perceived to be too close. In any event, the space research program—through a combination of foreign technology injections and indigenous efforts—has developed an “end-to-end space capacity” that has resulted in the ability to build a variety of space launch vehicles and communications, meteorological, and earth observation satellites. As part of this process, the space research program has also developed excellent test and launch facilities close to the equator, thereby creating a boon for space systems intended for geosynchronous orbit. India’s achievements in the space arena have become significant enough to make the country a serious candidate in the commercial satellite launch market, and its investments in the realm of space-based remote sensing have made it a potential resource for many U.S. and European customers.

With these impressive achievements, the space research program—despite its early institutional intentions—will wind up actively supporting the Indian nuclear posture, even if only indirectly. To begin with, several of the specific technologies required to develop a credible deterrent are space-related, and it will not be surprising to find India’s atomic and defense research complexes leaning on its space research organizations for solid fuel rocketry, satellite-based reconnaissance, communications, and meteorology packages, and ground-based surveillance, control, and telemetry systems. The space complex’s achievements in solid-fuel rocketry, for instance, are of critical interest to organizations that have been tasked with developing long-range ballistic missiles. As an example, the Polar Satellite Launch Vehicle (PSLV), a booster with a 20-meter-long and 2.8-meter-wide five-segment solid-rocket motor in its first stage, is in the same payload-carrying class as the U.S. Atlas E launch.

203 This dynamic is well understood as described in “Indian Space Program,” U.S. Embassy Political Section, Cable to U.S. Department of Defense No. 30510, New Delhi, January 6, 1988, paragraph 62, cited in McCarthy, “India: Emerging Missile Power,” p. 205.


vehicle and, if developed into a ballistic missile, could easily carry a 1-ton military payload out to intercontinental ranges. Such capabilities would be of great interest to defense technologists attempting to improve on the new all-solid-fueled Agni IRBM currently being tested by India. Beyond solid-fuel rocketry, the space complex’s ever-improving earth observation satellites would also be attractive technologies for absorption—particularly as the IRS-P6, with its 2.5-meter-resolution panchromatic imaging capability, and the Cartosat-2, with its 1-meter-resolution capability, become operational in the next few years.

Given the past record, however, it is unlikely that any of these technologies will be transferred directly to the military sector. Rather, new patterns relating to internal technology diffusion are likely to become evident. The most obvious and already established conduit centers on the transfer of personnel with specific skills to the other complexes as the need for their services arises. A.P.J. Kalam, previously the highly visible manager of the Indian Integrated Guided Missile Program, for example, was a space engineer who transferred to the Defence Research and Development Organization (DRDO) in order to head the new missile R&D effort. Less obvious but equally exchanges will take place in the form of knowledge transfers carried out through collaborative work at the interindividual or intergroup level across various complexes. If these forms of collaboration turn out to be insufficient, new institutional arrangements enabling joint access to space-related technologies are likely to emerge. This is most probable where access to satellite systems is concerned; since satellites are high-value

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206 The Geosynchronous Satellite Launch Vehicle (GSLV), which is slated for launch in 2001, will have an even bigger solid-fuel first stage consisting of the PSLV’s first-stage motor and a 275,000-lb, 9.2-foot-diameter booster that produces one million pounds of thrust, clustered by six PSLV strap-on motors, making it capable of carrying 5500-lb payloads to intercontinental ranges.


208 As one U.S. analyst noted, “Although the [Indian defense research and space] organizations are competitive, it is most natural for scientists and engineers working on similar problems (particularly if working for the same employer of last resort) to discuss problems and success, sharing information about their projects.” Telegram No. 31294, paragraph 96, U.S. Embassy, New Delhi, telegram to the U.S. State Department, in National Security Archives, Washington, D.C.
systems that exist in small numbers and remain under the control of the Indian Space Research Organization (ISRO) for both technical and operational reasons, new institutional arrangements allowing the atomic energy and defense research establishments (and even the armed forces) to access their data streams are likely to be developed. This will allow the satellite itself to remain under the control of a civilian research organization while its onboard capabilities (and data outputs) can be shared with a variety of strategic users, sometimes through straightforward commercial arrangements.

The bottom line, therefore, is that the space research complex, which has benefited over the years from the investments in high technology associated with India’s strategic enclaves, will soon be confronted with an opportunity to contribute substantially to the work that will be carried out by these enclaves. Even though it will still be inclined both by institutional temperament and by necessity to stay as far away from military-strategic endeavors as possible, that complex is likely to become more and more involved in the same. In fact, it is doubtful that India will be able to develop an effective nuclear posture without meaningful contributions from its space research complex: As one of India’s leading newsmagazines noted, “A separate component to the space programme is overdue. In fact, so is a new space policy.”

Implications for India’s Nuclear Posture. The importance of the country’s three strategic complexes is thus likely to increase over time, with significant implications for India’s nuclear posture. Despite the fact that the track record of these complexes has been less than stellar in several issue areas, each of these complexes is widely viewed within the country (and increasingly outside) as being on the leading edge of Indian technology. That alone gives them great bureaucratic weight where influencing political decisions is concerned. Further, most Indians appear to be noticeably proud of the enclaves’ achievements, viewing the capabilities these organizations nurture as safeguarding both national security and political autonomy in an international environment that is often perceived as hostile to the

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ascendancy of Indian power. The utterances of India’s top scientists and technologists are therefore treated with considerable public respect. Since these individuals are all civilians, their statements—even on matters at the interstices of science, defense, and national policy—fall within the realm of permissible discourse in the Indian context and can therefore influence public expectations with respect to national policy, even if they do not determine those policies independently.

It is clear that at least two of the three strategic enclaves have already successfully altered Indian national policy. The atomic energy establishment, which had long argued publicly for renewed nuclear testing, certainly felt vindicated by the consultative processes that led up to the 1998 Indian decision to test its nuclear weapons. The defense research establishment, in turn, having succeeded in developing an SRBM in the face of complete disinterest on the part of the Indian armed forces, is now focusing on developing more capable, longer-range ballistic and cruise missiles that will almost certainly become the mainstay of an Indian nuclear deterrent when such a deterrent is completed. The success of these two enclaves thus augurs well for their continued influence, but the limits of such influence must be recognized as well. Thus far, for example, India’s political leaders have succeeded in preventing technological determinism from running amok by carefully directing the pace of research and development through stringent control of funding and by basing all testing and deployment decisions on political necessity.


211For a trenchant commentary on the pernicious consequences of this process, see “Democracy of Science,” The Times of India, January 7, 2000.


213The strategic and bureaucratic logic beneath the development of the Integrated Guided Missile Development Programme (IGMDP)—note the lack of a General Staff Requirement for any of the surface-to-surface missiles developed under the program—has been explicated in Sidhu, The Development of an Indian Nuclear Doctrine Since 1980, pp. 248–274, and in Sidhu, Enhancing Indo-U.S. Strategic Cooperation, pp. 21–27.
rather than merely on technical capability—and this dynamic is unlikely to change in the future. However, to the extent that India’s indigenous achievements occur in the context of a deteriorating regional environment and the rise of a global regime marked by ever more restrictive technology flows, the definition of political necessity itself will expand to accommodate the views of India’s strategic enclaves even more systematically. In a world where India increasingly sees autarkic solutions as the only way to preserve its security and autonomy, considerations about the morale of its enclaves will interact with the intuition that these organizations represent the best route to great-power capabilities, thereby making India’s strategic enclaves even more significant players than before.  

**Political Parties.** As the enclaves press to advance India’s nuclear capabilities further over time, the breakwaters that previously served to resist such pressures at the political level will continue to fissure. So long as the Congress Party was assured control of the national polity, its traditional preference for nuclear ambiguity automatically became India’s national policy as well. It must be remembered, however, that even the Congress government came close to changing that posture several times after 1992, at least as far as testing was concerned; the national test site at Pokhran was continually prepared, and on the two occasions when India seemed ready to test, only strong U.S. political pressures succeeded in averting that outcome. The subsequent United Front (UF) regimes in New Delhi also appear to have toyed with the idea of testing but ultimately demurred; as former Indian Prime Minister I. K. Gujral later acknowledged, these “no-test” decisions were reached under pressure even though it was “conceded that . . . [testing] . . . had to be done at sometime or the other.” The evidence thus suggests that even the Congress and UF governments—regimes that were unquestionably moderate in their political inclinations—had contemplated the idea of altering India’s nuclear posture and would probably have done so in the absence of pressures emanating from the United States. In any

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event, the Congress Party’s traditional lock on power has all but evaporated, and the UF has been similarly marginalized in Indian politics. Moreover, the rise of new national parties such as the BJP, which have already declared India to be a nuclear weapon state, implies that future debates about the country’s nuclear posture will probably pivot on what kind of deterrent should be created, what forms that deterrent capability should take, and over what time frames these capabilities should materialize.

The actions of the BJP-dominated NDA government have thus forced the center of the Indian nuclear debate substantially to the right, leaving all the other political parties struggling to respond to the new strategic realities. 217 Both the major opposition groupings, the Congress Party and the UF, felt uneasy about supporting the BJP-dominated government’s surprise decisions to resume testing and to declare India as a nuclear weapon state. This unease, however, derived not so much from a judgment that such actions ran counter to the national interests as from a recognition that these decisions, being immensely popular in domestic political terms, would serve only to remind voters that the opposition parties lacked the courage to take on the established nonproliferation order and do what most Indian elites believed was necessary for the country’s safety when they were in power.218 A different and more subtle private criticism offered by some opposition leaders who had served in high government positions centered on the claim that the Vajpayee government’s decision to test only compromised what the country had been secretly doing all along and, by opening the door to renewed external pressures, actually compromised India’s ability to continue the covert development of its nuclear weaponry.219

Whatever the merits of such concerns, the decision to test rattled all the opposition parties, who scrambled to position themselves


218 As one Indian commentator noted, “For forty years, no political party had the guts to take the nuclear process to its logical conclusion.” T.V.R. Shenoy, “Why the Buddha Smiled,” Indian Express, May 20, 1998.

so that they could bask in the glow of the country's achievements even as they sought to avoid endorsing the decisions of the BJP-dominated government in power. Not surprisingly, the Congress Party initially responded to the tests by claiming that they were simply the culmination of a long-standing policy initiated by previous Congress governments. This position was later refined to hold that the tests represented a national achievement and, as such, could not be treated as a trophy to be claimed by any single political party. The UF similarly chimed in by congratulating the country's scientists and technologists, and while its most visible member, I. K. Gujral, initially insinuated that India's tests were motivated by domestic politics, he too subsequently sought—at least in public forums—to justify them as having been made necessary by changes in India's strategic environment. Most opposition parties would thus have endorsed the sentiments expressed by one Indian observer who, seeking to deflate the BJP-dominated government's claims of political courage, argued succinctly that "the bomb . . . has many fathers. The Congress conceived it. The UF nurtured it. The BJP delivered it. Let us not give the obstetrician any more credit than is due."^220

Whether the twin decisions to resume testing and to declare India a nuclear weapon state were substantially motivated by domestic political considerations, as many commentators both in India and abroad have alleged, remains yet another issue that will be debated for years to come and may never be conclusively resolved.^221 Irre-


^221 A short summary of the positions taken by the principal Indian opposition parties to the test can be found in Joshi, "Nuclear Shock Waves," p. 20. The claim that the May 1998 tests were motivated simply by domestic politics in different ways is assessed and—correctly—dismissed in Sumit Ganguly, "India’s Pathway to Pokhran II: The Prospects and Sources of New Delhi’s Nuclear Weapons Program," International Security, 23:4 (Spring 1999), pp. 171–175. The conclusion offered and defended later in this monograph is that the May 1998 tests provided some domestic political benefits to the BJP-dominated government, but that these benefits were welcome by-products of a decision made primarily on grounds of national security. The validity of these grounds may be contested, but the fact that they did motivate India’s national leadership seems compelling given the changing character of the country’s security debate since 1995 and the BJP’s distinctive vision of Indian security needs. For more on the latter, see Jaswant Singh, Defending India (Chennai, India: Macmillan, 1999), pp. 1–60 and 306–338. For other views on the role of domestic politics, see Hilary Synnott, The Causes and Consequences of South Asia’s Nuclear Tests, Adelphi Paper No. 332 (London: IISS, 1999).
spective of the position one takes on this question, the fact remains that the BJP-dominated government has bequeathed to India a strategic situation differing significantly from that which existed prior to its entry into office. It is, moreover, unlikely that any future government, irrespective of how it is constituted within the political spectrum, will roll back the clock and return India to the condition that obtained prior to May 1998—assuming that is at all possible. As one Indian commentator noted, “No government in India will go against the consensus in favour of creation of an adequate nuclear deterrent.”222 In fact, as the analysis in Chapter Five will demonstrate, the alterations that are likely to occur in India’s nuclear posture will be either covert changes or mutations that can be readily disguised under the rubric of conventional force modernization. Thanks to this fact, future Indian governments, whether they are formed by the Congress Party, by the UF, or by any of the regional parties now proliferating around the country, can derive all the international benefits that come from the appearance of “moderation” while still pursuing the development of exactly the same kind of deterrent that a BJP-dominated government would probably pursue if it were assured many years in power. The implications of this judgment should be sobering for all who have set their hearts on ridding South Asia of its nuclear weaponry and, at the very least, should caution those who believe that the present regime’s departure will inevitably usher in a new era of nuclear equipoise in the subcontinent.

**Popular Preferences.** While all the major political parties likely to form a government in the future would thus carry the country’s strategic posture further toward a nuclear arsenal, albeit covertly and with much ambiguity, the final ratification of this direction will of course come from India’s body politic itself—both its elites and its increasingly sophisticated mass of ordinary voters. The best studies of Indian public opinion on the nuclear question indicate that the elite population believes that the country’s weapon option should not be divested.223 Given the progressive changes in Pakistan’s and China’s nuclear posture, a smaller but still substantial proportion of

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those polled argued that India should develop a nuclear arsenal immediately. In fact, in the aftermath of the nuclear tests, most reports suggested that Indian elites were ready to endorse development of a ready nuclear arsenal right away. This position, driven by post-test euphoria, was also influenced by concerns about national self-respect and the desire to prove—first and foremost to themselves—that India is autonomous, can stand up to the great powers, and is worthy of being treated as a regional hegemon.224

This enthusiasm for nuclear weapons by Indian elites is, however, somewhat misleading. To begin with, it may simply be a transient phenomenon precipitated by the events of May 1998. Further, the elite population itself consists of at least two broad groups: those involved in economic affairs and those connected to the political and strategic establishments. The former subset is unlikely to support nuclear weaponization if it undercuts the prospects for growth and investment;225 in contrast, some of the latter would most likely argue that India’s size and capabilities allow it to pursue further nuclearization with minimal damage to the prospects for continued growth.226 Finally, it is unclear whether the vast majority of the voting masses share the Indian elites’ enthusiasm for nuclear status and, in particular, for a large and ready arsenal. While most Indians traditionally have endorsed the idea of maintaining the nuclear option as a hedge against an uncertain future, few have actually been enamored of more complex nuclearization when the costs of the weapon program become apparent to them. Popular opinion and, for that matter, most elite opinion as well thus support maintaining a national nuclear capability but seek to preserve this “on the cheap”—and certainly not at the expense of economic development and technological modernization.227 Only a small subset of the security elite has argued for complete nuclearization no matter what the cost, and even here, this support is often rationalized by the claim that an ar-

227—Perkovich, India’s Nuclear Bomb, pp. 451–452.
senal in the Indian context would be relatively inexpensive to create and maintain in comparison with the West.228

Where the influence of elite and mass opinion on nuclear weapon choices is concerned, perhaps the most critical fact, then, is that the former group (in its security-related incarnation) dominates the political debate and defines the range of preferred choices but has remarkably little power to force policymakers to act in support of those preferences. The actual policy choices are determined by the autonomous interests of the Prime Ministers in office, who, while taking into account the preferences of the strategic enclaves, the political elites, and various political parties, have generally been acutely sensitive to the impact of the nuclear issue on economic development and foreign relations precisely because these variables most affect the living conditions of the large voting populace and, by implication, the political survival of the politician. Given that there has never been a clamor for a nuclear arsenal at the popular level, thanks both to a lack of popular interest in these issues and to the costs involved, India’s security managers are unlikely to feel compelled to accelerate nuclearization because of any public pressure. All decisions here will be essentially private ones that can be made without fear of any adverse popular opinion so long as they do not involve a surrender of India’s nuclear options. This gives Indian decisionmakers great latitude—because no matter whether their choices are excoriated or lauded by the elites, the latter are essentially incapable of forcing the pace of weaponization in any practical terms, and the large voting masses continue to be relatively uninterested in all security-related issues. All this implies that popular opinion will not drive future Indian choices about the shape and pace of nuclearization. To the contrary, so long as Indian capabilities are not perceived to be surrendered, such opinion is likely to remain neutral and may function as a modest brake on weaponization if the cost of creating a nuclear arsenal threatens to exacerbate economic difficulties.229

228See the claims adduced in Manoj Joshi, “Marginal Costing,” India Today, June 1, 1998, pp. 22–23.

229The relationship between economic pressures, public opinion, and Indian decisionmaking with respect to India’s nuclear capabilities was manifested most acutely during the 1964 debates, which are examined insightfully in Perkovich, India’s Nuclear Bomb, p. 74ff.
Economic Performance. India's economic performance may well have a significant effect on India's future strategic direction. On a fundamental level, this would seem to pertain primarily to how much a nuclear arsenal costs in both absolute and relative terms. Unfortunately, however, no authoritative estimates of the costs of an effective nuclear force are available, in part because the secrecy enveloping India's strategic enclaves makes it difficult to compute the true burdens of many of their programs. Although the Indian government's official defense, atomic energy, and space budgets are publicly disseminated, these are usually of little help because the relevant grant requests invariably identify only gross amounts associated with various heads of expenditure rather than the specific amounts allocated for individual projects or systems. This paucity of authoritative information has resulted in a variety of private estimates about the costs of a nuclear arsenal, most of which represent either Western estimates (sometimes modified) or simply back-of-the-envelope calculations provided by military officers or budget analysts.²³⁰

These figures, at any rate, embody enormous variation. As early as 1966, Major-General Som Dutt, in an analysis based on Western writings of the time, suggested that "even a modest retaliatory force with a sophisticated delivery system"²³¹ would cost India between $230 and $300 million annually for at least a decade. Even these figures, he admitted, were probably underestimated, since France and Britain were reported to have spent between $300 and $340 million on their nuclear arsenals for well over two decades. In 1968, the doyen of India's strategic analysts, K. Subrahmanyam, estimated more realistically that an Indian nuclear deterrent could cost $1.5 billion annually (presumably in 1968 dollars) over a ten-year period, while Vice-Admiral K. K. Nayyar, who participated in a secret internal study of this issue in the mid-1980s, claimed more recently that a limited nuclear arsenal would cost approximately $1 billion (Rs. 4000

crocro) annually for a decade. In his published recollections of India’s nuclear policy, Subrahmanyan asserted that the internal study referred to by Admiral Nayar concluded that “India could have a balanced deterrent programme within ten years at a cost of Rs. 7000 crore” ($1.6 billion). It is unclear whether this figure represents total costs or simply annual costs spread out over a period of ten years. If it is the latter, the total cost of the arsenal at $16.3 billion (Rs. 70,000 crore) would constitute the high—but probably more honest—end of the estimates currently populating Indian discussions; if it is the former, it would be in line with other more optimistic assessments claiming that a modest arsenal could be constructed “within five years” and “would not exceed Rs. 5000 crore” ($1.2 billion) in aggregate costs. Cost figures of the sort offered by Admiral Nayar, which represent roughly 10 percent of the 1998–1999 Indian defense budget (which itself constitutes less than 3 percent of the country’s GNP), have thus led many Indian commentators to argue that the expenses of full nuclearization remain well within India’s economic capacity.

A cursory examination of the Indian defense budget initially appears to justify such optimism. The Indian defense budget in 1998–1999 was approximately $9.5 billion—which, for the sake of discussion, was probably about 3 percent of the country’s GNP during that year. If it is assumed that this GNP will grow at about 5.5 percent for another decade—with defense expenditures held constant as a percentage of GNP—the Indian defense budget will be a little over $16 billion by 2008–2009. If such growth and expenditure levels actually obtain, the cumulative marginal increase in Indian defense resources will be approximately $34 billion a decade or so from now. If it is further assumed that all marginal increases in defense expendi-

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234 A similar accounting has also been offered by C. Rammanohar Reddy, “The Wages of Armageddon—I–III,” The Hindu, August 31–September 2, 1998. The author also offers an excellent survey of other Indian estimates together with a critique of these judgments.
236 Calculated at an exchange rate of roughly $1 = Rs. 40.
tures are set aside only for the nuclear arsenal, then it is possible—based on the cost estimates one relies on—to argue that the arsenal can be financed solely out of the marginal increases in defense expenditures that will accrue as a result of normal economic growth alone. Of course, this claim assumes that India will grow constantly at a rate of at least 5.5 percent annually; that defense expenditures as a percentage of GNP will remain constant over time; and that no dramatic changes will occur in the rates of exchange relative to internal prices during this period. All these are no doubt significant assumptions, but if they are presumed to hold for the sake of argument, then it is possible to assert that at least Admiral Nayyar’s arsenal, coming in at $10 billion, and one of Subrahmanyan’s estimates of Nayyar’s arsenal, coming in at $16.3 billion, could be financed by the marginal increase in defense expenditures alone over the next decade.

There are many reasons, however, to be skeptical of such a conclusion.

First, a great deal of uncertainty exists about the accuracy of all the cost estimates proffered above, in part because they are often advanced by individuals who have publicly advocated the acquisition of a full-fledged nuclear arsenal. The temptation to understate costs for the purpose of enticing the Indian government to embark on certain courses of action thus cannot be underestimated, especially because it is recognized that the decision to create an arsenal would be irreversible once it is embarked on, despite whatever its true costs eventually turned out to be.237

Second, the absence of true cost information relating to the component parts from which any aggregate numbers are derived is as serious a problem as lack of scrutiny on the part of budget analysts outside the government. In effect, this problem boils down to the fact that real information about program costs is unavailable to non-

237See the apt comments of Peter Lavoy in this regard, cited in Mann, “Subcontinent Poised for Nuke Deployment.” One recent news report, for example, has indicated that India has drafted a $3.75 billion nuclear C³I plan to be completed over the next five years (“India Drafts New N-Command, Control System,” Hindustan Times, January 12, 2000). If true, this represents a substantial increase over the $112 million (or thereabouts) that previous Indian estimates of the sort found in Joshi, “Marginal Costing,” p. 23, had asserted would be required by a nuclear C³I system.
governmental entities and, because of genuine methodological difficulties, may even be unavailable to the Indian government itself. This peculiar problem is caused largely by the fact that the Indian defense budgeting process did not adopt the Planning Program Budgeting System (PPBS), which would have allowed security managers to assess the true costs of any given system in its entirety as well as its cost-effectiveness in relation to some alternatives.\footnote{Consequently, Indian security managers can discern total program costs \textit{post facto} better than they can assess individual and comparative project costs in real time because the detailed breakdown of costs in terms of capital outlays and labor distinguished by skill levels is rarely available for all defense programs across the board. Consequently, it is impossible to apply the standard cost-benefit analysis techniques detailed in I.M.D. Little and J. A. Mirrlees, \textit{Project Appraisal and Planning for Developing Countries} (London: Heinemann, 1974), to compute the real costs of the development and deployment of India's desired nuclear posture. This difficulty, as well as the consequences thereof, is assessed in detail in Amiya Kumar Ghosh, \textit{India's Defence Budget and Expenditure Management in a Wider Context} (New Delhi: Lancer Publishers, 1996).}

Third, if the history of India's military R&D programs is any indication, no major development effort has been successfully completed on schedule and in line with expenditure forecasts.\footnote{Arnett, "Military Technology: The Case of India," pp. 343–365. See also Chris Smith, \textit{India's Ad Hoc Arsenal} (Oxford, UK: Oxford University Press, 1994), pp. 144–178.} This implies that even if the estimates currently offered represent honest appraisals, the sorry record of simpler projects undertaken in the past should give decisionmakers reason for pause, since the currently advertised costs of the arsenal will in all probability turn out to be gross underestimates as development efforts take longer than expected and as national macroeconomic conditions change over the ten-year time frame incorporated in these calculations. It is worth remembering that developing a nuclear arsenal—even one that comports with India's minimal needs—would involve not only producing dozens of individual systems but also integrating such systems into an organic structure that renders all previous military development projects and their associated cost overruns trifling by comparison.\footnote{This reality is already becoming apparent if recent news reports are to be believed. For example, the Su-30 MKI aircraft, which many Indian analysts claim will become the air-breathing component of their future triad, is already facing difficulties, as its surface attack capabilities are apparently not as effective as expected. With production difficulties affiliating the Sukhoi plants in Russia, it is not clear whether the...}
Fourth, even if some of the more modest cost estimates relating to the arsenal turn out to be correct, it must be recognized that the costs associated with funding a nuclear arsenal cannot supplant those associated with personnel expenditures, conventional modernization, ongoing military operations, and routine cyclical training. All four of these heads of account have suffered greatly during the last decade, and if the Indian armed services are to maintain their operational proficiency in the obligations they are currently servicing, the anticipated marginal increases in military expenditure arising from normal economic growth will have to be allocated in growing proportion to the conventional elements of the existing military force rather than to any new nuclear-related systems. In fact, one Indian analysis has suggested that conventional modernization alone would require $16.8 to $35 billion (Rs. 72,200–1,51,700 crores) over the next five years^{241}—clearly a figure that would substantially erode (if not wipe out entirely) the $34 billion notionally available for a nuclear arsenal over the next decade.

The immensity of India’s conventional defense needs cannot be underestimated, and if the Indian military is to be modernized sufficiently to exploit the evolving RMA even as New Delhi proceeds to develop a robust nuclear arsenal simultaneously (especially in the form of the triad urged by most Indian security elites), it would require increases in defense expenditures over and above those enlargements which accrue simply as a result of a growing GNP.^{242} It is unclear at this point whether such increases could be undertaken

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^{242} See the analysis in Jasjit Singh, “Budgeting for Security Needs,” *Frontline*, July 18–31, 1998. It must be remembered that India already lacks many of the advanced technological capabilities necessary for effective counterinsurgency operations—already the biggest consumer of India’s large military manpower pool and its most demanding security challenge on an ongoing basis—and that New Delhi will soon have to reinvest in modernizing India’s northern defenses if it is to maintain its current margin of conventional superiority vis-à-vis China. Meeting both of these challenges will only burden the Indian exchequer further as it attempts to satisfy other demands relating to the need for a large quantum of conventional stores, the investment choices imposed by the emerging RMA, and the burdens exacted by the desire for a nuclear deterrent.
without having a deleterious effect on the larger processes of economic growth itself. The challenge of sustaining rising levels of economic growth in fact remains the principal problem facing New Delhi, and it is by no means obvious that India has yet surmounted the impediments to generating high, self-sustaining growth. As an editorial in a major Indian newspaper put it in the aftermath of the government of India’s record 2000–2001 defense budget,

The unprecedented increase in the defence budget is worrisome because it goes against a long trend of declining or standstill defence expenditure. It has been a deliberate matter of policy to try and contain defence expenditure in order to leave more resources for social sectors such as education and health. If anything has changed in the non-defence sectors in the last decade of structural adjustments and economic reform, it is the squeeze on resources for social sectors and the sharp decline in capital formation. . . . Runaway defence expenditures are not what this country needs. 243

While most economists believe that India would have to grow at a pace of at least 7 percent per annum if it is to simultaneously beat absolute poverty and develop great-power capabilities by the year 2015, these growth rates simply cannot be sustained if India is forced to increase nondevelopmental expenditures at a time when it seems unable to enforce further structural changes in its economic institutions for political reasons. 244 Further, the achievement of these growth rates is clearly contingent on expanding the economy’s connectivity with the global system. Yet this connectivity, which is required to underwrite the vast investments necessary in infrastructure, power, agriculture, and human development, cannot be achieved in the face of continued Western opposition to Indian nuclearization, especially when coupled with domestic decisionmaking failures relating to further economic liberalization. Given these facts, the costs of developing a nuclear arsenal are likely to be much greater when the opportunity costs of nuclearization are factored in, and to the degree that they contribute to depressing India’s economic performance, they will have had a more lasting effect on


244 On India’s failures in this regard, see “A Decade of Economic Reforms: Political Discord and the Second Stage,” Doing Business in India, 2:1 and 2:2 (Fall 1999), pp. 1–42.
India’s security than the mere presence or absence of the arsenal itself.  

None of this is meant to suggest that India will simply be unable to afford a nuclear arsenal. It is meant to suggest, however, that an arsenal could be much more expensive than is currently imagined in that it would require greater defense burdens than the country has borne over the past decade; could cut into critical expenditures on conventional forces; and, finally, would retard India’s capacity to grow rapidly if it cements Western reluctance to support the country’s economic modernization in the face of continued domestic failure to pursue the economic reforms necessary for sustained future growth. It is the twin components of this last variable that will have a substantial effect on the course India pursues with respect to nuclearization. If its arteriosclerotic domestic economic policies can be reformed successfully, New Delhi might be able to ward off the most painful consequences of Western governmental pressure that have materialized in the aftermath of the 1998 nuclear tests. Continued economic reform would allow private interests abroad to dominate the opposition of their governments and enable India to sustain the economic performance that would be necessary to generate larger defense budgets, including those additional expenditures required for a nuclear arsenal. Failure to sustain high growth rates, however—whether rooted in domestic malaise or in indifferent foreign participation—will have exactly the opposite effect: It would result in an inability to develop a deterrent of the kind India’s security elites

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245 Not surprisingly, a leading Indian newsmagazine argued that the NDA government should have used the 1998 nuclear tests “to push ahead with [the] tough economic measures” that were necessary to ensure increases in the country’s “true strength.” See “Nuclear Afterglow,” *India Today International*, May 25, 1998, p. 7. The NDA regime’s failure to accelerate the program of structural reforms pertaining to the economy—as evidenced by its three lackluster national budgets in 1998, 1999, and 2000—will have more serious consequences for India’s claims to great-power capabilities than will its refusal to develop a ready arsenal of the sort demanded by one Indian hawk. See Brahma Chellaney, “For India, the Big Nuclear Breakthrough Has Fizzled,” *International Herald Tribune*, May 13, 1999.

believe is necessary. Even worse, such failure might result either in the creation of a ragged nuclear capability or in a gradual political retrenchment at a time when New Delhi’s adversaries, having anticipated a distension in India’s nuclear arsenal, appear well along the road to developing even more significant capabilities of their own. India’s economic performance, and the perceptions of that performance by the country’s voting masses, will thus condition the pattern of nuclearization that New Delhi could pursue in the future.

On balance, then, how do these four structural factors affect India’s future nuclear direction? Although this question cannot be answered with certainty, the most reasonable conclusion at this point is that these factors will interact, as Indian Defence Minister George Fernandes put it, to make “nuclear weaponization . . . necessary and, in the ultimate analysis, inevitable.” To be sure, the forms, pace, and manifestations of weaponization are still not fully settled, but this certainly seems to be the direction in which New Delhi is headed—as opposed to the reverse course, which involves denuclearization and India’s possible accession to the NPT as a non-nuclear weapon state. This should not be surprising given the character of the four issues analyzed above. Despite recognizing the significant improvement in the global nuclear regime, Indian elites view the reluctance to carry the process forward toward complete abolition as implying that international politics has not been transformed in any fundamental way, or at least not in any way that requires India to contemplate moving further away from the acquisition of nuclear weaponry. The steady increases in Pakistan’s nuclear capability, coupled with the extant Chinese nuclear threat, are seen to demand changes in India’s traditional policy of merely “keeping the option open” to the neglect of other alternatives that may include developing a full-fledged arsenal. India’s relations with key states in Asia and beyond are viewed as either good or steadily improving, but no single dyadic relationship, including that with the United States, is seen at this point as providing the strategic resources—political, economic, or technological—that make a change in India’s traditional nuclear posture unnecessary. Finally, pressures from the scientific establishment and national elites

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compete with the many views of India's political parties and their mass following—and while the resulting vectors do not inevitably translate into the demand for a ready arsenal, the fact remains that if national economic performance allows it, India would move in such a direction rather than away from it. All things considered, therefore, a shift toward further nuclearization seems inescapable, although the exact predicates of that dynamic remain to be discerned.