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CONFERENCE
PROCEEDINGS



Shaping Tomorrow Today

Near-Term Steps Towards Long-Term Goals

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Sponsored by the RAND Frederick S. Pardee Center for Longer Range
Global Policy and the Future Human Condition



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for Longer Range Global Policy and the Future Human Condition

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Preface

On March 17–18, 2009, the RAND Frederick S. Pardee Center for Longer Range Global Policy and the Future Human Condition hosted a workshop called “Shaping Tomorrow Today: Near-Term Steps Towards Long-Term Goals.” The workshop gave policymakers and analysts an opportunity to explore new methods and tools that can help improve long-term decision-making. The intent was to conduct this exploration collaboratively, drawing from many countries a mixed group of tool builders, analysts, planners, decisionmakers and interested lay observers. Their task was to consider how analysts and policymakers can determine when it is important to make long-term (as opposed to short-term) decisions, how to make better long-term decisions, and how best to support policymakers in thinking long term.

These workshop proceedings summarize the main discussions and presentations that took place during the two days of the workshop and include the papers written for workshop participants. They will be of interest to anyone engaged in the study and practice of thinking and acting meaningfully over the long term, with particular reference to problems faced by planners and policymakers in public institutions of governance.

About the RAND Frederick S. Pardee Center for Longer Range Global Policy and the Future Human Condition

The Pardee Center aims to enhance the overall future quality and condition of human life by aggressively disseminating and applying new methods for long-term policy analysis (LTPA) in a wide variety of policy areas in which they are needed most. There has been no shortage of past attempts to think globally about the human condition or the long-range future. What has been missing, however, is a means of tying those efforts systematically and analytically to today’s policy decisions. This is the gap that the Pardee Center seeks to address.

Questions or comments about these proceedings should be sent to the director of the Pardee Center, Robert J. Lempert (Robert_Lempert@rand.org). Information about the Pardee Center itself and its other projects and initiatives is available online (http://www.rand.org/international_programs/pardee/). Further inquiries about Pardee Center activities and projects should be sent to the following address:

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Summary

Today, in a time of rapid and profound change, our society faces many decisions with consequential implications for the United States' and humanity's long-term future. In many cases, society can best advance its long-term goals by focusing only on its near-term needs, because a progression of good short-term choices provides an adequate path to a desirable long-term future. But, in some instances, today's choices—often ones with relatively similar near-term implications—can lead to unavoidable and significantly different long-term paths. The ability to identify where a long-term view may prove most important as well as the ability to meaningfully incorporate such a view into today's decisions may prove critical in shaping our future prospects.

The common claim that policymakers think only in the short term is clearly untrue. Throughout history, leaders have made choices in an attempt to achieve long-term goals. Sometimes, they have chosen well, and sometimes poorly. On occasion, future generations can look back and say leaders acted effectively to achieve their long-term goals. Other times, the unintended consequences overwhelm the intended decision. And, frequently, short-term pressures dominate any long-term vision.

In March 2009, the RAND Frederick S. Pardee Center for Longer Range Global Policy and the Future Human Condition hosted a workshop, “Shaping Tomorrow Today: Near-Term Steps Towards Long-Term Goals,” to give policymakers and analysts an opportunity to explore tools to identify those cases in which a long-term view should have the most significant influence on near-term decisions and to suggest the long-term policy analyses that can most usefully inform these choices.

This document summarizes the proceedings of this Shaping Tomorrow Today workshop. The first chapter defines our concept of long-term decisions and summarizes each of the workshop sessions. Each of the next four chapters presents a white paper prepared for the event. The first of these, by Robert Lempert and Paul Light, describes the Pardee Center's innovative work in new methods for longer-term policy analysis—in particular robust decisionmaking (RDM)—that assess near-term policies' ability to achieve long-term goals over a wide range of future scenarios. The essay then describes how the U.S. government might use the concepts underlying these RDM methods to improve its ability to conduct effective long-term policy analysis (LTPA). The remaining three papers seek to identify long-term policy decisions in each of three different policy areas. Lant Pritchett examines long-term challenges in education in the developing world. Gregory Treverton examines priority long-term decisions facing U.S. foreign policy. Robert Lempert addresses how long-term thinking might affect the debate over near-term climate policy.

To better frame the challenge of identifying and evaluating the near-term steps most important to achieving long-term goals, the workshop participants adopted the view that a long-term decision occurs when the process of reflecting on potential events decades in the future causes policymakers to choose near-term actions different from those they would otherwise have pursued. Such an intent-focused definition is central to two main messages of the workshop. First, long-term thinking represents a practical and useful endeavor if it focuses on near-term actions. In brief, if it does not inform today's actions, long-term thinking provides only entertainment. Second, effective LTPA eschews the long-entrenched idea that long-term thinking should endeavor to predict the future. Rather than inquire, "What will the future bring?" policymakers should ask instead, "What steps can we take today to most assuredly shape the future to our liking?"

About 60 policymakers, policy analysts, and futurists attended the Shaping Tomorrow Today workshop at RAND's Santa Monica headquarters. The workshop's first day introduced participants to the philosophy and methods of RDM and helped them use this approach to identify important long-term decisions. The second day addressed how these ideas could be put into practice in real organizations.

The workshop opened with a backcasting exercise that proved to be one of the event's highlights. Traditional backcasting asks participants to envision a future goal and then work backward, describing near-term policies that would achieve these goals. The workshop's exercise added a twist in order to introduce the concepts of adaptive planning and robustness against surprise. Participants were divided into groups and asked to imagine a world in 2059 well on its way to solving its climate-change and energy challenges. Each group was then given 90 minutes to write a scenario describing a path to this happy outcome, focusing on the actions taken around 2010 and the events they set in motion. Before they started, participants were told that, just before they finished writing their scenarios, each group would receive an envelope describing two wild-card events occurring in the 2020s and 2030s that they would have to incorporate into their stories. Participants could not change the actions taken in the 2010s in response to these surprises; they could revise only their descriptions of how these actions played out over time. This unique backcasting exercise appeared very effective in encouraging participants to grapple with the concepts of robustness, adaptive policies, and surprise.

The participants then gathered in a plenary session to hear a series of talks on the Pardee Center's RDM methods that aim to provide a systematic foundation for the robust, adaptive thinking introduced by the backcasting. Participants next divided into three concurrent sessions to apply these long-term policy approaches in the broad policy areas of human development, international policy, and climate and energy. These sessions aimed to identify issues that would require long-term decisions in each of these three areas, characterize what makes that particular question one requiring the long-term approach, what would be required operationally to frame the issue appropriately, and what might be some immediate, short-term steps.

Dinner followed the afternoon breakout sessions and began the discussion of how governments and other organizations could implement these concepts. The keynote speaker, former California governor Gray Davis, addressed the question, "How can democracies make long-term decisions?" The governor described the many challenges, and some of the rare successes, elected officials face in attempting to implement long-term decisions.

The workshop's second day focused on the question of how governments could do a better job of long-range decisionmaking. The first session featured representatives from Canada, Norway, Israel, and the United Kingdom describing their governments' foresight activities;

the second featured representatives from U.S. governments at the federal and local levels. In both sessions, each speaker described his or her government's foresight activities and how they might be improved.

In addition to identifying specific issues for which long-term analysis might lead to better near-term decisions, the human-development breakout session suggested a list of general characteristics that would strongly suggest a situation in which long-term thinking might lead to better near-term choices. This was a welcome advance to the practice of LTPA.

The five factors tentatively suggested by this group include situations

- with substantial delays between actions and desired effects
- undergoing substantial transformations
- subject to significant surprises
- with institutional lock-in that yields a persistent gap between goals and performance
- where longer-term thinking can help solve short-term deadlocks.

The workshop concluded with a lively discussion of several key themes that participants clearly thought important to implementing long-term decisions in government. These themes included flexibility and precommitment as well as the importance of narratives in communicating with policymakers.

Some participants emphasized the importance of near-term actions that create options for future decisionmakers. As one example, the concept of navigating the future—*orienteering*—offers a key means to address long-term goals. Orienteering is the sport of racing across unfamiliar terrain using a map and a compass. In this case, the map should be thought of as rudimentary and involving long-term objectives; the compass should be thought of as the current direction that policy is taking. This view of adaptability may provide a much more useful framing for policymakers than the typical image of predicting what the future is going to be and navigating toward that future.

Much discussion emphasized the importance of narrative in enabling LTPA to inform effective long-term decisions. Understanding the policymaker's concerns and addressing those concerns in a straightforward, defensible narrative was a common characteristic of reported successes in long-term policymaking. Decisionmakers, from senior policymakers to the average voter, generally think in terms of stories. To reach them, analysts need to provide compelling narratives. Long-term plans often serve as communication devices for a broad constituency.

Participants identified several themes in effective narratives. Stories about success have proven to be effective, as have historical analogies. Some stories prove more difficult to tell. Policymakers often do not like to hear about uncertainty; they prefer a clear causal chain. It often proves difficult to describe the counterfactual or the trade-offs that decisionmakers face.

Acknowledgments

These proceedings and our Shaping Tomorrow Today workshop owe to the dedication and labor of many more people than the four of us listed as authors.

Lant Pritchett, Gregory Treverton, and Paul Light not only wrote essays for this volume; they also vigorously expounded on their ideas during the meeting. Horacio Trujillo, along with two of this volume's authors, served as a discussion leader for our breakout sessions. Benjamin Bryant, Jeffery Tanner, and Michael Scheiern served as excellent rapporteurs. The speakers and panelists mentioned in Chapter One—some traveling from great distance to attend—offered engaging and insightful presentations, some on short notice. Stijn Hoorens performed wonderfully as our backcasting exercise's man from the future.

Sandra Berry gave invaluable advice in workshop planning, as did Barry B. Hughes, director of the Frederick S. Pardee Center for International Futures at the University of Denver, and Adil Najam, director of the Boston University Frederick S. Pardee Center for the Study of the Longer-Range Future. David Tillipman, associate executive director of development for RAND, gave unsparingly of his advice and good cheer. Lindsey Kozberg, RAND's vice president for external affairs, opened doors throughout our planning. Jeffrey Hiday, director of the RAND Office of Media Relations, helped us hone our message. Susan Everingham, director of International Programs for RAND during most of our planning, offered vital suggestions and encouragement throughout the process.

Robin Meili, RAND's new director of International Programs, facilitated the publication process for these proceedings. Lisa Bernard's edits helped integrate a document with many authors.

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My assistant, Laurie Rennie, truly made the event possible through her cheerful and determined willingness to work endless hours managing invitations, guest lists, signage, and the hundred other details needed to pull off such an event.

To all of you, thanks!

Abbreviations

ABP	assumption-based planning
AIDS	acquired immunodeficiency syndrome
ASER	Annual Status of Education Report
ATGM	antitank guided munition
CIA	Central Intelligence Agency
CO ₂	carbon dioxide
COIN	counterinsurgency
DHS	U.S. Department of Homeland Security
EU	European Union
G8	Group of Eight
GAO	U.S. Government Accountability Office
GDP	gross domestic product
GHG	greenhouse gas
GNP	gross national product
HIV	human immunodeficiency virus
IAEA	International Atomic Energy Agency
IEA	International Association for the Evaluation of Educational Achievement
IEUA	Inland Empire Utilities Agency
IMF	International Monetary Fund
INCSR	International Narcotics Control Strategy Report
IPCC	Intergovernmental Panel on Climate Change
ISR	intelligence, surveillance, and reconnaissance
IT	information technology

LADWP	Los Angeles Department of Water and Power
LEAPS	Learning and Educational Achievement in Pakistan Schools
LTPA	long-term policy analysis
MANPADS	man-portable air-defense systems
MDG	Millennium Development Goal
MLG	Millennium Learning Goal
MLGH	high Millennium Learning Goal
MLGL	low Millennium Learning Goal
MWD	Metropolitan Water District of Southern California
NAEP	National Assessment of Educational Progress
NAFTA	North American Free Trade Agreement
NGO	nongovernmental organization
NIC	U.S. National Intelligence Council
NPT	Treaty on the Non-Proliferation of Nuclear Weapons
NSC	National Security Council
NSS	National Security Space
OECD	Organisation for Economic Co-operation and Development
OMB	Office of Management and Budget
PEMEX	Petróleos Mexicanos
PGM	precision-guided munition
PIRLS	Progress in International Reading Literacy Study
PISA	OECD Programme for International Student Assessment
ppm	parts per million
R&D	research and development
RDM	robust decisionmaking
TIMSS	Trends in International Mathematics and Science Study
UNFCCC	United Nations Framework Convention on Climate Change
WMD	weapons of mass destruction

Shaping Tomorrow Today Workshop: An Overview

Humans often think about the longer-term future. Framing short-term actions in light of long-term goals may be as simple as saving a portion of this year's grain for future planting or as sophisticated as ensuring adequate funding for the higher education of children yet to be weaned. To be sure, the desire to align today's actions with tomorrow's needs and the ability to do so effectively vary considerably among individuals. Nevertheless, to a greater or lesser extent, this proclivity is shared widely among individuals around the globe.

Making such long-term decisions often proves more difficult for governments. Even when they themselves think long-term, policymakers in democracies cannot pursue future goals by fiat. They must act through persuasion, communication, interest- and coalition-building, and wise policy formation. This often proves difficult enough when pursuing only near-term goals. But effective long-term decisions are often even more elusive because citizens generally prefer gratification in the present to that in the future and because deep uncertainty can sever any clear connection between near-term actions and their long-term consequences.

Yet, the common claim that most policymakers think only short term is clearly untrue. Throughout history, leaders have made choices in an attempt to achieve long-term goals. Sometimes, they have chosen well, and sometimes poorly. On occasion, future generations can look back and say leaders acted effectively to achieve their aims. Other times, the unintended consequences overwhelm the intended decision. Frequently, short-term pressures dominate any long-term vision.

Today, in a time of crisis overlaid on rapid and profound change, it seems imperative to improve governments' capacity to make effective long-term decisions. Many characteristics of the present day speak to that need:

- an increased pace of technological change coupled with the increasing role of technology in our public and private lives
- enhanced global communications and the consequences that ensue from their ubiquity and speed
- reduced times for consideration and deliberation before the need to act and react
- changes in civil society and public participation in governance
- an increasing number of actors, both individuals and groups, whose efforts and capabilities have been magnified by several of the other trends
- increasing evidence in the form of visible consequences that rapid industrialization carried forward at an increasing scale and tempo may prove to be unsustainable in several respects.

In some cases, such factors make the consequences of poor long-term decisions more severe. In some cases, such factors make it more difficult for governments or other actors to overcome the barriers to making effective long-term choices. Either way, it may behoove us to trust less to our luck in finding an Abraham Lincoln or Franklin D. Roosevelt when the times require them and instead ask how it might be possible to deal more systematically and effectively with questions having long-term implications.

Since its founding in 1948, the RAND Corporation has dedicated itself to fact-based research that provides objective analyses for the policy issues of the day. It has done so when the issues were of large scale (e.g., defending the United States and its interests in a cold war, enhancing the welfare of all of the country's citizens no matter their station) or more focused on specific issues (e.g., regulation of new media and technologies, provision of high-quality health care). This tradition continues today. The RAND Frederick S. Pardee Center for Longer Range Global Policy and the Future Human Condition was founded with the specific intent of developing and deploying operationally meaningful ways of conducting long-term policy analysis (LTPA).

In support of this mission, on March 17–18, 2009, the Pardee Center hosted a workshop, “Shaping Tomorrow Today: Near-Term Steps Towards Long-Term Goals,” organized to give participants an opportunity to explore new methods and tools that can help improve long-term decisionmaking. The workshop demonstrated how analysts and policymakers can use long-term thinking to determine when it is important to make long-term (as opposed to short-term) decisions, demonstrated how to make better long-term decisions, and encouraged policymakers to think long term. Doing so collaboratively, drawing on participants from many countries, and ensuring a mixed audience of toolmakers, analysts, planners, decisionmakers, and interested lay observers made possible a cross-fertilization of experience and knowledge.

This document summarizes the proceedings of this Shaping Tomorrow Today workshop. The balance of this chapter defines our concept of long-term decisions and summarizes the contents and conclusions of each of the sessions. The remaining chapters present four white papers prepared for the event. The first of these, by Robert Lempert and Paul Light, describes the Pardee Center's innovative work in new methods for longer-term policy analysis—in particular, robust decisionmaking (RDM)—that assess near-term policies' ability to achieve long-term goals over a wide range of future scenarios. The essay then describes how the U.S. government might use the concepts underlying these RDM methods to improve its ability to conduct effective long-term policy analysis. The remaining three papers seek to identify long-term policy decisions in each of three different policy areas. Lant Pritchett examines long-term challenges in education in the developing world. Gregory Treverton examines priority long-term decisions facing U.S. foreign policy. Robert Lempert addresses how long-term thinking might affect the debate over near-term climate policy.

What Is a Long-Term Policy Decision?

In 1919, the victorious Allied powers crafted a peace treaty with Germany that addressed the short-term needs of the day. Germany was forced to accept sole responsibility for the cataclysm of 1914–1918. It was largely stripped of all the appurtenances of a modern military force and so the very means to defend itself. The German nation was laid subject to reparations and punitive economic damages that were designed to squeeze the country “until the pips squeaked” in

the phrase of then–British minister of transport Eric Geddes.¹ Only in this manner could the public opinion in the countries that had borne so much suffering for what appeared to be so little gain be swayed from venting their fury on their own politicians.

John Maynard Keynes' (1920) book, *The Economic Consequences of the Peace*, laid out a long-term analysis of the likely consequences of these measures. He proved tragically prophetic. He subjected the question of how to normalize relations between the formerly belligerent states of Europe and came to a different policy prescription from that in the Treaty of Versailles. His book and his analysis proved exceedingly influential—alas, too late to avert the even greater disaster of a second world war born in no small measure out of the seething resentment and true hardship that the 1919 settlement fostered in Germany. In 1945, the far more unconditionally victorious allies took a very different course. They conformed their short-term actions to their long-term interests.

Very often, we find that society can best advance its long-term goals by focusing only on its near-term needs because a progression of good, short-term choices provides an adequate path toward a desirable long-term future. But, in some instances, today's choices—in many cases, ones with relatively similar near-term implications—can lead to unavoidable and significantly different long-term paths. The ability to identify where a long-term view may prove most important as well as the ability to incorporate such a view meaningfully into today's decisions may prove critical in shaping our future prospects.

To better frame the challenge of identifying and evaluating the near-term steps most important to achieving long-term goals, the Shaping Tomorrow Today workshop emphasized a specific, intent-focused definition of long-term decisions. The Pardee Center defines a long-term decision as one in which reflecting on potential events decades in the future causes policymakers to choose near-term actions different from those they would otherwise have pursued. For a long-term decision, long-term thinking must influence near-term choices.

A simple example can illustrate this concept. Imagine that your child loves basketball. Short-term thinking might lead you to build a basketball court in the backyard. But long-term thinking might remind you that you also want a good college education for your child and that your child may never get a basketball scholarship. You might thus decide instead to buy only a basketball and invest the remaining money in a college fund. In this case, long-term thinking leads to a long-term decision. This is not always the case. If money were no limit for your family, you might still build the basketball court even considering the future. In this situation, long-term thinking does not influence near-term choices.

To be sure, this definition does not necessarily cover the entire universe of decisions that involve longer-term thinking. As described in Chapter Two, however, focusing on those cases in which a long-term view most significantly influences near-term actions can improve our ability to shape the future to our liking.

Overview of the Workshop

About 60 policymakers, policy analysts, and futurists attended the Shaping Tomorrow Today workshop at RAND's Santa Monica headquarters. The workshop's first day introduced participants to the philosophy and methods of RDM and helped them use this approach to identify

¹ December 1818, Guildhall, Cambridge, England.

important long-term decisions. The second day addressed how these ideas could be put into practice in real organizations.

The workshop opened with a backcasting exercise that proved to be one of the event's highlights. Traditional backcasting asks participants to envision a future goal and then work backward, describing near-term policies that would achieve these goals. The workshop's exercise added a twist in order to introduce the concepts of adaptive planning and robustness against surprise. Participants were divided into groups of five or six people and asked to imagine a world in 2059 well on its way to solving its climate-change and energy challenges. Each group was then given 90 minutes to write a scenario describing a path to this happy outcome, focusing on the actions taken around 2010 and the events they set in motion. Before participants began writing, Theodore Gordon described a RAND study he had conducted in 1964 that forecast key developments by the year 2000. The study correctly predicted some technology breakthroughs but missed most of the discontinuities—from the rise of the Internet to the end of the cold war—that define our times. Thus sensitized to the likelihood of surprise, participants were told that, just before they finished writing their backcasting scenarios, each group would receive an envelope describing two wild-card events occurring in the 2020s and 2030s that they would have to incorporate into their stories. Participants could not change the actions taken in the 2010s in response to these surprises; they could revise only their descriptions of how these actions played out over time. The backcasting appeared very effective in encouraging participants to grapple with the concepts of robustness, adaptive policies, and surprise.

The participants next gathered in a plenary session to hear a series of talks on the Pardee Center's RDM methods that aim to provide a systematic foundation for the robust, adaptive thinking introduced by the backcasting exercise. Described in detail in Chapter Two of these workshop proceedings, RDM emphasizes finding near-term strategies that perform well (that is, are robust) over a wide range of plausible future scenarios. Robert Lempert explained the fundamental principles and methods underlying RDM (see, for instance, Lempert, Popper, and Bankes, 2003). David Groves then described how California water-resource agencies have been using these approaches to incorporate climate change into their long-range water-management plans (Groves et al., 2008). Steven Popper provided additional examples of similar analyses drawn from the realms of science and technology policy, foreign policy, and long-term energy strategy, using examples from Korea (Seong, Popper, and Zheng, 2005), Israel, and Iran.

Participants next divided into three concurrent sessions to apply these long-term policy approaches in three broad policy areas: human development, international policy, and climate and energy. These sessions aimed to identify issues that would require long-term decisions in each of these three areas, characterize what makes that particular question one requiring the long-term approach, what would be required operationally to frame the issue appropriately, and what might be some immediate short-term steps. Each session debated issues raised in earlier drafts of the papers in Chapters Three, Four, and Five of these workshop proceedings. The current versions of these papers reflect input from those discussions.

Dinner followed the afternoon breakout sessions and began the discussion of how governments and other organizations could implement these concepts. The keynote speaker, former California governor Gray Davis, addressed the question, "How can democracies make long-term decisions?" The governor described the many challenges that elected officials face attempting to implement long-term decisions. As an example of success, Davis described his role in the creation of the Governor Gray Davis Institutes for Science and Innovation. His administration used part of the state's then budget surplus to fund the capital costs necessary to launch each

of the four institutes, which have since relied on private-sector funds for a significant fraction of their operating expenses. Davis described how this mechanism enabled him to create new institutions that would enhance California's economy and remain relatively immune from the state's regular boom-and-bust budget cycles.

The workshop's second day focused on the question of how governments could do a better job of long-range decisionmaking. The first session featured representatives from Canada, Norway, Israel, and the United Kingdom describing their governments' foresight activities. Marcel Saulnier from Health Canada said that his government is working to grow its long-term planning activities and described a program called Canada at 150 that had tasked 150 young Canadian public servants to engage in long-term thinking to prepare for their nation's sesquicentennial in 2017 (Government of Canada, 2009). Knut Kjaer, former executive director of the Norges Bank Investment Management, described the long-term strategy of the Norwegian sovereign wealth fund (described in more detail later). Gaby Golan of Israel's Prime Minister's Office described the challenges of long-term thinking in a country beset by many near-term crises and the work his country is conducting with RAND to improve its capability for long-term analysis. Alex King of the UK's Foresight Programme discussed how his agency pursues two types of research agendas—one focusing on unknown unknowns in multiyear studies initiated by the Foresight Programme itself and a second focusing on known unknowns in shorter studies requested by other government agencies (Foresight Programme, undated).

The second session featured representatives from U.S. governments at the federal and local levels. Nancy Donovan of the U.S. Government Accountability Office (GAO), an agency that does work for the U.S. Congress, described GAO foresight work (e.g., GAO and Senate Committee on Commerce, Science, and Transportation, 2008, and GAO, 2005). One recent study identified key driving forces (such as the long-term fiscal crisis and other 21st-century challenges) that will affect the future—and signal a need to reexamine the way in which government does business. In addition, the GAO methodology group has developed conceptual frameworks that might help government agencies address high-clockspeed trends. The GAO has also developed conceptual frameworks to help other government agencies improve their foresight capabilities. Ryan Henry, a former principal deputy undersecretary of defense for policy, emphasized the need to make a concise, compelling analytic case to convince senior decisionmakers to allocate near-term resources to address long-term challenges. Grace Chan, a manager at the Metropolitan Water District of Southern California (MWD), suggested that her agency, like many others, is relatively conservative and requires significant evidence before changing course, which can pose a challenge when faced with novel long-term threats. She described MWD's collaboration with RAND and the Pardee Center in employing RDM methods to address this challenge. David Goldston, former senior staff member of the U.S. House of Representatives Committee on Science and Technology, argued that most decisions facing policymakers have a long-term component. He argued that policymakers often think about, but have trouble acting on, the long term. He suggested that policies with triggers (discussed in more detail later) can help address long-term goals while deferring near-term costs. Jim Lopez, then deputy chief of staff to King County (Wash.) executive Ron Sims, emphasized the importance of success stories in motivating people to think long term.

Paul Light, who chaired this second session, also summarized his proposals for improving the U.S. government's ability to conduct foresight, as discussed in Chapter Two of these workshop proceedings.

The full agenda for the workshop may be found in the appendix.

Key Issues

As these proceedings demonstrate, the workshop engaged a diverse set of participants and explored a wide array of topics. But two simple ideas summarize the main messages. RDM eschews the long-entrenched idea that long-term thinking should endeavor to predict the future. Rather than inquire, “What will the future bring?” policymakers should ask, “What steps can we take today to most assuredly shape the future to our liking?” In addition, the workshop demonstrated that long-term thinking represents a practical and useful endeavor if it focuses on near-term actions. In brief, if it does not inform today’s actions, long-term thinking provides only entertainment.

Two other sets of workshop results warrant mention here: the key characteristics of issues for which long-term thinking is likely to significantly improve near-term choices and the key themes in implementing long-term thinking in government.

Issues for Which Long-Term Thinking Improves Near-Term Choices

Each breakout session was asked to identify issues in that group’s policy area for which longer-term analysis might well lead to better near-term decisions. The workshop organizers intended to collect a set of issues representing good candidates for longer-range policy analysis, as well as examples from which might be abstracted general characteristics of issues that would be good candidates for longer-range analysis. The human-development breakout session very usefully reframed this question. That group asked, “For what issues (in human development) would longer-range thinking likely lead to near-term actions better for achieving long-range goals than actions developed in the absence of the longer-range thinking?” That is, what issues are there about which one could not only say (perhaps to a decisionmaker) that this was an issue that could benefit from longer-range thinking but also explain why and how that thinking and analysis were likely to lead to better near-term actions.

The breakout session tentatively identified five conditions under which such considerations apply:

- *There are substantial delays between actions and desired effects.* The group suggested that the field of primary education offers many examples of actions with unintended or unknown long-term consequences because it can take many years to conclusively demonstrate that a young child’s education was or was not effective. Lant Pritchett’s paper in Chapter Three argues that many of the short-term actions taken in primary education in Organisation for Economic Co-operation and Development (OECD) countries have produced very little, if any, longer-term gains. Examining a wide range of future scenarios might lead to different near-term actions.
- *The field is undergoing substantial transformation.* The group discussed two notional examples. The first focused on postconflict planning in a failed state. Near-term actions taken in very volatile situations to solve immediate problems can have unintended longer-term implications. Considering how these actions play out over a wide range of future scenarios might avert some long-term disasters. The second example focused on information technology (IT). When technology changes rapidly, examining a wide variety of future possibilities may well improve near-term decisions.

- *The field is subject to significant surprises.* The group pointed to the Pardee Center’s work with California water-management agencies as an example of long-term analysis improving robustness to surprise. The center helps such agencies examine how their current long-range plans could perform over a wide range of future scenarios, including those with very stressing conditions due to climate change. Such studies have encouraged at least one agency to modify its current plans, increasing its emphasis on near-term water-use efficiency in order to reduce its potential long-term vulnerabilities.
- *Institutional lock-in yields a persistent gap between goals and performance.* The group discussed two slightly different situations. The first arises when society and an entity within it have divergent goals. The group discussed whether such is the case with the field of medicine in the United States. While many in society want more-affordable care, the medical field seems configured to produce increasingly expensive treatments. The second situation arises when an institution’s goals align with society’s, but there remains a persistent gap in performance. Such might be the case with Medicare. Considering the program’s long-range financial future makes it clear that performance of the fund is unlikely to improve without significant changes in near-term actions.
- *The situation is one in which longer-term thinking can help solve short-term deadlocks.* The group offered George Kennan’s famous X article (X, 1947) as an example. After the Second World War, U.S. policymakers debated how to respond to an expansionist Soviet Union. Some argued for near-term steps to strengthen the Army and ready for an eventual war. Taking a longer-range view, Kennan argued that the West should contain Soviet influence to its then-current spheres of influence and wait for the USSR to collapse from its own internal weaknesses.

This list clearly represents a preliminary rendering of the key characteristics of issues for which long-term thinking is likely to lead to significantly better near-term decisions. Nonetheless, workshop participants generally regarded this list as a significant advance in the study of long-term decisionmaking.

Key Themes for Implementing Long-Range Decisions in Government

The workshop concluded with a lively discussion of several key themes that participants clearly thought important to implementing long-term decisions in government. These themes included flexibility and precommitment and the importance of narratives in communicating with policymakers.

Some participants emphasized the importance of near-term actions that create options for future decisionmakers. For instance, the concept of navigating the future—or *orienteering*—offers a key means to address long-term goals. Near-term actions can promote future adaptive capacity, particularly the ability to quickly detect and respond to emerging new trends. Such capabilities make future decisionmakers nimbler and reduce the need to predict “black swans.”²

² Popularized by author Nassim Nicholas Taleb, *black swan* refers to a large-impact, hard-to-predict, and rare event beyond the realm of normal expectations. Before black swans were discovered in 18th-century Australia, Europeans were certain that swans were, by definition, white.

Alternatively, decisionmakers will devote near-term resources to drive down uncertainty about the future, thereby improving their successors' ability to act with confidence.

Other comments focused on the utility of precommitments—that is, near-term actions that constrain the options of future decisionmakers. Embedding triggers in policy plans provides one means of influencing the future while reducing near-term costs. For instance, planners can use scenarios to determine where a policy might fail and identify signposts that provide early warning of such scenarios, and they can place into legislation or planning documents requirements that certain contingency plans be adopted if those signposts are observed.

Some near-term actions both improve future adaptive capacity and constrain future options. For instance, establishing program audits or other ongoing data collection can provide future decisionmakers valuable information while also making it easy for future constituencies to hold them accountable for their actions. Mandating rainy-day funds, for example, both constrains future budgets and provides expanded options during economic downturns.

Times of crisis present a large opportunity and significant challenge for long-term decisionmaking. During a crisis, decisionmakers often recognize that they have rare power to make decisions with significant long-term consequences. But they often have no time to call for extensive formal analysis of their options. For instance, one participant recounted his experience in government just after the fall of the Berlin wall. It was clear that decisionmakers had more power to shape the international system at that point than anyone had had for decades, but they needed to make crucial decisions too quickly to ask for any formal policy studies. How can long-term policy analysis prove useful during such brief times when decisionmakers have the most influence over the future?

Much discussion emphasized the importance of narrative in enabling long-term policy analysis to have an impact on long-term decisions. Decisionmakers from senior policymakers to the average voter generally think in terms of stories. To reach them, analysts need to provide compelling narratives. Long-term plans, such as MWD's Integrated Resources Plan, often serve as communication devices for a broad constituency.

Participants identified several themes in effective narratives. Stories about success have proven to be effective, as have historical analogies. Some stories prove more difficult to tell. Policymakers often do not like to hear about uncertainty; they prefer a clear causal chain. It often proves difficult to describe the counterfactual or the trade-offs that decisionmakers face.

The challenges of managing the Norwegian sovereign wealth fund tied together many of these themes. Like most developed nations, Norway faced a long-term challenge of providing for an aging population, but, in Norway's case, the nation's North Sea oil offered a promising solution. However, the ruling government faced a large challenge. It needed to convince the Norwegian people that it was necessary to save oil revenue for future generations, that this was important not only for financing pensions but also for avoiding the "Dutch disease" that has distorted the economic system and efficiency in many resource-rich countries. The government and the managers of the fund had, in addition, the challenge of pursuing a long-term, rational investment strategy. The equity portion of the portfolio has been taken up to 60 percent, which means huge volatility and periods of heavy criticism because of market value losses.

The government and the fund managers pursued these goals by telling two stories repeatedly. The first story emphasized that, in the past century, through depressions and war, equities had proved the best long-term investment, far better than oil, cash, or any other option. This story suggested that Norwegians should expeditiously move their wealth from oil to equities and keep it there even through market gyrations. The second story emphasized the fate of the

16th-century Spanish empire that collapsed by spending rather than investing the gold pouring in from the New World. This story suggested that Norwegians should avoid spending their oil bounty.

The government and the fund managers told these stories—both historical analogies—again and again, in forms ranging from formal studies to numerous media appearances. Managers saw such story-telling as a key part of their job. Emphasizing the importance of such narratives, one participant said, “If the fund fails, it won’t be because of the models.”

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Evaluating and Implementing Long-Term Decisions

Robert J. Lempert and Paul C. Light

Let it be said by our children's children that when we were tested we refused to let this journey end, that . . . we carried forth that great gift of freedom and delivered it safely to future generations. (Obama, 2009)

By 1960, Los Angeles had become the United States' third-largest city, a feat that would have greatly pleased the city's leaders a half-century before. They envisioned creating a great metropolis from their small community and aggressively pursued the massive investments they believed necessary to make it happen. In particular, the Los Angeles River, on whose banks the Spanish had built their original pueblo, carried barely enough water to support a small town. In 1904, William Mulholland, superintendent of the Los Angeles Department of Water and Power (LADWP), projected that the city's water demand would double the available supply by 1925. Over the next nine years, the LADWP bought water rights throughout the distant Owens Valley and built the hundreds of miles of aqueduct and tunnels that still bring water to the growing city.

The frequent claim that policymakers think only short term is clearly untrue. Throughout history, people have made decisions that make sense only in the pursuit of long-term goals. In some cases, their choices have turned out well. The American statesmen who helped create the United Nations, World Bank, and other international economic and security institutions from the wreckage of the Second World War would, if they lived today, likely take pride in the past half-century of relative peace and prosperity. In other cases, policymakers failed to achieve certain long-term goals. President George Washington and his cabinet, understanding the slaughter their new nation might inflict on North America's indigenous peoples, took prescient but ultimately futile steps to establish principles and procedures that would allow future generations of both peoples to share the land (Ellis, 2007). In our personal lives, we too make long-term decisions when we save for retirement and invest in our children's education.¹

Such examples notwithstanding, we have good reason to lament our society's shortsightedness. Too often, short-term pressures dominate any long-term vision. When policymakers do act with long-term goals in mind, the unintended consequences frequently dominate any hoped-for effects. In the current times of crisis overlaid on rapid and profound change, our society faces many decisions that will have consequential implications for our countries' and humanity's long-term future. Our skills at motivating, evaluating, and implementing long-term decisions must be improved. People do care about the future, but deep uncertainty about the long-term severs any concrete connection between near-term actions and distant consequences,

¹ See RAND Corporation (2009) for a list of many long-term decisions.

thus reducing the incentives for policymakers to pay careful heed to the long term. This chapter lays out a framework for identifying those near-term actions most important to shaping the future to our liking and suggests how governments might implement these methods.

Challenges of Long-Term Decisionmaking

In a recent article, the chair of President Barack Obama's Council of Economic Advisers defines policymaking for posterity as current decisions with distant consequences (Summers and Zeckhauser, 2008). Political scientist Detlef Sprinz has defined long-term policy challenges as public policy issues that last at least one human generation, are characterized by deep uncertainty that is exacerbated by the depth of time, and engender public-goods aspects both in the source of the problem and among the potential responses (Hovi, Sprinz, and Underdal, forthcoming). These descriptions do a good job of suggesting why such decisions are important and hard. Our definition, however, focuses on the intent of the policymaker. For us, a long-term decision occurs when the process of reflecting on potential events decades or more in the future causes decisionmakers to choose near-term actions different from those they would otherwise pursue (Lempert, Popper, and Bankes, 2003).

We prefer this intent-focused definition because it facilitates thinking about ways to improve long-term decisions. In particular, it helps frame the problem of identifying and evaluating the near-term steps most important to achieving long-term goals. In many cases, society can best advance its long-term agenda by focusing only on its near-term needs, because a progression of good short-term choices provides an adequate path to a desirable long-term future. But, in some cases, today's choices, often ones with relatively similar near-term implications, can lead to unavoidable and significantly different long-term paths. Life is full of choices with long-term consequences.² Focusing on those cases in which a long-term view most significantly influences near-term actions can improve our ability to shape the future to our liking.

Such long-term decisions are hard for at least two overarching and deeply linked reasons: (1) people's general preference for gratification in the present to that in the future discourages near-term sacrifice for long-term gains and (2) deep uncertainty about the future severs any clear connection between near-term actions and their long-term consequences. While the former reason is no doubt important and real, the latter plays a crucial role. When convinced that their actions may have enduring consequences, people do sacrifice for the future.

Economists have a well-developed framework for describing the implications of people's preference for the present. Their concept of discount rate explains the amount of consumption of goods and services an individual would demand in the future in return for relinquishing some consumption today. The discount rate does an excellent job of guiding and describing saving and investment decisions and the functioning of the economy over time scales of days to a few years. But looking out over decades, any reasonable discount rate makes the far future unimportant. If I would invest \$0.95 to receive \$1.00 next year, discounting suggests that I would invest almost nothing to ensure that my grandchildren receive \$1.00 decades from now.

² We all owe our existence to a decision with long-term consequences made by our parents. But, by our definition, only some of those choices involve long-term decisions.

Debates rage over whether this represents a problem to fix or a reality to accept. For instance, the United Kingdom's Stern report (Stern, 2007) argued for aggressive early action to address climate change using economic models with very low discount rates, suggesting that people today should invest far more than implied by normal discounting to reduce the impacts of climate change on future generations. Such low rates reflect a large literature that makes ethical arguments against too heavily discounting the long-term future. Other economists contest such claims, suggesting that very low discount rates can lead to mathematical contradictions and observing that such low rates do not often describe how people behave in real life (see, for example, Nordhaus, 2007).

In their laboratories, psychologists do observe a preference for near-term rewards, but for reasons that admit to important exceptions (Weber, 2006). In many choice situations, people do not have firmly established preferences, in particular between near term and long term. Rather, they often construct their preferences in the context of each individual decision. In general, people tend to view the future as abstract but see the near term as concrete. Since concrete representations have more emotional force (what psychologists call affect), individuals favor the near term over the future.³ But, by presenting subjects with evidence that helps make the future concrete, psychologists can shift people's preferences from near- to far-term rewards.

Uncertainty thus complicates long-term decisions because it makes the future an abstract and distant concern. From the oracle at Delphi to today's most sophisticated computer simulations, people have strived to make the future concrete. But, despite their best efforts, people understand that the long-term future remains fundamentally and irreducibly unpredictable. We call this condition *deep uncertainty* (Lempert, Popper, and Bankes, 2003), in which the parties to the decision do not know, or do not agree on, the system model that relates actions to consequences or the probability distributions over the key parameters to these models. Real life thus often makes it difficult to replicate the psychologists' experiments that make the future sufficiently concrete to value over the near term. In addition, people are simply averse to the deep uncertainty that characterizes the long-term future. When given a choice among options with known and unknown consequences, individuals tend toward the former, even if the latter offers potentially larger gains.⁴

Uncertainty also makes our control over the future tenuous, which can further undercut any inclination to make long-term decisions. For instance, we understand that decisions made by future generations may prove at least as important as today's choices in determining the success of our long-term goals. When forced to choose between taking an action with an immediate, predictable impact and taking an action that may generate benefits decades from now, policymakers have good reason to choose the former irrespective of any discounting. Any anticipated long-term impacts of today's actions could easily be derailed by unexpected events. Any long-term benefits might also materialize, without our help today, due to some unanticipated future good fortune. A prudent policymaker can offer, with confidence, strong arguments for concentrating on those near-term outcomes they can influence and for leaving the long term in the hands of future generations.

³ Weber (2006) offers the example of an academic who easily agrees to give a paper at a conference many months from now and feels the pain of writing it only a few days before the meeting.

⁴ Ellsberg (1961) first highlighted this tendency toward vagueness aversion.

Despite these impediments, people do make long-term decisions. Political scientist Thomas Princen (2009) points to the importance of legacy. He notes that human behavior displays many dualities—between self-interest and altruism, competition and cooperation, aggression and nurture, indulgence and restraint. Similarly, he argues, humans operate on multiple time scales, preferring present over future consumption while also expressing concern with their impact on and reputation among future generations. People care about the future, and the long-term decisions that they do make—investing in long-lived infrastructure, educating children, building enduring institutions—seem to occur most frequently when they can envision a strong connection between near-term choices and long-term goals. Despite deep uncertainty, people can envision a new road or aqueduct serving future generations; they understand the benefits an education will bring their children decades hence; they have seen the enduring stain of a tarnished reputation so may pay high near-term costs to maintain theirs. When people can see concrete long-term consequences from their near-term actions, they can act on the long term.

Connecting Near-Term Actions and Long-Term Goals

The existence of RAND and institutions like it rests on the belief that evidence-based arguments can play a constructive role in public policy debates. No doubt a host of considerations influence political decisions, but a preponderance of solid, difficult-to-refute evidence favoring one side or the other can often make an impact.

The traditional tools of policy analysis have great difficulty, however, establishing the clear, evidence-based connection between near-term actions and long-term goals that might have the most significant impact on policymakers' willingness to make effective long-term decisions.

The traditional approach to quantitative policy analysis embodies a framework we call *predict then act*. The framework asks decisionmakers to first characterize their uncertainty about the future—with either point forecasts or probability distributions over future states of the world—and then to use these predictions to rank the desirability of alternative policy options. This framework provides the foundation for most decision analysis, risk analysis, cost-benefit analysis, and the other quantitative methods used to inform policy debates. It provides the impetus and conceptual foundation for the many forecasts that pervade discussions about the future. Even when they argue without the support of the analytic machinery, policymakers often justify their favored policy with reasoning drawn implicitly from the predict-then-act framework.

But the deep uncertainty of the far future denies predict-then-act analysis the ability to establish a firm connection between near-term actions and long-term goals. As confident as policymakers and analysts may appear about the future, most observers do not believe their predictions.⁵ In some cases, policymakers may nonetheless think long term but choose poorly because predict-then-act analysis makes it difficult to consider a full range of unpredictable discontinuities and surprise. In many cases, policymakers shy away from any explicit long-term decisions because they rightly fear taking ownership of questionable forecasts. Justifying poli-

⁵ Wise policymakers do not believe their own predictions either.

cies with predictions of unpredictable futures opens a policymaker to attacks from rivals, even ones who justify their own policy preferences with equally rickety assumptions.

Effective LTPA requires a different approach from predict then act. In recent years, RAND has deployed an alternative decision analytic framework that seeks to identify near-term policies that can achieve long-term objectives over a wide range of plausible futures. This RDM approach asks analysts to begin with a proposed policy, comprised by a set of actions that society will take today, and plans for how it will respond to the contingencies that subsequently arise. Computer simulation models then follow this policy down hundreds to millions of paths into a multiplicity of futures. Each path encompasses one set of assumptions about the future—one vision of how the world works, one set of fundamental trends, and one manifestation of any discontinuities and surprises. Interactive visualizations and statistical analysis then help to summarize these many paths by distinguishing the key characteristics of futures in which a proposed policy achieves its long-term goals from those in which it does not. Policymakers can then use this information to suggest modifications to policy that can improve its performance in these stressing scenarios. The simulations are run again, and the results are used to help policymakers decide whether the benefits of a modified near-term policy are worth the costs. The process is repeated until policymakers have developed a near-term policy as robust as it can be over a multiplicity of plausible futures (Lempert, Popper, and Bankes, 2003; Lempert and Collins, 2007).

In brief, rather than encourage policymakers to seek predictions—“What will the future bring?”—RDM focuses long-term analysis on near-term actions—“What steps can we take today to most assuredly shape the future to our liking?”

As an example of this approach, RAND recently helped the Inland Empire Utilities Agency (IEUA) of Southern California incorporate the potential impacts of climate change into its long-range plans (Groves et al., 2008). Like most water-management agencies in the arid American west, IEUA is legally required every few years to prepare a 20- or 30-year plan demonstrating how it will ensure its community’s access to water. At present, IEUA serves about 1 million people relying primarily on local groundwater and imports from northern California. To serve its growing population, IEUA’s 2005 water plan called for the agency to improve its groundwater management and launch a major program of wastewater recycling.

But IEUA did not consider the potential impacts of climate change, so, in 2007, RAND helped the agency revisit its plan. The researchers constructed a wide range of future climate-change scenarios for Southern California using 21 of the world’s best climate models, each of which generated different predictions for the region. Climate change is not the only important uncertainty facing IEUA, so they also considered a wide range of assumptions about the agency’s ability to implement its aggressive new groundwater and recycling programs, as well as a wide range of assumptions about events outside the agency’s service area, such as those affecting supplies of imported water. They used a simulation model to follow IEUA’s current plan into several hundred different futures, each characterized by one set of assumptions about future climate change, the agency’s future level of success in implementing its plans, and future supplies of imported water. A statistical analysis of these simulation runs revealed a combination of three key factors that would cause IEUA to suffer future water shortages: a significant decrease in annual precipitation, any decrease in the agency’s ability to capture precipitation as groundwater, and a failure of the recycling program to meet its ambitious goals. If all three of these events were to occur over the next few decades, IEUA would run a serious risk of water shortages. Otherwise, IEUA’s current plan would probably fare reasonably well.

Using the results of this analysis, RAND also helped IEUA to consider a range of potential modifications to its current plan. The agency chose to increase its near-term investments in water-use efficiency, to carefully monitor its groundwater levels, and to respond with additional measures if those levels dropped below a specific threshold at some point in the future. A long-term analysis of this modified plan suggests that it is robust over virtually all the hundreds of scenarios considered.

This experience with IEUA, a variety of other engagements, and the beginnings of systematic testing (Groves et al., 2008) all suggest that the decision analytic framework exemplified by RDM can help individuals and organizations make better long-term decisions by tightening the connection between near-term actions and long-term goals.

First, RDM creates scenarios that help make the future more concrete. Like the products of a more traditional scenario analysis, the cases highlighted by RDM can support a narrative that helps people more vividly imagine a particular future. In what psychologists call the *availability heuristic* (Kahneman, Slovic, and Tversky, 1982), people pay more attention to cases they can easily imagine or recall from memory. A compelling set of details can thus give the future some of the emotional force often available only to the near term. But such vividness can also promote a fallacy, because the more extensive the details, the less likely a scenario becomes. The RDM approach aims to solve this problem by scanning numerous cases and focusing attention on the types of scenarios that should have the most significant impact on policymakers' choices.

Second, the robustness concept enhances policymakers' confidence that they have chosen near-term actions that will positively influence an unpredictable long-term future. RDM considers a huge number of potential paths into the future and identifies those near-term actions that consistently make a difference over most or all of them. For instance, such an analysis showed IEUA that increasing its attention to near-term conservation could greatly decrease its vulnerability to shortages over a wide range of futures. This shift of frame—from what will happen to what actions make a difference—can help policymakers overcome, without false overconfidence, the aversion to ambiguity that often dissuades effective long-term thinking. Rather than become confident about future predictions, policymakers can become confident that they have chosen reasonable near-term actions, no matter what the future brings.

In some applications, a robust strategy acquires a Niebuhrian character.⁶ RDM often measures a policy's performance by considering its deviation from optimality across the wide range of future scenarios. That is, for each set of assumptions about the long-term future, the analysis compares the performance of a proposed policy to that of the optimum policy for that future. Using this so-called *regret criterion* (Savage, 1954), RDM may find that, in some futures, it makes no difference what near-term actions are taken, either because the future will work out well no matter what we do today or because the future will prove miserable despite our best efforts. For instance, today's climate-change policy may prove irrelevant either because some breakthrough invention is lurking in the wings that will soon easily decarbonize the global economy or because we long ago passed some cataclysmic climate threshold that is only now in the process of revealing itself. In some futures, however, the choice of near-term actions may prove decisive. A robust strategy evaluated using a regret measure causes little harm in

⁶ In the sense of the famous serenity prayer attributed to Reinhold Niebuhr: "God, give us grace to accept with serenity the things that cannot be changed, courage to change the things that should be changed, and the wisdom to distinguish the one from the other."

those cases in which near-term action makes no difference while accomplishing what is needed in those cases in which near-term action can strongly influence the path into the future.

As an analytic tool, RDM has been made possible by advances in information technology—fast computers with vast memory, interactive visualizations, and sophisticated search algorithms—that enable analysts to run complex simulation models many times and to extract meaningful patterns from the resulting data. But the fundamental concepts underlying the decision framework long predate RDM and can enrich the nonquantitative long-term thinking of most policymakers. Just as officials who have never heard of subjective expected utility⁷ can nonetheless make arguments based on a predict-then-act approach, policymakers can internalize the key elements of effective LTPA used by RDM. First, when making long-term decisions, policymakers should consider a multiplicity of plausible futures chosen to highlight the strengths and weaknesses of proposed policies rather than seek a best-estimate prediction of likely and unlikely futures. Second, policymakers should seek near-term policies robust over a wide range of plausible futures rather than strive for the best policy contingent on some best-estimate prediction. Third, policymakers should explicitly consider how near-term policies will evolve over time in response to future information since such adaptivity is often a primary means to achieve robustness. Fourth, policymakers should follow these steps through several iterations—proposing a candidate robust policy, characterizing the futures in which it would perform poorly, and identifying, then evaluating, some new combination of near-term actions and adaptive responses that reduce these vulnerabilities—to design increasingly robust policies.

Taken together, these principles suggest that policymakers should strive to identify what we might call *priority long-term decisions*—that is, those near-term actions that will advance their long-term goals no matter what the future brings. Policymakers cannot confidently predict the long term, in part because future surprises and future generations will influence it in ways we cannot project. Attempting to justify near-term actions with such predictions makes it easy to avoid responsibility for the future, to leave it in the hands of subsequent generations. But, if policymakers acknowledge this uncertainty and nonetheless identify near-term steps that make a positive difference over a wide range of plausible futures, the long-term consequences will become more concrete. Taking these actions will become more compelling.

Implementing Effective Long-Term Decisions in Government

This notion of priority long-term decisions, and the decision analytic framework that underlies it, provide an overall concept for how the U.S. federal government, or any government, might more effectively advance its long-term objectives.

In brief, the government should identify, publicize, and monitor progress on priority long-term decisions. The government should begin by articulating the nation's long-term goals, then require executive agencies and congressional committees to identify their priority long-term decisions implied by these goals. As they conduct their regular, largely short-term-focused business, these agencies and committees should periodically report on how they have chosen near-term actions to balance both near- and long-term aspirations. People's general preference

⁷ *Subjective expected utility* is the mathematical measure used to rank alternative policy options in a formal predict-then-act analysis.

for near-term gratification and deep uncertainty about the long-term consequences of today's actions greatly complicates any attempts to assign responsibility for the future. Congress could argue endlessly about what scenario future policymakers will face and how they might respond. The concept of priority long-term decisions can cut through this debate and identify the key choices in which responsibility for the future most significantly lies.

Many barriers exist, of course, that make such a program difficult. Incentives to focus on the short term dominate policymakers' agendas. Voters often have short memories and often show little inclination to reward leaders who ask for concrete near-term sacrifice in return for less-certain long-term gains. The available evidence suggests that Congress and the president see great risk in making long-term policy unless it carries short-term political gain. Campaigns have become increasingly sophisticated at exploiting even obscure decisions and votes that might create potential attacks in the next election, while the two major political parties' polarization creates electoral incentives for keeping difficult issues alive. Leaders often find it much easier to take credit for short-term accomplishments than to demonstrate concrete progress toward long-term goals.

Even when they do wish to solidify their legacy, policymakers have little time to consider the impacts of their actions on the long-term future. They face a flood of demands on their time, driven in part by a fast-paced, highly networked world and its 24-hour news cycle. Elected officials spend significant time raising campaign funds yet find themselves responsible for a vast number of decisions in a wide range of policy areas. Fashioning a response to each daily crisis proves difficult enough; thinking through the potential impacts of today's actions on a multitude of plausible long-term futures can require more time than a leader can devote to even the most pressing issue. Although deliberative capacity involves more than just time and energy, it is most easily measured by examining the amount of slack in the congressional and presidential calendars. By this measure, the opportunity to learn, study, debate, and come to judgment about a given policy issue has become seriously diminished.⁸

Congress has also erected institutional and procedural barriers that undermine its ability to deliberate effectively on long-term decisions. As individuals, members of Congress have perhaps never had better educations, more political experience, and more access to information from a vast policy community, including the congressional research agencies, think tanks, academia, interest groups, the media, and citizens at large. But, as a group, members have lost their ability to aggregate their individual information into effective long-term decisions. Congress increasingly uses omnibus legislation and continuing resolutions as key legislative tools, as well as conference committees to remake policy choices.

The traditional process of subcommittee and then full committee hearings, markups, reports, and floor debate has certainly produced flawed decisions. But, by bypassing these traditional forums, Congress has limited its opportunities for effective debate, often relies on a narrow band of expertise, and restricts its ability to consider the broader trade-offs and implications of near-term choices. In both the legislative and executive branches, needless bureaucratic overlap among committees and agencies and rapid turnover of key congressional staff and presidential posts undermine the government's capacity for effective deliberation on long-term decisions.

⁸ A member of the California state assembly estimated that his schedule allowed him an average of six minutes to think about each of his votes (personal communication).

The U.S. government thus affords its policymakers little incentive, little time, and few venues to pursue effective long-term decisions. New structures and procedures could help alleviate some of these barriers by creating opportunities for deliberation about the future and a responsibility to use them. But these new institutions will remain too easy to evade and ignore if they do not directly confront the fundamental barriers to effective long-term decisions: people's general preference for near-term gratification and the deep uncertainty about the consequences of today's actions on the nation's future goals. The following proposals draw on those developed by New York University's Legislating for the Future project, fortified by the concept of requiring the Congress and executive branch to identify priority long-term decisions (see NYU Wagner, undated).

At the start of each new Congress, the president should deliver a proposed national agenda for the future. This document would concisely articulate the nation's long-term goals and suggest two or three policy areas that the administration believes require particular focus over the following two years. The Congress would consider the president's suggestions, then modify and approve the nation's future agenda. At first, the statement of goals generated by this process might be ambiguous and imprecise. But, over several Congresses, as the nation gains experience converting such goals into policy, the language would grow more precise. Setting this agenda would become part of the national debate during each election before it came to conclusion on the floor of the House and Senate.

Once the nation's long-term goals have been articulated, each congressional committee would be expected to take responsibility for identifying priority long-term decisions in the legislation it considered and the oversight it conducted. That is, as it moved legislation, the committee would ask whether any of the questions before it should be significantly affected by long-term goals. It would ask the same questions as it examined the actions and proposals of the executive agencies under its jurisdiction. In some cases, legislators would find such questions simple to answer. Other cases would require more detailed analysis. Congress should thus establish an office of long-range policy analysis that would issue periodic reports identifying and evaluating the priority long-term decisions implied by the national agenda for the future. This new office would also respond to requests from members and committees, helping them to fulfill their long-term legislative and oversight duties. This office of long-range policy analysis would supplement (and certainly not replace) the current congressional-support agencies, such as the Congressional Budget Office, which focuses on short-term budget projections for major legislation.

To help the president draft his or her proposed agenda for the future, a national foresight agency should be established in the Executive Office of the President, headed by an assistant to the president. This office would also provide surveys of emerging threats and opportunities that might affect the nation's ability to achieve its long-term goals, would support each of the executive agencies as they identify their own priority long-term decisions, and would help ensure some consistency among the long-term analyses and decisions of these agencies.

In turn, every department and agency would be required to submit an annual report identifying its priority long-term decisions and its progress toward the national long-term goals. To assist in this function, some agencies might establish an office of long-range policy analysis headed by career senior executives in an effort to insulate the process from political manipulation. Like the federal inspectors general, whose reports are submitted simultaneously to Congress and the executive branch, long-range policy chiefs should maintain a transparent reporting process and be free to issue recommendations as legislation moves forward.

As part of its oversight role, the Office of Management and Budget (OMB) would review each agency's response to the national agenda for the future, assessing whether the proposed actions seem adequate to the task and whether any important threats and opportunities had been neglected—in short, whether each agency's plan seems robust.

Some precedents for these actions exist. At the start of each new parliament, the government of Finland proposes national long-term goals. Both a dedicated unit in the Prime Minister's Office and a special parliamentary committee take responsibility for defining and advancing the Finns' future agenda. The British government has a dedicated future office, the UK Foresight Programme, which provides visions of the future that can help policymakers identify risks and opportunities (see Foresight Programme, undated). The state of Oregon has spent the better part of a decade in designing long-term goals that provide benchmarks for policy projects. Similarly, the GAO (2007) has conducted a future scan to identify key trends that may significantly affect the United States' future and the policies its government should set.

Such anticipatory activities are not, however, immune from near-term political pressures exacerbated by deep uncertainty and people's preference for near-term gratification. The 1983 debates over Social Security reform provide an example of how difficult it can be to disentangle clear responsibility for the future from concerns about the present.

In 1983, the president and Congress largely agreed that the Social Security program faced significant future deficits, as the number of living retirees grew far larger than imagined by those who established the program. To inform that debate over reforming the program, the National Commission on Social Security Reform, chaired by future chair of the Board of Governors of the Federal Reserve System Alan Greenspan, proposed five future scenarios to compare competing versions of a rescue package for the beleaguered program. The scenarios reflected, at least in part, a recognition that the success of near-term policy choices could depend on deeply uncertain trends. As described by then-member of the U.S. Senate Committee on Finance Bill Bradley (D-NJ),

We have two sets of books in which there are different sets of economic assumptions. One of the sets is the budget of this administration upon which all the spending cuts are based. . . . That set says there will be unemployment of 6.6 percent. . . . Then we have the pessimistic assumption for the social security trust fund. . . . That set says the unemployment will be 9.7 percent in 1983, not 6.6 percent. So this is your classic case where you can't have it both ways.

Appearing on *Face the Nation*, OMB director David Stockman was more succinct: "None of us really understands what's going on with all these numbers. . . . All the conventional estimates end up as mud . . . as absurdities" (Light, 1985).

Not surprisingly, advocates used this uncertainty for strategic advantage, emphasizing the scenarios that best corresponded to their favored policy response. The administration, which favored reduced benefits, often used pessimistic economic assumptions to increase the pressure for action while using optimistic assumptions to describe the impacts in order to mollify critics. Groups who supported higher payroll taxes used optimistic assumptions to decrease the sense of crisis but pessimistic assumptions about the impacts of benefit cuts in order to activate interest groups that worried about increased poverty among older Americans.

Any new congressional office of long-range policy analysis or national foresight agency in the Executive Office of the President would face similar pressures to strategically use uncertainty

to highlight favored policies and to diffuse lines of responsibility. The RDM approach provides a quantitative tool kit that would help new federal future-anticipating agencies avoid such pressures. Rather than predict likely futures, the office of long-range policy analysis and national foresight agency would report the combinations of future scenarios that represent vulnerabilities of policies proposed by Congress and the president and the trade-offs involved in reducing those vulnerabilities. Unlike the official forecasts of most current government bodies, these agencies would pay full attention to how today's policies might evolve over time in response to new information in each of many scenarios.

Tracing this multiplicity of paths into the future is useful only alongside today's powerful new approaches for concisely summarizing the information for policymakers. But by so doing, the new federal future-anticipating agencies would also help identify signposts, those early indicators of particular scenarios, that enable policymakers to design more-robust near-term policies that adjust more successfully over time, as well as identify those near-term actions that, if not taken, could deny the nation an ability to achieve its goals over a wide range of scenarios. Applied, for instance, in the 1983 Social Security debate, this RDM approach would have clearly identified the future scenarios in which the administration's proposals, and those of its critics, would have failed to meet the nation's goals. By asking neither side to agree on the likelihood of these scenarios, the agencies would have created an opportunity from Senator Bradley's struggle with competing projections. Having established acceptance by both sides, however grudgingly, of the different vulnerabilities of alternative policies, the analysis could identify the key near-term decisions that could best reduce these vulnerabilities and any irreducible trade-offs involved. The agencies would have thus helped focus debate on the key choices for which current decisions have the greatest impact on future goals.⁹

In conducting such LTPA, the new federal future agencies would not only serve the president and Congress. They would also provide the information necessary for outside groups and citizens at large to hold their government accountable for the nation's future. A wide variety of groups, including the newly created Peter G. Peterson Foundation, focus on what they see as the nation's legacy and have made long-term decisionmaking a central cause in their grant making to a host of advocacy groups, such as Public Agenda, numerous environmental groups, the National Academy of Public Administration, the Concord Coalition, and OMB Watch. But their efforts are made more difficult by competing forecasts and diffuse lines of responsibility. A clear government statement of long-term national goals and an analysis of the resulting priority long-term decisions would greatly empower these groups to hold the government accountable for its values, analysis, and actions. By conducting effective LTPA amid the deep uncertainty of the future, new federal future agencies would provide the clarity the public needs to create incentives for its elected officials to make effective long-term decisions.

Responsibility for the Future

The U.S. Congress owes its basic design to a long-term decision. Delegates to the Constitutional Convention in 1787 wanted a legislature to represent the people of their new nation. But perched on the eastern shore of a vast continent in 13 sparsely populated states, they were well aware that population growth and geographic expansion could significantly and unpredict-

⁹ Popper (2007) sketches such an RDM approach for the Social Security program.

ably shift the power balance between large and small states. They thus created the House of Representatives, with members chosen proportional to population, and the Senate, with equal representation from each state.

The delegates to the Philadelphia convention needed little convincing that their decisions could have consequences that would last for generations. Legacy often loomed large in their deliberations. Today's policymakers generally face more-mundane challenges. In many cases, they can rightly focus on their near-term goals, confident that a progression of near-term successes will guarantee a promising future.

But in today's time of rapid and profound change, some near-term choices can have significant long-term implications. Today's policymakers generally lack the tools and the institutions that can help them clearly see and act on those cases. By creating institutions that can systematically identify priority long-term decisions, today's policymakers can hold themselves responsible, and be held responsible by others, for taking those key actions that can help shape an unpredictable future more to our liking.

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Long-Term Global Challenges in Education: Are There Feasible Steps Today?

Lant Pritchett

It is a commonplace that it is difficult to predict far into the future accurately.¹ Like all aphorisms, there is some truth to that, but it is completely false in some dimensions. Let us imagine the world in the year 2050, 41 years ahead, far into the future (the same distance back in time takes us to 1968, the turbulent year of Vietnam War protests, assassinations, and race riots). There are many things we cannot know—change in the economy, technology, politics, environment—but there are actually some things we know with certainty. If a prime age for leadership is 50 years (the age many become CEOs; the last three U.S. presidents were around that age), then we know something about those leaders in 2050—we could know exactly what the leaders of the future were taught and were learning in fourth grade, because they are in fourth grade right now, even as we speak, so we could ask them. That, of course, even potentially underestimates the duration of the impacts of education: Ronald Reagan, U.S. president until 1989, had completed his formal education 57 years before, graduating from Eureka College in 1932. The educational foundations of the leaders of the distant future are being laid in classrooms today.

This chapter raises two sets of issues. The first is the current status of the level and distribution of measured learning achievement and whether students emerging from schools around the world are ready for the economy of today (much less the next 40 years of their working lives). This breaks into three distinct concerns: (1) the failure of most countries of the world to produce students with even minimally adequate levels of actual learning, (2) the long-run stagnation of measured learning achievement in nearly every single OECD country—in spite of massively increasing inputs, and (3) the question of the educational preparation of superstars in an increasingly global market for top talent.

The second issues are about the structure of educational systems themselves. Most countries have educational systems that were developed in the late 19th and early 20th centuries and that are almost identical now to the systems as they consolidated in the 1950s. In almost no area of activity has there been as little organizational and systemic innovation as in the production of schooling—which perhaps helps explain the outcomes observed. The question is whether the existing educational systems, as systems, are sufficiently adaptive so as to make short-run accommodations add up to adequate long-run change. In my view, this is an open, not rhetorical, question.

¹ This has been revised since the Shaping Tomorrow Today conference. I would like to thank Robert J. Lempert, Jeffery C. Tanner, Barry Hughes, and Elizabeth D. Brown for helpful comments and discussion.

Three Issues About Learning Achievement

I am not going to discuss the more-standard descriptions of the education sectors around the globe (e.g., enrollments) and the pressing policy issues (e.g., system expansion, access, input upgrading). There are a number of reports on this that are solid and interesting on their own terms but are more about pragmatic, short-run issues than about setting the stage for a big picture.² I am also not going to focus on the longer-term issues of expanding enrollments and increased number of years of school completed into the future (material well covered by the work of Barry Hughes using the International Futures model). Moreover, I am going to take for granted most of the issues around the available evidence about the results of international tests, as I have covered this before (Pritchett, 2004). Hanushek and Woessmann (2008) gathered all of the available internationally comparable test results together and synthesized them as well as is possible, and they show the importance of the role of schooling in economic growth of the measures of learning achievement. Rather, I am going to emphasize three issues that get less attention but that I believe will be crucial to the future.

Learning Achievement of New Cohorts (mostly non-OECD)

In any given cohort—say, 15-year-olds—there are roughly 120 million people, of whom 100 million live in the less developed world and 20 million in the more developed. So, any discussion of education globally is primarily a discussion about what is going on in the developing world, as it already comprises more than 80 percent of each cohort, a fraction that will only grow over time as demographics of low fertility rates and narrowed population pyramids in the industrialized countries play out.

So, a key question is, “Is each annual 100 million–strong cohort emerging from completion of basic education adequately equipped for its lifelong participation in the relevant society, polity, and economy?” The answer is, “No one has the slightest idea.” Really. Not the slightest idea, for two very deep reasons.

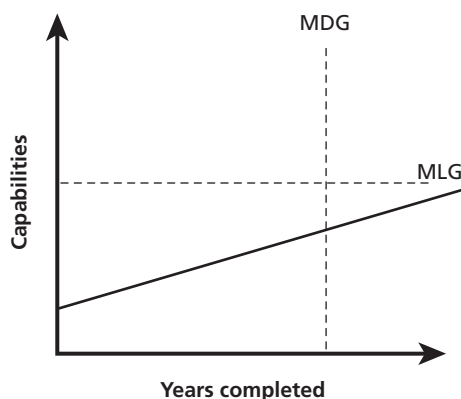
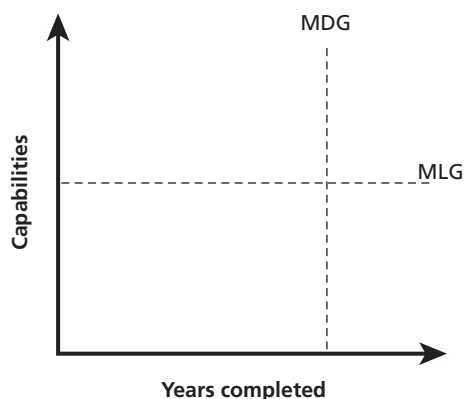
First, the educational establishments around the world have been focused almost exclusively on “butts in seats”—whether children enroll in and attend school and, at best, the number of years of schooling that a child completes. Every international organization or national education ministry can furnish reams of numbers about the butts in seats with those numbers broken down by sex, age, region, country and other characteristics.³ In fact, the agreed-upon international goal for universal primary education is monitored for a target that every child will be able to “complete a full course of primary schooling” (UNICEF, undated), which is explicitly a butts-in-seats goal—no mention of the content or curriculum, whether primary alone is adequate, or whether the student has actually been able to learn anything.

Of course, no one has a goal that children literally just spend time at a place called school—there is an assumption that butts in seats leads to education (knowledge/skills/attitudes/dispositions/talents) in heads. Figure 3.1 illustrates, on the vertical axis, some general measure

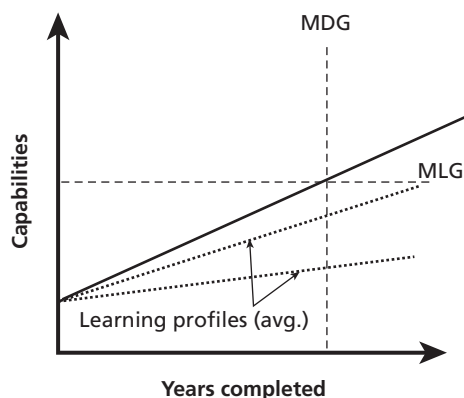
² There are excellent institutional reports from the World Bank (e.g., Bruns, Mingat, and Rakatomalala, 2003), an annual report from the agency for monitoring the education Millennium Development Goals (MDGs) (e.g., World Bank and International Monetary Fund, 2009), or independent exercises, such as those of the Copenhagen Consensus Center (Pritchett, 2004; Orazem, Glewwe, and Patrinos, 2007) or the American Academy of Sciences (Cohen, Bloom, and Malin, 2006).

³ This is *at best*, as mostly what they really provide is “names on paper,” because enrollment figures often diverge massively from actual attendance.

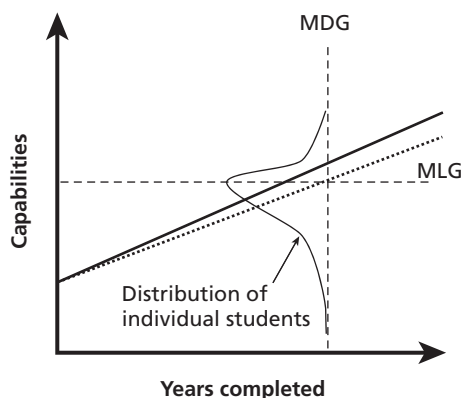
Figure 3.1
Connection Between a Butts-in-Seats Goal (e.g., the MDG) and a Millennium Learning Goal of Skills, Knowledge, or Attitudes: Three Disconnects



Disconnect 1. Does curricular design lead to the MLG at the MDG?



Disconnect 2. Do learning profiles, in practice, on average, reflect achievement of the curriculum-design goals?



Disconnect 3. Even if curricular design reaches the MLG at the MDG and learning profiles, in practice, implying that the MLG is reached on average at MDG, how variable is the distribution of student achievement?

NOTE: MLG = Millennium Learning Goal.

RAND CF267-3.1

of the desired educational outcomes (I am making no assumption that these can be adequately measured with standardized exams). Everyone's actual educational goal is some preference over the distribution of completed learning—which could be that everyone be above some threshold or that the average be high, for example. Suppose we had an MLG based on a goal for minimally adequate learning (Filmer, Hasan, and Pritchett, 2006). One could then assume some cause-and-effect relationship between a measure of time spent in school (or grade progression) on the horizontal axis and progress on the educational goal on the vertical axis and assume that the curricular design were such that completing the one (primary schooling, say) led to the other. Of course, assumptions can prove wrong, and there are three huge problems with connection between an MDG and an MLG.

First, while—at some early stage in the creation of the national educational systems—there might have been serious consideration given to the issue, there is little reason to believe that curricula are set so that completion of the primary cycle really gives a person minimally adequate schooling. This might be so, but, as national curricula are often old or have grown by accretion and serve multiple purposes (e.g., preparing most with foundations for further schooling), it would be amazing if it were really the case that reaching the MDG and having mastered the primary-school curriculum really led to reaching a considered set of educational standards in terms of performance.

Second, even if mastering the curriculum objectives of x years of schooling would lead to adequate schooling, the problem is that the *learning profile*—the connection between the years spent or progress in school and increase in learning—is, in many countries around the world, much, much, weaker than what is assumed. Typically, curricula are massively optimistic about the learning progress from year to year, so that, while having mastered the primary curriculum meant that a child had a minimally adequate education, in many countries, very few children actually finish primary school having mastered the curriculum. In countries that have retained primary schooling, leaving exams, one often sees average scores in the 40- to 60-percent range. Moreover, the learning profiles are highly heterogeneous across regions and schools.

Third, measures of primary-school completion ignore that huge variation across children in their mastery at any given level. So, even if exiting primary students, on average, were meeting the curricular objectives whose completion for the MDG was assumed to also reach the MLG, this would not answer the question of how many children were meeting the MLG itself (and if the average and median were the same, it would imply that 50 percent were not achieving the MLG).

Of course, in many countries, there are examinations and assessments that gauge learning achievement, some of which are comparable over time, and some of very few of which are comparable across countries. But this raises the second big issue, which is that nearly all tests are given in school, so they are tests only of those still attending school. So, while some developing countries (such as Thailand and Morocco) have participated in internationally comparable assessments (such as the Trends in International Mathematics and Science Study [TIMSS], the OECD Programme for International Student Assessment [PISA], or Progress in International Reading Literacy Study [PIRLS]), this still does not allow us to answer questions about the adequacy of the learning achievement of a cohort of, say, Thai or Moroccans because enrollments at the secondary ages are far from universal.

A paper by Deon Filmer, Amer Hasan, and myself (2006) tried to remedy these defects and create a measure of how many children in various countries were meeting MLGs (the goals were plausible but entirely illustrative, not normative). We took the PISA results, which aim to show students' ability to apply skills to real problems. PISA provides levels of performance based on the assessment, which is normed such that the OECD mean is 500 and the OECD student standard deviation is 100. To reach level 1, students have to score about 350, a level below which only about 5 percent of OECD students score. We used achieving the PISA level 1 competency as a proxy for a low MLG (MLGL) and the OECD mean as a high MLG (MLGH).

Table 3.1 shows what fraction of a cohort of students from various countries lies above the MLGL. For reference, two OECD countries—Japan and the United States—are included. In Japan, only 3 percent of students failed to reach level 1, so think of the worst-performing students in any given class, who probably receive attention or tutoring because they are lagging

Table 3.1
Cohort-Based Estimates of Cumulative Learning Achievement: Percentage Below MLGL or MLGH in Mathematics

Country	Test Takers (%)		Cohort (%)		Female Cohort (%)	
	Below MLGL	Below MLGH	Below MLGL	Below MLGH	Below MLGL	Below MLGH
Brazil	64	93	78	96	78	97
Indonesia	59	97	68	98	69	97
Korea ^a	2	25	2	25	2	30
Mexico	38	88	50	91	52	92
Thailand	26	80	34	82	30	82
Turkey	45	84	67	91	74	94
Uruguay	32	77	39	79	40	81
Greece ^a	17	66	17	66	18	71
Japan ^a	3	30	3	30	3	30
United States ^a	9	49	9	49	8	51

SOURCE: Filmer, Hasan, and Pritchett (2006, Table 2, p. 32).

^a Enrollment of 15-year-olds is assumed to be 100 percent in the grades covered by PISA.

so badly. In the United States, only 9 percent do not reach this standard, so, again, think of the bottom 9 percent in performance in mathematics in a typical U.S. high school—these are students who may well not graduate from high school (the high-school dropout rate among 16- to 24-year-olds is roughly 9 percent), much less go on to higher education of any sort. This is just to emphasize that this potential MLGL is not attempting to set up some superlofty goal but is really minimal functionality in a modern economy.

In stable, reasonably functional, middle-income countries, such as Brazil, Indonesia, and Turkey, less than two-thirds of a 15-year-old cohort reach this low threshold. Even in Mexico, only half of students reach that standard by age 15. Of course, higher-performing countries, such as Korea, prove that this is not beyond the reach of (once) developing countries, as only 2 percent do not reach level 1 performance. And these are middle-income countries with the wherewithal to participate in PISA. Imagine if this standard were applied to countries that both have lower scores among test takers and have lower fractions of their cohorts still in school at age 15.

Das and Zajonc (2008) have managed to do a similar calculation for two states in India by using an examination that could be matched to TIMSS. They found that, if one is willing to take the leap of faith and extrapolate these results to all of India (based on the relative ranking of the two tested states), 70 percent of a cohort of Indian 15-year-olds are not meeting the TIMSS lower threshold.

So, while the only empirically supported answer to the original question about the learning achievement of the world's children is, "No one has the slightest idea," we can see that, if one were able to establish any plausible threshold and measure student performance against this threshold, the answer would be that, even in countries that are easily meeting the MDG (such as Brazil and Indonesia), one cannot answer with any confidence that even half of children

are really emerging from their schooling experience adequately equipped for the 20th century, much less the middle of the 21st century into which they will live (and in which some will be leaders). In poorer countries, such as India (using the Annual Status of Education Reports, or ASERs) and Pakistan (using the Learning and Educational Achievement in Pakistan Schools, or LEAPS), when assessments have been done, they find that, on average, learning achievement is much lower than that, such that many children complete primary schooling having learned precious little.

Long-Run Stagnation of Learning Performance in the OECD

The second issue is that most OECD countries are pretty well clustered in the international assessments of learning performance. Of course, a huge amount gets made of the differences in the averages and the dispersion in TIMSS and PISA across countries (and that is, to some extent, their advocacy purpose). But, in reality, what is striking are not the differences but the similarities, particularly if one ignores the striking success of the east Asian countries. In some dimensions, there is actually not that much difference between the United States and Europe. What is much more interesting about the cross-national comparisons—the evolution of performance over time—gets almost no attention.

There are two well-known facts about basic education in the United States. First, the National Assessment of Educational Progress (NAEP) of average learning achievement of 17-year-olds had shown almost no improvement over a very extended period (until a bit of progress quite recently). In 1969, the science score was 305; it was 296 in 1973 and 295 in 1999. In 1971, the reading score was 285, while, in 1999, it was 288. In mathematics, the score in 1973 was 304, while, in 1999, 26 years later, the score was only 4 points higher.

Second, in striking contrast to this long-run stagnation of scores, nearly every measure of schooling-based inputs has increased dramatically, both in physical terms and in terms of resources used. Every conventionally conceived input into quality of schooling has increased substantially: Class sizes are much smaller, ratios of instruction personnel to pupils are much higher, the fraction of teachers with higher degrees is much greater, and facilities are better, not to mention the spread of instructional aids, such as technology. This goes along with a substantial expansion in real expenditures per pupil. It is worth stressing that the measures of real expenditures reported in this chapter deflate nominal expenditures on education, not with a general consumer price index but with the gross domestic product (GDP) deflator for services comparable to education. So the fact that some services are productivity resistant and, hence, their relative costs will increase over time (known to economists as the *Baumol effect*; see Baumol and Bowen, 1966) is already accounted for, so this represents education expenditures relative to other productivity-resistant services.

If these facts were unique to the United States, this would be of little interest except to people in the United States, but the debate has been transformed by a pair of clever studies. A German researcher, Ludger Woessmann, and his coauthors (Gundlach, Woessmann, and Gmelin, 2001; Gundlach and Woessmann, 2001) realized that the lack of consistent, comparable, nationally representative intertemporal data in countries besides the United States can be overcome by using the international assessments of math and science learning achievement (the International Association for the Evaluation of Educational Achievement [IEA] and TIMSS) and linking these to the United States and the NAEP. So, for example, even though Japan does not have a consistent time series to compare absolute performance, one can compare Japan to the United States at each point. While Japan outperforms the United States at every point in

time, if the absolute learning achievement of Japanese students were growing and that of U.S. students was stagnant, the gap between the United States and Japan should grow over time. In contrast, the Japanese performance gap with the United States, scaled in terms of the standard deviation of the test scores across countries, seems, if anything, to be shrinking (Table 3.2).

This is just one example, but the point is more general: We know that NAEP performance is constant in the United States, and we know that the position of the United States compared to other OECD countries does not appear to be deteriorating—for instance, on the recent PISA comparisons, the United States was right at the median.

Using this basic insight (and some unavoidable assumptions about the variance of the international assessments over time, to fix the problem created by the changes in the scaling of the various assessments), Woessmann and his colleagues constructed an estimate of the change in measured learning achievement of students of all ages in 11 OECD countries (including the United States) in math and science.

Then these same researchers computed the change in real expenditures per pupil, with nominal education expenditures deflated by a price index for government and private services. This deflation is important because the relative price of services to other goods will rise if productivity growth is slower in services (the Baumol effect). These represent the evolution of real expenditures on education relative to other (also labor-intensive and productivity-resistant) services.

Putting the evolution between 1970 and 1994 of test scores and expenditures per pupil together produces the truly shocking Table 3.3. In every OECD country, the changes in measured learning achievement have been modest; in many countries, it has fallen, and in no country has learning achievement improved dramatically. At the same time, expenditures per pupil have risen substantially—if not sharply—in every OECD country. This means that the

Table 3.2
Japanese Student Achievement Compared with U.S. Student Achievement

	Comparison Testing Year			
	1970 (score: 255)	1982 (score: 250)	1994 (score: 257)	1999 (score: 256)
Test: Year, Group, Scale	IEA I: 1970–1971, 14-year-olds, percentage correct	IEA II: 1983–1984, 13-year-olds, percentage correct	TIMSS: 1994–1995, 8th graders, proficiency scale (mean = 500)	PISA: 2000, 15-year-olds, proficiency scale (mean = 500)
Japan's score	39%	67.3%	571	550
United States' score	27%	55%	534	500
Japan's excess over U.S. score	12%	12.3%	37	50
Japan's excess scaled in cross-national standard deviations	2.41	2.81	1.73	1.84

SOURCE: Gundlach, Woessmann, and Gmelin (2001, Table A.2).

NOTE: All testing compares Japanese students' achievements with U.S. 13-year-olds' achievement on that year's NAEP for science.

Table 3.3
Achievement Stays the Same or Drops but Expenditures Rise in OECD Nations

Country	Estimated Change, 1970–1994 (%)		
	Assessment of Math and Science Learning Achievement	Real Expenditures per Pupil	Expenditures per Score
Sweden	4.3	28.5	23.2
United States	0.0	33.1	33.1
Netherlands	1.7	36.3	34.1
Belgium	–4.7	64.7	72.8
United Kingdom	–8.2	76.7	92.5
Japan	–1.9	103.3	107.2
Germany	–4.8	108.1	118.6
Italy	1.3	125.7	122.8
France	–6.6	211.6	233.7
New Zealand	–9.7	222.5	257.2
Australia	–2.3	269.8	278.5

SOURCE: Adapted from Gundlach, Woessmann, and Gmelin (2001, Tables 3.3 and 3.4, pp. 235–236).

combination of stagnation in measured learning achievement and increasing costs, far from being a problem unique to the United States, has been a large and universal OECD phenomenon.⁴

The implications of this relatively simple fact are huge. First, it takes all of the explanations of the stagnation or deterioration of scores per expenditure for U.S. students that depend on U.S.-specific phenomena off the table entirely. That is, the question that needs an explanation is why this same deterioration has happened in every single OECD country.⁵

Second, it means that developing countries cannot look to the recent experience of the leaders to learn what works in improving the systemwide student learning achievement of the type measured by these types of assessments. If the countries worried about their lagging performance follow the leaders, they may find themselves escalating costs with no learning gains, which is what the leaders have been doing for the past 30 years or more.

Third, it means that the cross-national evidence about the performance of different types of educational systems has to be reassessed. That is, while some other countries may have had educational systems that outperformed the United States in some dimensions, they all have been subject to very long-run stagnation in spite of rapidly increasing real costs and huge increases in the standard inputs (e.g., smaller class sizes, better-educated teachers).

⁴ Gundlach and Woessmann (2001) also demonstrate that this is an issue for the rising east Asian countries.

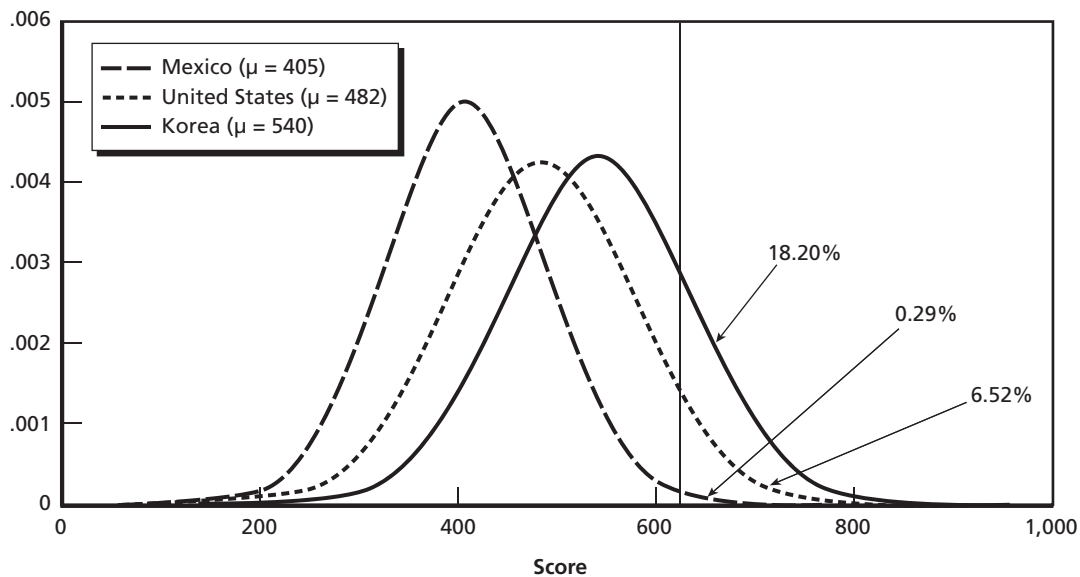
⁵ While it is possible that there is a U.S.-specific explanation for the United States and a different explanation for each of the other countries in which this same phenomenon has happened, this would certainly be unsatisfying to Ockham and his razor.

The Economics of Superstars and Their Production

Let's come back to the comparisons across countries, including between OECD and non-OECD countries. Most of the attention in comparing countries comes from comparisons of their differences *on average*, so that, in the 2003 TIMSS, the typical 15-year-old in Japan scores 570 on mathematics, in the United States 504, in Chile 387, and in Ghana 296. However, what is often underappreciated is the implications that has for the *upper tail*, the best of the best, across countries, which depends (on average) on the distribution and the absolute number. How many students in a given country are above a global threshold for *excellent* performance?

A test score higher than 625 is considered advanced by PISA international standards. This is, by construction, 1.25 standard deviations above the OECD mean. This is the score near the middle of students in proficiency level 5 (from 607 to 668). Students above this benchmark of proficiency are capable, among other things, “of advanced mathematical thinking and reasoning and can interpret complex information about real-world situations.”⁶ Figure 3.2 shows that only 0.29 percent of students in Mexico who took the test performed above the advanced international benchmark. This is compared to 18.2 percent of those tested in Korea and 6.5 percent in the United States. This implies that only three in 1,000 Mexican 15-year-olds tested were advanced or above in mathematics. This is compared to roughly 100 in 1,000 above that threshold OECD-wide.⁷

Figure 3.2
Distribution of Test Scores in the 2003 PISA for Mathematics for Three Countries



SOURCE: Pritchett and Viarengo (2009, p. 5).

NOTE: Percentages represent those students achieving scores greater than 625, the advanced international benchmark.

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⁶ Adams (2005, p. 261). This corresponds to proficiency levels 5 and 6.

⁷ Since the test is constructed to have mean 500 and standard deviation 100, the level 625 is roughly at the 10th percentile.

One implication of this is that there are just very few students in any given year in Mexico, a middle-income country with more than 100 million people, who score above an advanced international benchmark in mathematics—a score representing the kind of knowledge that would be needed to get a world-class preparation for careers in, say, engineering, computer science, mathematics, or physics. The United States—not particularly known as a stellar performer in international assessments—by virtue of size and inequality, actually produces around a quarter of a million students above that threshold. In contrast, Mexico can muster less than 4,000: Every student in Mexico with this level of performance could fit in a small auditorium (Pritchett and Viarengo, 2009).

Das and Zajonc (2008) do a similar calculation for the 43 countries with available TIMSS data (not PISA); by their own calculations, they provide a rough estimate for India (see Table 3.4). What is striking is that India, by dint of its size and massive inequalities in performance, produces roughly 100,000 students at the advanced level per year. In contrast, the absolute numbers of students who are above this threshold at age 15 in many countries is tiny. In 26 of the countries, the estimates are that there are less than 5,000 students a year above this threshold—including 15 countries for which the estimated number of students, rounded off to the nearest 1,000, was *zero*.

The awkward fact is that the *best* Tunisian students (in the 95th percentile) are roughly the same as the U.S. *median* student (515 versus 505) and worse than the typical (median) Dutch student (515 versus 540); the same is true for many other middle-income countries (see Table 3.5). Tunisia's *good* students (at the 75th percentile) at 450 do less well than the bottom quarter of students in the Netherlands (488).

Why might we care about the upper tail and, in particular, the absolute number of students in it? Globalization, emergence of superstar economies, and scale effects in the production of knowledge give us reasons to care.

Let's take these in reverse order. It may well be the case that, to sustain the production of knowledge or, more measurably, universities that sustain the production of higher education, one needs a certain minimum scale. Ranking universities for quality is intrinsically a difficult business, and one can certainly be skeptical of the precise rankings. A think tank associated with a Chinese university has produced rankings of the world's top 500 universities based mainly on the presence of superstar academics (prizes and citations) (Institute of Higher Education, undated). What does it take to be in this top 500—which is not to be at the top, like Cambridge, Oxford, Harvard, or Stanford, but to just make the list? The rating system groups universities out of the top 500 only in groups of 100. Some of the U.S. universities in the 400–500 range are the University of Maine; Utah State University; the University of Maryland, Baltimore County; and the University of Wyoming.

The first thing one notices is the concentration of these in English-speaking countries: Nearly half the world total—237—are in the United States, the UK, or Australia. The second thing one notices is that poorer countries have almost no universities of global standing (where *global standing* is not defined by Oxford University but by the University of Wyoming). For instance, in all of sub-Saharan Africa (with a population of more than 700 million), there are only three in the top 500, all in South Africa. Some major middle-income countries, such as Mexico and Turkey, have only one each. Many countries that are huge in population have none at all (e.g., Indonesia, Egypt, Pakistan).

An alternative, perhaps more populist ranking is by a group that assesses a university's Web presence (CCHS-CSIC, undated); this is technologically biased but captures a larger

Table 3.4
Estimate of Students Above the Advanced Benchmark Score (625) in the Latest TIMSS Data

Country	Absolute Number of Students Above 625 in TIMSS (thousands)	Share of All Students Above (%)	Cumulative Share (%)
Japan	291	22.8	22.8
United States	258	20.2	43.1
Korea	226	17.7	60.8
Taiwan	115	9.0	69.8
India	101	7.9	77.7
Russia	70	5.5	83.2
Indonesia	26	2.0	85.3
Malaysia	23	1.8	87.1
Singapore	23	1.8	88.9
Hong Kong	19	1.5	90.4
Netherlands	18	1.4	91.8
Australia	17	1.3	93.1
Italy	15	1.2	94.3
Egypt	13	1.0	95.3
Hungary	12	0.9	96.2
Belgium (Flemish)	11	0.9	97.1
Romania	8	0.6	97.7
Israel	6	0.5	98.2
Serbia	4	0.3	98.5
Slovakia	4	0.3	98.8
Sweden	3	0.2	99.1
New Zealand	3	0.2	99.3
Bulgaria	2	0.2	99.5
Lithuania	2	0.2	99.6
Armenia	1	0.1	99.7
Jordan	1	0.1	99.8
Latvia	1	0.1	99.8
Estonia	1	0.1	99.9
Slovenia	1	0.1	100.0

SOURCE: Adapted from Das and Zajonc (2008).

NOTE: These countries are estimated to round to zero above the threshold: Bahrain, Botswana, Chile, Cyprus, Ghana, Iran, Lebanon, Macedonia, Moldova, Morocco, Norway, Saudi Arabia, Philippines, South Africa, and Tunisia.

Table 3.5
Test-Score Distributions for Middle-Income Countries

Country	Percentile				
	5th	25th	50th	75th	95th
High performer: Netherlands	417	488	540	587	644
Middle performer: United States	369	450	505	560	635
Low performers					
Tunisia	316	368	407	450	515
Chile	258	328	382	441	531
Philippines	241	316	373	437	527

SOURCE: Based on Das and Zajonc (2008).

dimension than just Nobel Prize winners. Again, the United States and other English-speaking countries dominate the list, with more than half of the 500 (259). Again, Africa is essentially invisible—University of Cape Town is the only entrant in the top 500 (again, keeping in mind that this is not whether they are Stanford University; the relevant comparison of making the top 500 is Boise State University, 483rd on this list). Again, many large, middle-income countries are nearly invisible: Mexico has two universities in the top 500, Chile and Argentina only one each, the entire Middle East and North Africa only two (in Saudi Arabia), and Indonesia (with 200 million people) has none.

The basic point is that, if a country is annually producing only a few thousand students who are in the world's top 10 percent of all students, it will have a very difficult time maintaining world-class universities.

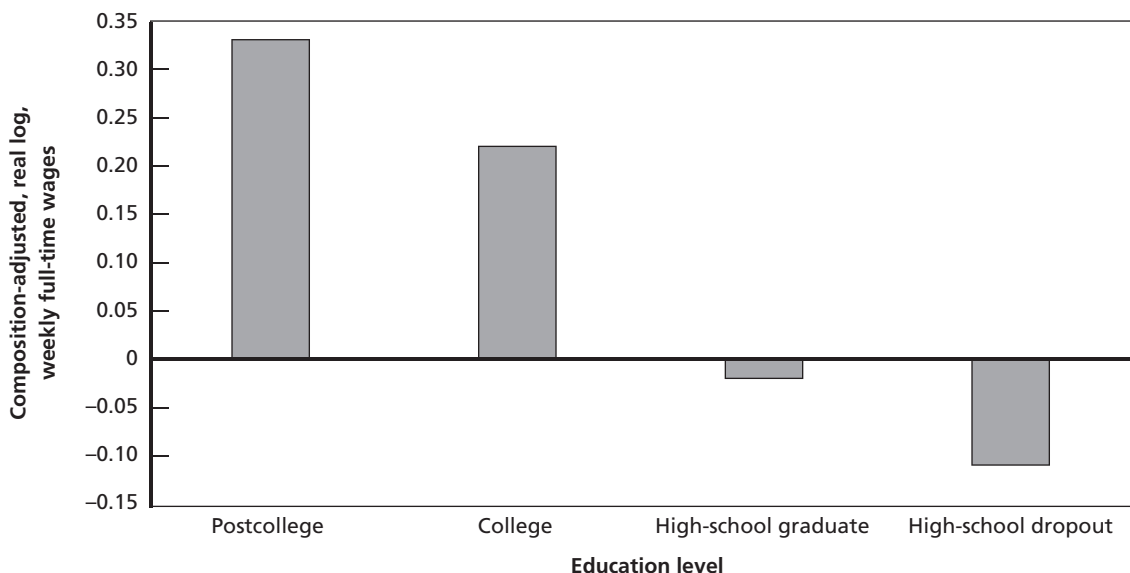
The second point is about the economics of superstars. Perhaps the most striking feature about the evolution of the U.S. economy over the past 30 years or so has been the increase in inequality. This obviously has many causes, but one of them has been a very large rise in the inequality in incomes. There are two aspects of this. One, very widely remarked on, is the increase in the returns to college. However, the increase in inequality has come at every level and within every level of schooling—so that inequality among specific occupations has also gotten larger. Three figures illustrate the phenomenon in the U.S. labor market. Figure 3.3 shows that real wages fell for high-school graduates, rose for college graduates, and rose by even more among those with more than a college education.

Figure 3.4 shows that the rise in inequality in the United States was not primarily a poverty issue, in that the middle pulled away from the bottom, but also that the top (90th percentile) pulled away from the middle.

Figure 3.5 shows that, even among the 90th percentile, the very top percentile—the top 1 percent—more than doubled its share of total wages between 1967 and 1997. This suggests that, within any given educational group (college, postcollege), the inequality increased.

The upshot is that, in the U.S. labor market, it appears that the returns to those with high-school education stagnated and the returns to the *very* highly skilled increased substantially. The deep question, for which I have no answer, is what that means for the returns to education in other places around the world.

Figure 3.3
Changes in U.S. Full-Time Wages, by Education Level, 1981–2005



SOURCE: Pritchett and Viarengo (2009).

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The third issue around the top end is globalization. One possible explanation is that returns to superstars increased because globalization allowed the highly skilled to leverage their talents over larger and larger markets. If that is the case, what this implies for the returns to a country's economic elite that is globally low skilled is not clear. If they compete head to head (so to speak), they lower their wages or returns. This also may distort their relative returns so that they allocate into nontradable activities (e.g., government, law, medicine) and away from activities in which their skills are pitted head to head against global talent.

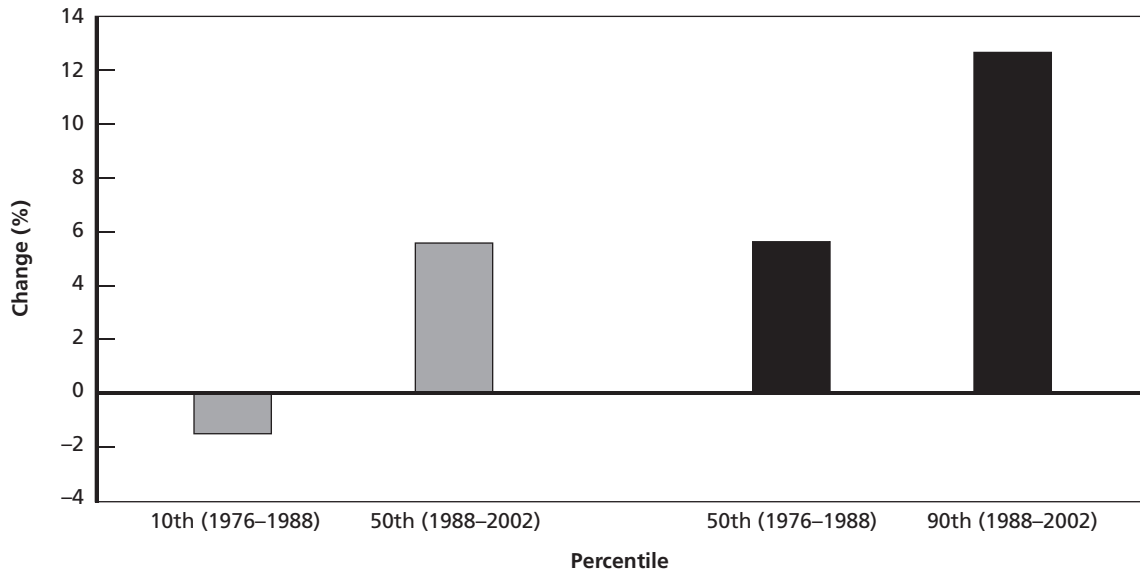
Long-Run Considerations in Human Capital

If a modern Rip Van Winkle had gone to sleep in 1908 and woken up today, he would be bewildered and disoriented by the technological, economic, and social changes in the world.⁸ I am amazed by YouTube, streaming video over the Internet on computer, but Rip would not have even seen television. I am amazed at the rise of outsourcing that moves service jobs to remote locations thousands of miles away, but Rip would not have even experienced the decline of agriculture as the major occupation. I am amazed by the decline of Anglo-Saxon and other European heritage as the majority in many cities in America and amazed that the United States has an African American president, but Rip would not have even seen the end of segregation.

Overwhelmed and bewildered, where could our 1908 Rip go today to feel right at home? School. He would recognize the buildings; he would recognize the classrooms; he would recognize the content; he would recognize the organization inside the classroom, the pattern of

⁸ This section is adapted from a recent essay of mine, *The Re-Birth of Mass Education* (Pritchett, 2009).

Figure 3.4
Changes in U.S. Male Hourly Earning Inequality Among College-Graduate Males with 24–26 Years of Experience, 1976–1988 and 1988–2002



SOURCE: Autor, Katz, and Kearney (2005), using March Current Population Survey (CPS) data, 1976–2004.

NOTE: Statistics pool three years of data. College graduates are those with 16 or 17 years of completed schooling (surveys prior to 1992) or a baccalaureate degree only (1992 forward).

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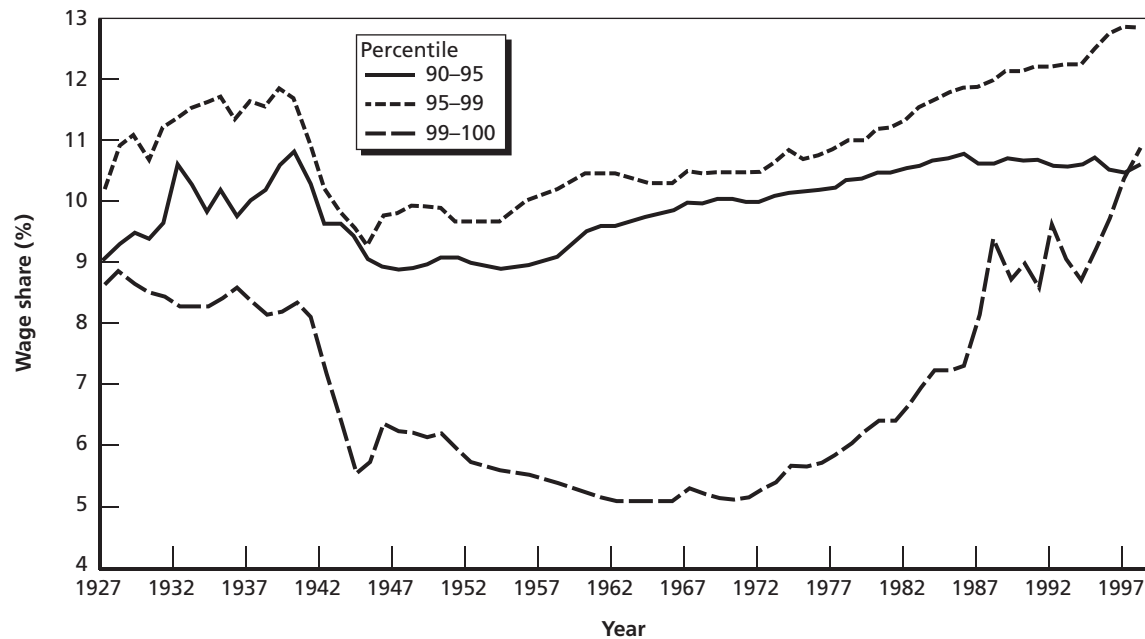
the day, the internal organizational structure of the school itself (a principal and teachers). Even more deeply, he would recognize the overall *system* of government-owned and -operated schools.⁹

Moving from Rip Van Winkle to Marco Polo, modern travelers in the world are often struck by differences in flavors, in colors, in culture, in language. Overwhelmed and bewildered, where can a traveler go to feel right at home? School. I have been in classrooms in more than a dozen countries, in cities and in poor rural areas, and—while the foods people eat, the way they dress, and the work they do vary enormously—schools are amazingly the same. Even more deeply, the structure and *system* of schools, how they are run and governed, is often a direct copy of other systems.

This persistence and institutional isomorphism of features of schools and schooling systems has deep and powerful causes. The legacy systems of large-scale government production of basic schooling that span the globe have survived and thrived precisely because they were a perfect fit with the needs of their time. The need was occasioned by a historical fourfold transformation in the economy, the polity, administration, and the society—the school was a key instrument in the rise of the modern. Crudely put, schools were about the transformation from traditional occupation of farming to factory, from subject to citizen in the political sphere, from peasant to clerk, and from member of a clan to patriot of a nation-state. As these legacy systems of schooling arose, these roles were recognized and debated and contested, but

⁹ I was in Lehi, Utah, when Lehi Senior High School was celebrating its 100th anniversary, and I would guess that the pictures of Lehi High in 1908 would be instantly recognizable.

Figure 3.5
Top U.S. Wage Shares in the Long Run: Wage Income Shares for Top Education-Level Percentiles, 1927–1998



SOURCE: Piketty and Saez (2001).

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the virtue of success in socialization is that complete success means the complete invisibility of inevitability: The structure of schooling systems is not seen as a choice but as just plain common sense.

As central as legacy systems of schooling have been in the social, political, and economic developments of the 20th century, they are now obsolete, but in different ways that reflect the three issues outlined in this section: obsolescence from success, failure, or rapid change.

Obsolete from Success

The plateau in measured performance of nearly all OECD countries in spite of dramatic increases in the inputs (both quantity and quality) raises difficult issues, particularly because the OECD nations have, at least superficially, very different systems. That is, one could imagine that whether a country adopted a centralized, federal, localized, or privatized system might matter a great deal. However, the world has run that experiment: Countries, mainly for reasons of historical evolution, do have very different educational systems, so that, very crudely put, France is centralized, Germany is federalized, the Netherlands is privatized with public support, and the United States is localized (with powerful school districts much smaller than the states). One might think that these would lead to very different outcomes. However, while lots of ink gets spilled over these differences, they do end up with roughly the same outcomes: Once one looks across a variety of topics and variety of instruments, the country-specific differences are harder to detect. Moreover, as I stress in the preceding section, whatever gaps in performance there are, all of these systems appear to have seen plateaus, as the gaps are not growing over time.

At the same time, in terms of the modernization agenda, schools in the OECD have been fantastically successful in creating economically productive individuals, citizens for stable democracies, and capable administrators (for management of both public- and private-sector bureaucracies) and fomenting social affiliations. However, the very essence of those socialization tasks of mass education in supporting modernization is to create students who can follow the rules. Much the very essence of the modern school is to teach children to sit down, be quiet, and do what they are told—as precisely these characteristics really were valuable in the labor market (factory workers), in nation-state formation (limiting democratic participation to voting and away from direct action), in administration (good postal workers, soldiers), and in social relationships (the rules apply to everyone equally).

Again, schools have been so successful as a social innovation that they have completely rewritten their own history. What were urban schools in the early 20th century really like? In one poignant historical example, Tyack (1974, p. 177) writes about Helen Todd, a factory inspector in Chicago who interviewed 500 children working in factories (often in dangerous and unpleasant conditions) and asked the question, “If your father had a good job and you didn’t have to work, which would you rather do—go to school or work in a factory?” Of those 500 interviewed, fully 412 said they would choose factory work—again, under the explicitly posed premise they did *not* have to work for economic reasons. The researcher recounts asking one 14-year-old girl in a particularly unpleasant factory (lacquering canes in an attic, involving intense heat and the smell of turpentine) why she did not go to school. The response “School is de fiercest t’ing youse kin come up against. Factories ain’t no cinch, but schools is worst.”

The tension in educational systems and philosophies has been that one of the foundational writers on education, John Dewey, understood very well how the education of an elite should be handled: exactly like the University of Chicago Laboratory Schools. However, public educational systems around the world were created often with precisely the opposite purposes, which, my conjecture is, explains why his theories and ideas got so much lip service but so little traction in practice.

The question is then one of how to create an educational system that will adapt itself to the type of education needed. This is a hard question, particularly because there are two ways in which systems learn. At one extreme, there can be *ecological* learning: No organization ever learns, but organizations with the new ideas are more likely to survive and capture a larger and larger share of the activity.

This, of course, describes a market as one type of ecological system learning. Innovations need not diffuse by being adapted by existing organizations; rather, new organizations emerge and capture large market share and then other organizations may imitate them. Note, for example, that Sears was once a dominant firm. It had pioneered many aspects of modern retailing and, in so doing, became a giant, a firm revered for the quality of its management. However, its organizational culture was so well adapted to the conditions and practices that made it a success that it could not learn and respond to new demands and, hence, in a period of a few short years, it went into permanent decline—undone by newer, more agile discount retailers. Eventually, K-mart itself was displaced as the leader in the industry by Wal-Mart, which implemented a whole new series of organizational processes and practices that have allowed it to achieve a dominant position and that are widely implemented by other firms.¹⁰ So

¹⁰ Sears and K-mart merged in 2005.

productivity in retailing increases through innovation even if no individual organization ever learns fundamentally new ways of doing things.

At the other extreme, systems learn through organizations learning. This is often the only option when there is an intrinsically monopolistic provider of the service and it is very difficult for one organization to displace another. Armies (and defense forces, more generally) are a classic example: There is no competition for what organization is the supplier of defense services to Germany or France or the United States. In peacetime, there is also very little way to know how effective one's organization really is—armies maintained for decades in the barracks and marching grounds can collapse into disorganized rabble in days. In this case, organizational learning is crucial—but the history of warfare demonstrates how hard such learning is.

Successful organizations, in particular, find learning very difficult, as there are two dangers. One is that, when organizations understand in what areas lie their strengths, they will seek tasks at which they excel, even when this requires redirecting efforts and resources away from important challenges. A second danger, illustrated for private firms by Christensen's (1997) *The Innovator's Dilemma* is that organizations will learn but be so absorbed with learning in one domain that they will completely miss disruptive technologies, as these would require organizations to change and redefine their core competencies.

Getting back to the big question: Are educational *systems* in the OECD capable of systemic learning on the scale needed to move into the future? I do not know.

Obsolete from Failure

The fourfold broadly synchronous modernization of the West's historical experience has not been reproduced successfully in many parts of the world. The enormous success in spreading modern *forms* of schooling—which are fundamentally about the transformation of world views—has not been matched by a similar success in other areas of economic, political, administrative, and social modernization. This contrasting success and forgetting about failures creates an awkward situation. The West and its institutions (in particular, the array of donor institutions) live in a *mental* world with only one possibility—the modern—even having forgotten that anything else ever was. In poor countries, governments maintain the fiction of the modern, but other possibilities exist and are the reality. This means that the reaction of *development policy*—which is more or less adequately defined by the attempt to replicate the historical transition experience of the West—to failure is always a doubling down of the bets, an intensification of more of the same, as it cannot see any other possibility (Scott, 1998). But the reality of the world outside of the West (and its bubbles) is huge and varied. The Indonesian educator Ki Hadjar Dewantara described the advent of modern schooling in postcolonial Indonesia in these terms:

Thus we have sacrificed what was ours but have not gained in its place anything that might be considered its equivalent; we have lost our world, but we have not entered another. (quoted in Harper, 2009, p. 3)

The failed states of the world—such countries as Afghanistan, Nepal, Cambodia, Sudan, Somalia, and Yemen—have not undergone any of the four modernizations, in spite of, in many cases, having substantial expansions in schooling.

Other states, which have moderately more control, have not been very successful at actually creating schools in which effective learning happens regularly. Often, the directly observ-

able proximate causes are identified but without any assessment of the connection between the flailing in attempting to produce schooling and the deep mismatches between the modern school and the economic, political, social, and administrative realities (Pritchett, 2009).

Finally, in a third class of countries are states that are reasonably functional but have relatively low-quality schools (e.g., most of Latin America, Turkey). The usual recommendation for all of these places by experts in education is just doubling down the bet in the attempt to reproduce the schools of the West. While economics has received barrages of criticism for one-size-fits-all recommendations, there is nothing so one size fits all as the recommendations of international experts in education (Pritchett and Woolcock, 2004). The problem with “business as usual with more money” as *the* solution is that what the actual solution really is depends on many factors, including which other elements of modernization have actually taken hold.

In completely failed states, schooling systems either are built from strong communities from the ground up (and then rationalized into formal systems) or are imposed from the top down by strong states. The problem with educational systems in failed states is that they have both or neither and hence a set of blocking vetoes.

In flailing states, the question is whether the modern mode of administration has deteriorated beyond a point of no return. In some places, it likely has (e.g., Pakistan), while, in others, it might not have, in spite of the present functioning (e.g., some states of India). The question in these cases is how to constitute system strength that drastically economizes on scarce administrative capability—which open localized systems can, at least in principle, be made to do.

The functional states just face the problem of how to make their Western-legacy systems deliver OECD-level performance. While radical changes are less attractive, I have not seen anyone do this very easy but really ugly arithmetic. Suppose you are currently roughly a student standard deviation in assessment learning behind the OECD (e.g., around 400, which is where most Latin American countries are). The challenge is to put together a package of interventions, investments, and programs that will erase that gap. This involves multiplying the empirical magnitude of the available interventions (scaled in terms of effect sizes, so scaled by student standard deviations) by the scope of the proposed intervention. So, for example, suppose that country X is going to improve quality by (1) upgrading teacher qualifications, (2) reducing class sizes, and (3) improving availability of learning materials. Suppose, too, that the goal for reducing class sizes were to bring them all below 40 students. The total effect on average scores is the effect on the affected students (e.g., the effect size of being in a class of fewer than versus more than 40) times the scope (those who were in classes larger than 40 but are now in smaller classes). The math works similarly for other known interventions. The problem is that you cannot make these numbers add up, as both effect sizes and and scope are typically small and the math is that a small number (say an effect size of 0.1) times a small number (20 percent of students affected) leaves a *very* small number—a 0.02–standard deviation gain in average performance.

There is just no reliable evidence about how to address the very low learning performance currently observed in the poorer countries on anything like the magnitude and time scale people would wish—a point not generally acknowledged because legacy systems continue to set only MDG-like goals.

Obsolete from Changes in Needs

The final area that brings about obsolescence is the changes in the demands on education. Education has always been about the preparation of children to take on their roles as adults,

and schooling has long been one element of that overall education. It is clear that, in the most advanced economies, the demand in the market for people who have only the skill set that the legacy systems were honed to produce—people who follow the rules—has steadily declined. This creates pressures to produce people with new basic skills, such as those proposed by Murnane and Levy (1996) and many others. It is also clear that, with globalization, the scope for and rewards to creativity (both mass—e.g., the traditional “economics of superstars” à la Rosen, 1981—and niche—the long tail) have increased.

I have three points about these changes.

First, the conflict between an emphasis on the upper tail of performers and the traditional focus on equality is greater in practice than in concept. The issue of equality is almost always equality of opportunity so that the question is whether children born into less advantaged households have the opportunity to become high performers and, if they do, whether they will be able to receive the desirable quantity and quality of education. So, any degree of equality in opportunity is compatible with any degree of inequality in outcomes. However, many societies have been reluctant to openly and actively promote inequality when the reality is that opportunity to access the upper tail is strongly socially stratified (e.g., on race, caste, parental background).

Second, an emphasis on the production of very top quality would have to avoid reducing that to a single dimension—only one type of intelligence. Many schooling systems with high stakes for the students—life-chance determining—standardized testing at relatively early stages does, in fact, produce spectacular results on international assessments (e.g., Korea, Japan, Singapore, Taiwan). However, I think that, within these societies, there is a realization of the negative repercussions on lifelong learning, creativity, and rewards to other intelligences. However, most countries simply cannot afford to counteract these tendencies in the way in which the United States does—by allowing huge numbers of second chances and keeping very large portions of youth in schooling with the possibility that potential will emerge, which makes for very low-stakes, relatively low-performance high schools but fantastic universities and, ultimately, a rich and creative economy (perhaps, with the current crisis, too creative, but, as I heard Derek Neal say at a conference I attended detailing how poorly U.S. students do on international assessments at age 15, “Hey, if we’re so stupid, how come we are so rich?”).

Third, if little is reliably, scientifically known about how to design systems that produce good outcomes on easily measurable dimensions of performance in learning—such as those limited aspects of education that can be reliably measured with a standardized examination—even less is known about how to promote creativity or excellence. So the practical recommendations in the short run will be few, but even a discussion of the issue of equal opportunity—to attain not a minimally adequate education for all but a maximally potential-revealing education for those who would most benefit (and, in turn, most benefit society)—would add a new dimension to most policy discussions. It is something of a puzzle that No Child Left Behind (Pub. L. No. 107-110) focuses on producing precisely the kind of education for which the U.S. labor market has been saying for decades that there is no demand.

Conclusion

Publicly produced schooling has been the most fantastically successful institutional innovation of the modern age (started in the 19th, scaled in the 20th). However, in the long run, planning

future success can be as difficult to cope with as can planning for future failure. In advanced economies, such as that in the United States, the economy for which schools were well adapted has long since ceased to be dominant. Henry Ford's famously modern River Rouge plant is now a subject of history exhibits, but the River Rouge-like model for schools continues to churn along. On the opposite extreme, the four modernities we have described have never really come into existence in most of the world (most countries in the world are still at levels of output per capita well lower than the United States had in 1900), in spite of massive physical expansions in modern schools. The question of how school systems, as systems, will adapt into the long-run future to cope with economic, political, social, and administrative transformations is an important, and wide-open, question.

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International Policy

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In a recent RAND project seeking to draw both the long- and short-term implications for U.S. policy of futures out to 2025 as sketched by the U.S. National Intelligence Council (NIC), in many cases, the policies that seemed appropriate for 2025 were also the right ones for the immediate agenda (NIC, 2008). For instance, the NIC's vision of a 2025 world that will be multipolar, with transnational actors more and more important, implies a very different style of leadership, one in which the United States behaved neither like a hegemon nor like an ordinary state. In its model, consultations with other major powers would be real, and the United States would make clear that it was considering other major states' interests in framing its own policy approach. Yet, that also seemed to be the right style of leadership now, especially in dealing with the global economic crisis.

So, too, the NIC vision of China in 2025—continued growth and, with it, an increased stake in the international order—seems to call for U.S. policies that would not be very different in 2025 from what they should be now. Policy would accommodate Chinese power, trying to steer it toward constructive engagements with both the United States and international institutions. At the end of 2008, most observers would have bet that China, given its large reserves, would weather the economic crisis better than the United States. By early 2009, that looked much less certain. Yet, even if a sharp fall in China's economic growth touched off political turmoil, that would not necessarily change the U.S. policy prescription—only make it less urgent.

By contrast, this chapter concentrates on important long-term issues for which ultimate decisions may *not* be ones that are convenient now. Thus, *long-term decisions* occur when the process of reflecting on potential events decades in the future causes decisionmakers to consider and perhaps choose near-term actions different from those they would otherwise pursue. After starting by setting out long-term U.S. goals and a brief summary of current U.S. international policy, the chapter turns to six priority long-term decisions—that is, important, near-term actions the United States should at least consider taking today in order to meet its long-term international goals that it would not take absent these long-term goals. Those six are fiscal discipline after the immediate economic crisis has passed, visions of the nuclear future, effects of revolutions in military affairs, reshaping international institutions, whither Mexico, and refashioning domestic institutions. (Climate change and energy would be seventh and eighth on this list and are the subject of Chapter Five).

For most of the six, the case for adjusting now to account for the longer term is not as clear as it is for climate change, and, for several, the current policy approach that might be driven by attention to the longer term is not plainly in sight. Several of the six might be candidates for RDM—looking across hundreds of scenarios and asking which solutions are the

most robust across a wide range of uncertain futures. As context for the six, this chapter first articulates long-term U.S. goals then characterizes current U.S. international policy.

Long-Term Goals and Current U.S. Policy

Articulating long-term U.S. interests or goals is often done but seldom done well. It is also too easy to frame either interests or goals in terms too grand or idealized to drive policy.¹ For the purposes of this chapter, the five most important long-term U.S. goals relating to international security, stability, and transformation might be those listed here:

- Reduce the risk of an attack with very lethal weapons on the United States and its forces abroad.
- Ensure the integrity, stability, and prosperity of the United States.
- Ensure the survival of U.S. allies, and work with them and other like-minded states to produce a productive and democratic world congenial to U.S. interests.
- Prevent the emergence of a hostile or failed state on U.S. borders.
- Try to move rising powers, such as China and India, into constructive relationships with the United States and with major international institutions.

Transformation, in this context, means navigating the steep part of an s-curve transitioning from a world a century ago with almost everyone poor to a world in the coming decades with most people relatively rich. As Herman Kahn put it, “Two hundred years ago almost everywhere human beings were comparatively few, poor, and at the mercy of the forces of nature, and 200 years from now, we expect, almost everywhere they will be numerous, rich, and in control of the forces of nature” (Kahn, Brown, and Martel, 1976, p. 1). This transition will combine unprecedented opportunity with unprecedented stresses on international stability, the distribution of military and economic power, resource availability, environmental quality, international governance, and many other factors. A key question becomes what the United States should do in the near term so that this coming world is hospitable to its values, economic opportunities, and natural environment. A specific subquestion, one to which I return in conclusion, is whether the United States should do anything more or different with respect to the poorer countries that have not yet really started on the transformation.

The very short-term nature of current U.S. policy makes it hard to score against these long-term goals. A characterization of current policy that focused on actions—rather than rhetoric or aspiration—might be as follows:

- Work through the economic crisis by stimulating and regulating the economy while working closely with partners old and new and, especially, including China, to do the same.
- Wind down U.S. involvement in Iraq in the most orderly way possible while increasing the commitment to Afghanistan.
- Prosecute the fight against terror, primarily through military operations abroad and site protection at home.

¹ One better-than-usual effort, which is the starting point for this listing, was a tripartite cooperation of RAND, the John F. Kennedy School of Government, and the Nixon Center before 2001. See Allison and Blackwill (2000).

- Try to limit the spread of highly lethal weapons, especially nuclear, primarily through bilateral arrangements (in, e.g., Russia) or negotiations (in, e.g., North Korea, Iran, Pakistan).
- Address Arab-Israeli issues primarily through keeping some *process* going.

Long-Term Decisions

The workshop produced a useful checklist of characteristics of long-term decisions:

- They involve substantial delays between actions and desired effects (e.g., education).
- They involve substantial transformations (e.g., IT, postconflict planning in a failed state).
- They involve situations subject to significant surprise (e.g., climate change).
- Institutional lock-in yields a persistent gap between goals and performance:
 - The institution has goals separate from those of society.
 - Institutional goals are aligned with those of society, but there is a persistent gap in performance (e.g., Social Security).
- Longer-term thinking can help solve short-term deadlocks.

Against that characterization of long-term issues, we now examine six possible examples in U.S. international policy.

Fiscal Discipline After the Immediate Economic Crisis Is Passed

This issue is not one for which long-term interests require immediate policies that differ from those for short-term interests. Rather, the risk is that current policy will not turn around when the time comes for doing so. The agenda for the next several years will be dominated by trying to avoid having the recession turn into an enduring depression. Much of that effort will be conceived as domestic policy, including major stimulus packages dominated by large investments in infrastructure and tax policies tailored to provide the maximum multiplier affect. The result will be U.S. budget deficits on a scale without precedent, at least in nominal terms.² Those deficits, and the need to finance them, will be vivid testimony to the fact that, even on core economic policy, domestic and foreign cannot be separated.

The reason for the risk is a kind of institutional lock-in, in which what Congress, in particular, produces by doing business as usual does not meet long-term societal goals. No global economic crisis can ever be said to be well timed, but the one that began in 2008 is especially ill timed for the United States, which needed to recover from a generation-long consumption binge and increase savings. By contrast, the timing is not so bad for China, which needed to move in the opposite direction, saving less and consuming more at home.

The U.S. economy needed to be restructured in any case, a fact underlying but not the immediate cause of the financial crisis. The United States has been on a long consumption boom, fueled by the accumulation of huge quantities of private as well as public debt. Now, the country needs to see aggregate savings—household, corporate, and government—grow by

² Actually, the measure that probably matters most, debt in relation to GDP, peaked in 1950 at 94 percent and was 66 percent at the end of 2007.

about 4–6 percent of GDP. In the process, the perennial U.S. current-account deficits would diminish equivalently. From a position of near balance in the early 1990s, the U.S. external current-account deficit has progressively widened to reach around \$800 billion, or around 6 percent of U.S. GDP in 2008. The household saving rate was actually negative in 2005.

Accomplishing this U.S. restructuring without a serious and protracted recession and deflation will be no mean feat but is hardly impossible. The magnitude of the restructuring is relatively modest. The resilience of the U.S. economy is arguably greater than that of other economies—reflected, for example, in more-flexible labor markets and greater ease of market entry and of new start-up businesses.³ These sources of resilience will be further enhanced if and as U.S. credit markets begin to thaw, making short- and medium-term credit accessible for working capital purposes. But the nation's resilience will be tested.

The harder challenge will be political. Robert Lempert's description of the obstacles to creative congressional long-term decisionmaking on climate change is apt for fiscal discipline as well:

The flood of near-term crises demands much of Congress' attention. Congress' committee structure can make it hard to see the big picture and thus implement coherent, system-wide action. The constant pressure of the next election, combined with legislators' strong desire to return to office, make it hard for Congress to impose direct costs on special interests, even if such costs produce more significant but diffuse benefits for all. Congress also has a domestic jurisdiction, but U.S. reductions will mean little if other nations do not participate. (Lempert, 2007, p. 4)

In particular, spending is visible, while taxation is painful and discipline invisible. Combine Congress' atomized, running-for-office-all-the-time structure with institutions for budget reconciliation that have turned out to be weak, and the result is a built-in bias toward spending. So the challenge, once the immediate crisis has passed, will be to build, first, an argument for fiscal discipline rooted in national security and, second, ways to make and enforce the required—and painful—choices.

This challenge suggests beginning to build the basis for that policy change *now*. It means, for instance, presidential speeches to educate and to outline future commitments. It also means reaching out to advocacy nongovernmental organizations (NGOs), which can be part of coalitions supporting painful adjustments. And it almost surely requires beginning to think now about special procedures, like fast-track authority for approving trade agreements or the procedures for military-base closing and realignment, that amount to some tying of the hands of the executive or Congress, or both, once some blue-ribbon panel has reached recommendations. Those special procedures are hardly a substitute for the farther-reaching reforms in the way government does its work that are discussed later. But they are almost sure to be necessary while the still-broader agenda is considered.

³ The United States continued to rank first in the World Economic Forum's 2008–2009 global competitiveness report. China was improving but still ranked number 30.

Visions of the Nuclear Future

This is an issue for which prioritizing near-term convenience may be correct, but the level of correctness depends on whether the long-term vision is nuclear abolition.⁴ There is no question that a world without nuclear weapons—a world of zero—would be in the United States' interest. It would be a world safe for conventional weapons in which the United States reigns supreme. Yet, it would also be a world safer for all those who might be targets of nuclear missiles or terror. In particular, proponents of zero emphasize that the world is at a very dangerous pass, with North Korea perhaps already a nuclear-weapon state and Iran poised to become one, the latter eventuality threatening a very dangerous proliferation in the greater Middle East. The Treaty on the Non-Proliferation of Nuclear Weapons (NPT) envisioned the end of all nuclear weapons. It provides that states that (1) did not possess nuclear weapons as of 1967 agree not to obtain them and (2) do possess them agree to negotiate in good faith to divest themselves of these weapons over time.⁵

Yet, there are powerful arguments against abolition. The most obvious for the United States are the circumstances of nonnuclear allies, many of which (including Japan) can regard themselves as secure precisely because the United States has nuclear weapons and so extends nuclear deterrence to allies.⁶ These allies are understandably deeply ambivalent about abolition: As nonnuclear states, it is hard for them to oppose zero; yet, as insecure, the U.S.-extended deterrent is welcome insurance.⁷

Moreover, nuclear *knowledge* cannot be made to disappear, so a world of zero nuclear weapons, even if tightly verified, would, in reality, be a world in which some states might secretly retain a few weapons and in which a number of powers were a matter of weeks or months away from producing them. To opponents of zero, abolition is powerful symbolism, but, in the end, decisions by states to go nuclear are driven by their security calculations, not by symbolism. What is true of zero is also true of the Comprehensive Nuclear-Test-Ban Treaty (UN, 1996): U.S. nuclear weapons are an excuse, not a reason, for other powers going nuclear.

So, the convenient, near-term course is to pursue feasible steps that are in the U.S. interest in any case—for instance, negotiating cuts in U.S. and Russian weapons to fewer than 1,000, increasing delays in launch times, and better safeguarding weapons. It will be tempting to take these steps while giving lip service to abolition.

However, the question remains: Should abolition be a real goal, one both pushed and prepared for in the immediate future? If it were, that would entail serious conversations with allies about how to sustain their security, along with serious analysis of the implications of zero. For instance, it is arguable that, for a single would-be proliferator, such as North Korea, agreeing to inspections and forswearing nuclear weapons might not be such a bad outcome, even if the country cheated and retained a few secret ones. But would that logic hold more widely in

⁴ For the gang of four's argument for abolition, see Shultz et al. (2007, 2008). For the counterargument, see Brown and Deutch (2007) and Colby (2008).

⁵ The language, in the treaty's Article VI, is relatively vague: "Each of the Parties to the Treaty undertakes to pursue negotiations in good faith on effective measures relating to cessation of the nuclear arms race at an early date and to nuclear disarmament, and on a treaty on general and complete disarmament under strict and effective international control."

⁶ This tension in nonproliferation policy between the symbolism of zero and the importance of extending nuclear deterrence to nonnuclear allies is aptly discussed in Congressional Commission on the Strategic Posture of the United States and the United States Institute of Peace (2008).

⁷ For a nice example of this ambivalence, see Satoh (2009).

a world ostensibly of zero? Answering that question requires looking at a wide variety of scenarios for nations cheating or otherwise maintaining what amounted to warm production lines for nuclear weapons. Would zero still look good across a pretty wide range of those?

Effect of Revolutions in Military Affairs

The military stands out in government because it does think long term: Weapons imagined today will not be fielded for more than a decade and, once deployed, may be in service for several generations. In effect, the military tries to do something akin to RDM by looking out and across a wide range of conflict scenarios.⁸ Yet, again, the question is whether policymaking as usual is the right approach, given some vision of the longer term.

Surely, the war phase in Iraq was a stunning success of networking sensors and firepower. The post-2003 counterinsurgency operations have been, to put it mildly, much more difficult, but, even there, technology—for instance, to enable Predator strikes on al Qaeda leaders—has given the United States an advantage. Yet, foes in Iraq have been relatively unsophisticated technically. And so the question looking forward is will U.S. advantages continue—in either large-unit combat or counterinsurgency (COIN)?

In the context of economic crisis, there will be an immediate debate about the kind of military the United States should have.⁹ Secretary of Defense Robert Gates (2009) prompted that debate. His 2009 budget, which sharply constrained several major Pentagon weapon systems, further provoked the conversation. The *cointistas*—advocates of COIN capability—now seem in the forefront. They hold that future irregular warfare operations will be very labor intensive because technology will not be able to easily substitute capital for labor. The other side, however, will argue that the United States should shun such engagements and instead concentrate on sustaining the capability to deter and defeat major military rivals. This argument features the high-technology combat, vehicle-intensive forms of combined-arms warfare that characterize the big Army, Navy, and Air Force—just those that Gates targeted for cuts. Yet, is that debate the right one, or should developments afoot toward 2025 call for serious consideration of different policies now?

The first set of developments is nuclear, at the high end of the lethality spectrum. For nation-states, the next tipping point for sustaining the NPT regime is whether the Iranian nuclear-weapon program can be kept in remission through a grand bargain between Iran and the United States—an issue at the top of the Obama administration's agenda. If a deal that includes putting the Iranian fissile-material production infrastructure under tight International Atomic Energy Agency (IAEA) inspection that does not then materialize, it is plausible to assume that Iran will have a virtual, if not outright operational, nuclear arsenal by no later than the middle of the next decade. On the assumption that neither the United States nor Israel conducts military operations to delay this program, the region will have to face the prospect of a Persian or Shi'a bomb.

⁸ See, for instance, Davis (2002), which uses an RDM-like analysis to look across conflict scenarios for Achilles' heels—important shortcomings in U.S. capabilities.

⁹ It may do so in some unanticipated ways, though. For instance, those hardest hit by the downturn will be 18- to 24-year-olds, the prime targets of military recruiting. As a result, concerns about the difficulty and cost of sustaining the size of the U.S. military, let alone increasing it, will diminish. The Army exceeded its recruiting goals in the last three months of 2008 for the first time in five years.

Such a prospect raises the concern that several Sunni-dominated states, such as Saudi Arabia, Egypt, and Turkey, will find this new situation intolerable. Given the close political military ties between Saudi Arabia and Pakistan, the former might acquire both an operational arsenal and delivery systems from the latter. Egypt and Turkey may well attempt to follow Iran by first building up a civilian nuclear-power infrastructure and then using that mobilization base to move on to a nuclear-weapon program. The North Korean issue is perhaps less threatening to global NPT norms, but a final resolution of its nuclear status through the demise of the regime would be a very hard landing for the region.

Further nuclear proliferation in the greater Middle East would impel the United States to radically reconsider how prepared it is to conduct large-scale, regional military operations under the nuclear shadow. At present, the U.S. way of war includes dependence on the following:

- air supremacy
- intelligence, surveillance, and reconnaissance (ISR) supremacy
- a relatively small number of large bases, ports, and airfields to conduct logistically intensive combined-arms operations
- National Security Space (NSS) architecture that operates with high efficiency
- a global communication and command network that also operates with high efficiency
- technological superiority with highly trained personnel to compensate for the lack of large, personnel-intensive forces that can accept high casualty rates.

Moreover, this change in the strategic environment will be accompanied by another, the diffusion of precision-guided munitions (PGMs). The U.S. military has faced PGM threats in the form of surface-to-air missiles, yet in neither Iraq nor Afghanistan did it confront the widespread use of modern antitank guided munitions (ATGMs), man-portable air-defense systems (MANPADS), or even long-range mortars. Israel's war with Hizballah in the summer of 2006 is a warning that future insurgents may be far better equipped than those in Iraq or Afghanistan to attack armored and air forces. If they acquire precision-guided rockets and mortars from a wide variety of sources, this will imply, at a minimum, that future COIN operations could involve far more casualties than recent U.S. experience would have predicted. It would mean that the United States could no longer deploy forces in concentrations or house them in large bases in the war zone.

Diffusion of precision-guided ballistic and cruise missiles with tactical and operational ranges would compound the threat. China and Russia have and will continue to deploy a wide spectrum of these advanced weapons. One of the great advantages of PGMs is that they can be deployed without the need to develop a cadre of highly skilled pilots, thus leapfrogging a central requirement of modern air forces. By the next decade, China will have deployed not only the PGMs but also extended-range sensors and communications, including space based, to give it the capability to make the western Pacific inhospitable for U.S. ships and bases. Iran will be able to do the same for the Persian Gulf, even though it will lack the sophisticated sensors and communication. Globally, the U.S. military will operate more and more in a virtual goldfish bowl.

The central question running through these varied challenges remains: For what types of conflicts should the United States prepare, given both the world to 2025 and the likelihood of strong downward pressures on the budgets of the national-security establishment? Trying to reorient its expeditionary warfare capability to actually fight a nuclear-armed regional state is a

daunting task, if not an impossible one. Yet, not doing so would be to acknowledge that U.S. freedom to maneuver in future Eurasian military contingencies will be sharply constrained for fear of vertical escalation.

A focus on COIN and failed-state building is the call for the maintenance of a larger (expensive) but less technologically intensive ground force that operates within a far more robust interagency community. A focus on the war against Islamic extremism is a much lower-cost investment in the intelligence community, special operations, and law enforcement. On the other hand, an effort to transform the U.S. expeditionary warfare capability in order to conduct large-scale military operations in the face of major powers, or even large transnational groups, such as Hizballah, armed with arsenals of nuclear or precision-guided munitions will be a daunting and costly one. The successful conduct of a counterforce campaign against hidden and protected long-range missile systems will prove a major challenge to U.S. intelligence above and beyond its other more traditional and demanding missions.

Reshaping International Institutions

International institutions and processes, reflecting the configuration of state power more than 60 years ago, are ill suited to virtually all the attributes of future. Now, the United States is less dominant than it was then, and each of the ten largest companies in the world has an annual turnover larger than the gross national product (GNP) of 150 of the 185 members of the United Nations, including such countries as Portugal, Israel, and Malaysia.¹⁰ More subjectively, at least 50 NGOs have more moral legitimacy than many governments of UN member nations.

Yet the question remains: What to do? And, especially, what to do in the next five years? Too often, calls for reshaping international institutions seem to be for their own sake, lacking the “what for?” rationale. To be fair, if the UN Security Council is to represent the world’s premier powers, Japan and others rightly ask “why not us?”—never mind “what for.” Given the agenda facing the globe, any immediate reshaping of international institutions should be driven by need, and both the economic crisis and climate change and energy will provide plenty of need. It is plain that an increasing number of both states and nonstates will have a claim to serious participation, yet the challenge is to shape institutions that are too inclusive and thus too unwieldy to function, such as the United Nations General Assembly. The usual way to think about the institutional challenge is incremental, as steady brick-laying, building cooperation piece by piece, usually functionally in dealing with issues at hand and with those actors that have something to contribute, not conjuring grand, architectural designs.

This issue also directs attention to both the *capacity* and the *proclivity* of the American people to engage creatively in the world (Slaughter et al., 2008). For instance, the last time the United States was creative in international institution-building was when it was by far the biggest kid on the block, after World War II; two decades later, it began to see these same institutions as being less effective in advancing U.S. interests. Americans often assume that the United States can adapt, perhaps faster than other nations. It is nimble. But is that so? It is now mired in two wars and upward of several trillion dollars of potential new debt.

Given need, there is a wide range of possibilities between temporary coalitions of the willing and formal organizations. The passing of the Group of Eight (G8) into ritual speaks to the dangers of formality. If purposes drive groupings, most will be functional and, perhaps,

¹⁰ I am grateful to Nicholas Butler for this statistic.

regional as well. In all cases, it will be necessary to reach beyond governments, to private companies and NGOs. Already, a group of private companies, producers of gene-altering equipment, has taken it on itself to scrutinize its would-be customers.

Thus, necessity can be the parent of longer-term innovation. Economics will impel U.S. openness to ideas from other countries—not a trait widely considered typical among Americans—and creativity in devising multilateral arrangements. For instance, after trying one approach to injecting liquidity into the economy, the United States moved toward another, one that Britain had earlier selected (and that Sweden had followed in its crisis in 1992)—buying direct equity in financial institutions instead of bad debts. The Washington conference of the Group of 20 in November 2008 was a harbinger of the future: The United States resisted the inclination to handle the crises in the old way—with Europe, Japan, and the International Monetary Fund (IMF)—and the newly rising powers were fully represented. Yet, the meeting was in Washington and chaired by the U.S. president.

Yet, should the United States forsake incrementalism in favor of bold steps now? Should it seek the outright replacement of the G8 with a somewhat larger group that reflects shifting power and rising powers? Should it also get off the sidelines about UN reform and push for change in the Security Council's anachronistic membership? If not a league of democracies, should the United States seek a more formal group of democracies—a D8—to clearly advance its democratic values, cooperatively rather than at the barrel of a gun?

Whither Mexico?

In embracing the North American Free Trade Agreement (NAFTA), all three countries, but especially Mexico, made bets of historic proportions. Mexico decided that, since it was condemned to be, in the Mexican saying, so far from God but so close to the United States, it would seek the benefits of real partnership, not hold onto a grumpy autonomy. The United States decided, less explicitly and perhaps less consciously, that more-direct engagement with Mexico would be both an economic boon and, in the long run, the best way to manage the pressures for Mexican migration northward. Yet, those bets were long term, and they were not really accompanied by any real vision of what that long term would be—security zone, loose federation, or what.

The importance of Mexico to the United States hardly has to be underscored. It is the United States' second-largest trading partner, third-largest source of oil, and largest source of immigrants. Yet, while Mexico is not a failed state, like Somalia, it has *already* failed in at least two important senses: Legitimate authorities have lost both their monopoly over violence and their fiscal effectiveness—the capacity to compel citizens to pay enough taxes so the state can function. The gridlock leading to inability to tax will only grow worse as oil revenues decline (Krauze, 2006). Petróleos Mexicanos (PEMEX) supplies 40 percent of the government budget, yet, in trying to modernize to keep national oil production from falling, it is trapped. On one hand, the government siphons off 90 percent of the company's earnings, yet, on the other, inviting international oil companies to accomplish the modernization is regarded as a betrayal of the nationalization of the oil sector, one of the core legacies of the Mexican revolution (Kerr, 2008).

Increasing violence—especially violence that increasingly spilled across the border—would produce waves of implications for the United States. The first would be migrants. As violence increased and became more indiscriminant, pressures to migrate would also increase. The second wave, more serious still, would concern the border and trade. In 2007, Mexico

exported about \$210 billion worth of goods to the United States and imported about \$136 billion in goods from the United States. If the drug trade is \$40 billion, it represents about 25 percent of all exports to the United States.¹¹

Arms smuggling is the mirror image of drug trafficking, for, while narcotic use has increased domestically in the Mexico, the U.S. Department of State's 2007 International Narcotics Control Strategy Report (INCSR) estimates that about 90 percent of the cocaine that enters the United States is trafficked through Mexico. Arms flow in the other direction, with 90 to 95 percent of the guns used in drug violence in Mexico entering illegally from the United States, as estimated by the U.S. Bureau of Alcohol, Tobacco, Firearms and Explosives (GAO, 2009, pp. 14–16). And the weapons are more and more sophisticated. Where police used to find *cuernos de chivo* (goat horns, Mexican slang for AK-47s), they now find grenades and rockets. Moreover, the traffickers are enlisting the protection of special operations forces, such as the private Los Zetas militia (former members of Mexican military special operations forces) and Kaibiles (Guatemalan special operations forces).

The policy question is whether continuing existing policies—which focus on the wall and border control and quasimilitary assistance, much of it technical—is enough. The security situation in northern Mexico has deteriorated so precipitously that the government of President Felipe Calderón sent more than 25,000 soldiers and federal police in 2007–2008 to fight the drug cartels and bring order to areas that the cartels have infested (Kurtz-Phelan, 2008). Yet, over the same two years, more than 5,000 people have died from drug violence, including more than 400 police officers and government officials. The violence has increased in places, such as Tijuana, where the government seemed to be winning.

In October 2007, the United States undertook, in the Mérida initiative, to provide an additional \$0.5 billion per year to Mexico for equipment and training specifically intended to build capacity against traffickers and organized crime.¹² Yet, increasing the involvement of the military against cartel violence carries its own risks—especially those of corrupting the military itself or of soldiers deserting the military to join the traffickers, as did Los Zetas.

The outlines of an alternative policy are not yet in sight, but the starting point might be to recognize that it is not a matter of fencing the problems out. They are already here. The migrants are here, and the great majority of new ones indicate that they intend to make the United States their permanent home. Perversely, tighter control of the borders discourages back-and-forth flow and so encourages migrants to stay longer (Cornelius, 2006). It has also been a boon to people-smugglers (*coyotes*). While the George W. Bush administration's approach to Mexican migration was stillborn, it at least proved that a middle ground, combining some measure of temporary work programs with a path to legalizing the status of the undocumented, might be possible.

Not only is the problem in the United States; it is also its people—that is, the United States itself is the provider of arms, as noted earlier, and the engine of the drug trade. Secretary of State Hillary Rodham Clinton was eloquent on that score in her March 2009 trip to Mexico: “Our insatiable demand for illegal drugs fuels the drug trade” (Landler, 2009). Phoenix has taken over from Miami as the prime gateway for drugs entering the United States. In

¹¹ For obvious reasons, statistics on the drug trade are slippery. Kerr (2008) uses an estimate of \$10 billion for trafficker income.

¹² The U.S. Department of State (undated) has published fact sheets on the initiative, which also includes Central America.

the process, it has seen kidnappings—all connected to smuggling, police assert—jump to 366 in 2008 from less than 100 a decade ago (Quinones, 2009, p. 80).

Seriously addressing the U.S. demand for drugs is easy to promise but very hard to do, as administration after administration discovers. But at least recognizing that it is the engine of the trade is a start. And it should be possible to do something much more concrete about the enormous flow of weapons across the border into Mexico. Finally, long-term thinking might broaden the agenda in two senses—to incorporate local law enforcement and antigang community development across the four U.S. border states and their Mexican counterparts and to recognize that the problem is no longer confined to the border but now reaches to Guatemala and other parts of the hemisphere. This issue, too, would be a candidate for RDM, surveying a wide range of scenarios for policies that would produce the least regret in unpredictable futures.

Refashioning Domestic Institutions

No one has put the mismatch between the future's purposes and the structure of the U.S. government better than Ernest May. To him, the United States emerged from the 20th century's long war against fearsome territorial states with a capital, Washington, that would seem to "those sage, naïve Orientals favored by the philosophes . . . 'Yes, a city. But, at heart, a military headquarters, like the Rome of the Flavians or the Berlin of the Hohenzollerns'" (May, 1992, p. 270). The Pentagon, the Central Intelligence Agency (CIA) and the National Security Council (NSC) were creatures of the hot and cold wars, tinkered with but not fundamentally changed since. They are odd creatures for addressing trade and economic policy, population issues, migration, disease, climate change—or terrorism. More-recent organizational innovations, the creation of the U.S. Department of Homeland Security (DHS) or the reorganization of U.S. intelligence, have altered that portrait only somewhat.

For a number of well-known reasons, reorganizing the government is a parlous enterprise. Indeed, watching a carousel of reorganization in intelligence led me to a maxim: Any organization is better than any reorganization. Reorganizations disrupt the informal networks that grow up around any formal organization. Moreover, the history of organizational design in the public sector is cautionary in that it results from a political process of competition among interests and interest groups. In the words of one of the classic works, "American public bureaucracy is not designed to be effective. The bureaucracy arises out of politics, and its design reflects the interests, strategies, and compromises of those who exercise political power" (Moe, 1989, p. 267). The devil is in the details of mandate, organization, and process, and those details, too, are the products of political processes, with results perhaps reflecting the intentions of no participant.

Yet, for all the cautions, resort to incremental change means only that the dysfunction will continue longer. That is the argument for beginning the process of radical change now. Is it time to rewrite the National Security Act of 1947 (Pub. L. No. 80-253)? For that purpose, there is no better starting point than the report of the blue-ribbon panel chaired by former senators Gary Hart and Warren Rudman, which completed its work almost seven months *before* September 11, 2001 (U.S. Commission on National Security/21st Century, 2001). For instance, taking seriously the revolution in military affairs, by whatever label, means not only dramatically reshaping forces; it probably also entails consolidating several existing services or sharply revamping roles and missions. The Pentagon would be much more explicitly involved in homeland security, especially but not only through the National Guard and reserves. And

a new service or department would be created, principally out of Pentagon elements but also incorporating parts of State, aid agencies, and intelligence, for the range of politico-military operations ranging from prevention to peacekeeping, policing, and nation-building.

So, too, traditional diplomatic institutions, like ambassadors and embassies, no longer make much sense as platforms for either diplomacy or espionage. Instant communications and easier travel let national capitals talk directly, and trolling for spies can no longer be done on the embassy cocktail circuit. While something akin to the fortresses we now call embassies probably are required, their duties would be mostly consular.

The challenges of the world before us also require dramatic changes in interactions between the public and the private spheres of national life. That imperative is most inescapable, perhaps, in homeland security, where not only are there four times as many private security guards as public police, but where the fact that most public infrastructure is in private hands means that any arrangements for safeguarding those institutions must centrally involve private citizens. Ironically, the economic crisis may reshape public-private relations in ways not anticipated if, for instance, the Treasury and the Federal Reserve end up owning much of what had been the private banking system.

That would be back to the future because, in 1935 or even 1940, it was not so obvious that Washington would turn out to be that military headquarters. At the beginning of the 1930s, the entire government budget was under \$5 billion, and, money aside, the Agriculture and Commerce departments would have been thought as weighty as State and War, and the Treasury Department, on its side of the White House, was as weighty as State, War, and Navy, all three then housed in what is now the Eisenhower Executive Office Building.

In the end, serious restructuring would need to include the Congress, however unimaginable that now seems. Consolidating oversight arrangements to mirror a reorganizing executive branch—and the world—would be just a start. As suggested earlier, the nation's security can be argued to require different incentives for Congress—ones that will make for fiscal discipline, not profligacy. In that sense, the agenda is very far-reaching indeed—which is another argument for beginning to work on it sooner rather than later. Some process of RDM would make sense for this set of issues as well, for the one certainty is that, just as today's institutions address a world for which they were not designed, reshaped institutions would also address a future containing surprises.

Extending the List

The list could be extended, especially to include issues for which current policies seem the right ones in light of long-term thinking but perhaps should be reinforced, or ones that are plainly critical in the long run but for which the adequacy of current approaches is not clear, such as these:

- *Dealing with nuclear terror, especially locking up nuclear materials.* Here, the question is whether current efforts are enough. The George H. W. Bush administration proposed a UN Security Council resolution that would criminalize proliferation of weapons of mass destruction (WMD) and promoted the Proliferation Security Initiative, an 11-nation group that, stretching existing legal frameworks, searches vehicles suspected of transporting WMD cargo on the high seas. The administration eventually embraced the Coopera-

tive Threat Reduction Program to secure and eliminate formerly Soviet nuclear weapons and enlisted other members of the G8 to match Washington's \$1 billion annual commitment to the program over the next decade. And the United States cooperated with Russia to extract three potential nuclear weapons from Serbia and one from Romania. But much more could be done.¹³

- *Preparing for biological terror.* Here, again, the question is whether current approaches are enough. So far, despite lots of advertising of U.S. vulnerability, the United States' current terrorist foes seem not to have been attracted to biological terror. Killing lots of people relatively slowly perhaps has less dramatic appeal than explosions. Yet, if terrorists attacked with biological weapons, it might, for some time, be unclear whether the United States was under determined attack or was suffering an innocent pandemic. So far, the U.S. approach—to both prevention and detection—is pretty scattered. Indeed, on this issue, the government is divided (as it is in a somewhat different way over cybersecurity): Part of the government is concerned with biological threats while another part promotes research at universities and elsewhere that bode to produce medical advances but could also leak into bioterror.
- *Promoting transformation.* Here, the question is what, if anything, additional would be in the long-term U.S. interest in seeing the world transform from relatively poor to relatively rich. Using U.S. foreign aid as an admittedly imperfect indicator, U.S. priorities in the developing world are, first, the fight against terrorism, then the campaign against human immunodeficiency virus (HIV) and acquired immunodeficiency syndrome (AIDS), the Millennium Challenge Corporation, and the Economic Support Fund, the bilateral aid program that has traditionally been tied to U.S. security and political interests abroad (it was the major source of economic aid for Israel and Egypt for many years), each in the \$3 billion to \$5 billion range in 2008 (Lancaster, 2007). Among countries, the winners are Iraq and Afghanistan. Apart from aid for the campaign against terrorism, the largest recipients are South Africa, Nigeria, and Kenya, mostly for HIV/AIDS. If that funding is excluded as well, the largest recipients are Egypt, Pakistan, and Jordan. It is worth remembering, though, that the largest movement of humans out of poverty had little to do with outside *assistance* (as distinct from trade): It was China's Leninist capitalism—rough-and-ready capitalism conducted under one-party control—that elevated 400 million people out of poverty in a generation.
- *Promoting democratic values.* Here, the dilemma is that long-run aspirations run against short-term necessities. The combination of securing energy and fighting terrorism continues to associate the United States with countries that are undemocratic or unsavory or both—ranging from Egypt and Saudi Arabia to Pakistan and China, with plenty of others in between. The answer to “should the United States break away from the autocrats and corrupt?” has been, and continues to be, “yes, but not yet.” Should U.S. policy reconsider that answer *now*?

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¹³ Allison (2004) sets out an agenda.

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Setting Appropriate Goals: A Priority, Long-Term Climate-Policy Decision

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Overview

Interest in reducing the emissions of climate-changing greenhouse gases (GHGs) generally reflects concern with the long term. GHGs, such as carbon dioxide, have centuries-long residence times in the atmosphere; the oceans take decades to warm or cool. Any impacts from climate change experienced today thus result from the cumulative emissions of past centuries. Reducing today's emissions will yield their full environmental impact only decades from now. Thus, any concern with near-term GHG-emission reductions reflects long-term thinking.

But not all interest in near-term reductions reflects *effective* long-term thinking. Achieving any reasonable, long-term climate goal will ultimately require transitioning to an economy with near-zero net human GHG emissions—a monumental task sure to take at least decades. Looking back, future generations may judge today's climate-change decisions not by the amount of emissions they directly reduce but by the extent to which they help catalyze or hinder future efforts to eliminate GHG emissions. Some near-term actions may initially appear promising but may close off needed paths or fail to open others. Ideally, effective long-term thinking aims to compare how alternative near-term choices help shape the constraints and options facing future decisionmakers and thus identify which near-term choices can best set in motion an inexorable chain of events that eventually results in a near-zero-GHG-emission economy.

In an attempt to improve such long-term thinking, this chapter explores a qualitative approach to LTPA that draws on concepts from the quantitative RDM approach outlined in Chapter Two. The chapter conducts a vulnerability analysis of two very different proposed strategies for addressing long-term climate goals, thus identifying plausible futures in which each strategy would fail to achieve these goals. The chapter then uses this comparison to suggest a potentially more robust alternative that combines some of the best features of the two initial strategies.

The global-agreement strategy, the first of the two considered, calls for all nations to jointly set concrete, binding targets and timetables for reducing GHG emissions when they convene for the next round of climate negotiations in Copenhagen in December 2009. In contrast, the clean-energy revolution strategy calls for individual national governments to make large, near-term investments in research and the deployment of clean-energy technology without any near-term binding agreement on emission-reduction targets.

Table 5.1 summarizes the two vulnerability analyses by showing the key assumptions that underlie each strategy. A *key assumption* is one that must prove correct in order for a strategy

Table 5.1
Key Assumptions Underlying Clean-Energy Revolution and Global-Agreement Strategies

Assumption	Strategy	
	Clean-Energy Revolution	Global Agreement
Climate, technology, and economics	Research can generate inexpensive clean-energy options before cumulative carbon limits are exceeded. Current investments in infrastructure will not lock in high emissions for decades.	Emission-reduction targets are sufficient to hold the global average temperature rise to less than 2°C. Holding the global average temperature rise to less than 2°C is worth the cost.
Government capabilities	Governments can set aside sufficient sums for clean-energy investments. Government procurement and low carbon prices can provide sufficient market pull to guide clean-energy development.	Negotiable agreements will provide sufficient incentives for needed public- and private-sector investments.
Behavior of future decisionmakers	Any global regulatory institution or strong climate-protection norm needed in the future can develop independently of current policy actions.	Future policymakers will abide by the targets. Any failure of a global agreement negotiated in 2009 will not undercut future efforts to regulate GHG emissions.

NOTE: All the key assumptions for each strategy must prove true in order for that strategy to meet long-term climate-change goals. Thus, any key assumption that might plausibly fail represents a potential vulnerability of that strategy.

to succeed. For instance, the clean-energy revolution strategy encourages national governments to set aggressive goals for technology development but takes no near-term steps to build future global regulatory institutions or promote norms for climate protection. The strategy is at risk if future generations require such institutions and norms but cannot build them quickly from scratch. In contrast, the global-agreement strategy takes near-term steps to build global institutions and climate-protection norms but ties these steps tightly to achieving aggressive emission-reduction targets. The strategy is at risk if failure to meet these targets undermines the long-term legitimacy of the institutions and norms.

This comparison suggests a potentially more robust race-to-the-top strategy that would distinguish between two types of goals: *stretch goals*, intended to inspire people to reach for a difficult-to-obtain objective, and *legitimacy-building goals*, which demonstrate the competence of the goal-setting organization. The global-agreement strategy combines both stretch and legitimacy-building goals in the same set of new and potentially fragile international institutions. The clean-energy revolution strategy gives much-needed stretch goals to national governments but neglects goals for building international legitimacy. The race-to-the-top strategy would seek a global agreement that establishes its credibility by setting and meeting less aggressive emission-reduction targets and, at the same time, encourages individual nations to set and meet national stretch goals far beyond those targets. Such encouragement could come, for instance, by linking future tightening of global emission caps to newly demonstrated best practices and by laying out the conditions under which nations that had substantially reduced emissions could appropriately impose carbon tariffs on those that had not.

This chapter thus serves three aims. It suggests how effective long-term thinking—in particular considering how today's actions might evolve over long periods of time—can influ-

ence the design of near-term policies. It demonstrates a method for examining the long-term evolution of strategies by looking for plausible conditions under which a strategy might fail to meet its long-term goals. It uses this approach to suggest a near-term strategy that, over the long term, may prove more robust than those currently proposed.¹

Near-Zero Net Emissions: the Long-Term Climate Goal

The 1992 United Nations Framework Convention on Climate Change (UNFCCC), ratified by the United States and 191 other nations, offers, as its ultimate objective,

stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system. Such a level should be achieved within a time frame sufficient to allow ecosystems to adapt naturally to climate change, to ensure that food production is not threatened and to enable economic development to proceed in a sustainable manner. (Art. 2)

It is generally understood that stabilizing atmospheric GHG concentrations will take at least several decades.

Since the UNFCCC came into force, there has been much debate over how to make its objectives more concrete. Many commentators have offered specific threshold levels, above which concentrations should not be allowed to rise. For instance, some have suggested concentrations should not exceed 550 parts per million (ppm), about twice the concentration found before the advent of the industrial revolution (280 ppm).² The Commission of the European Communities (2009) has proposed holding the increase in global mean temperature to no more than 2°C above preindustrial levels, which likely requires holding concentrations below 350 ppm to 550 ppm. The range owes to uncertainty about the sensitivity of the climate system to increased GHG concentrations. Currently, the global mean temperature lies about 1°C above preindustrial levels.

Such targets have the advantage of specificity but are not necessarily the best way to frame the objectives of climate policy because no one can accurately predict the precise threshold for dangerous climate change nor the economic costs of remaining below any given threshold. To compare near-term climate strategies that use such targets with those that do not, it becomes useful here to operationalize the goals of the UNFCCC in a different way, one that is entirely consistent with, but broader than, the target-based strategies. To do so, it is useful to begin with some of the certainties involved with the climate challenge.

First, we know that the combustion of fossil fuels—coal, petroleum, and natural gas—is the primary cause of the 40-percent increase in atmospheric concentrations of GHGs since

¹ For simplicity, this chapter restricts its focus in several important ways. First, it addresses only the mitigation of greenhouse-gas emissions and not adaptation to impacts of climate change. The latter is certainly important and should be included in both international and national climate policies. But it raises a somewhat different set of issues from those addressed here. Second, this chapter tends to focus on carbon dioxide (CO₂), the primary source of anthropogenic increases in atmospheric greenhouse-gas concentrations. Other greenhouse gases clearly have policy relevance. In particular, methane, with its short atmospheric lifetime, provides important opportunities for fast reductions in the atmospheric concentrations of greenhouse gases. But, with its long atmospheric lifetime and ubiquitous sources, CO₂ represents the most significant long-term policy challenge.

² Concentrations of CO₂ are currently at 384 ppm, nearly 40 percent higher than preindustrial levels.

the start of the industrial revolution and that continued combustion of these fuels will further increase these concentrations (Bernstein, Pachauri, and Reisinger, 2007). Second, we know that, throughout history, the increased combustion of fossil fuels correlates strongly with increased wealth. In short, no nation has ever grown rich without burning significant amounts of fossil fuels. Third, the environmental impacts of GHGs released into the atmosphere are, for all intents and purposes, permanent (Solomon et al., 2009). That is, any impacts experienced from climate change now and in the future derive from the cumulative emissions from fossil-fuel combustion, since the start of the industrial revolution. Finally, current emission levels per capita show significant inequalities worldwide. The average American emits five times as much carbon as the average resident of China and 20 times more than the average African.

These constraints suggest that we might usefully consider humankind to have a cumulative carbon budget—that is, a total amount of GHG emissions that can be safely added to the atmosphere. In contrast to a focus on stabilizing atmospheric concentrations, this limit on cumulative carbon framing emphasizes two key points: Addressing climate change requires net human emissions to go toward zero, and today's emissions can have very long-term consequences.

This concept of a limit on cumulative emissions has led some to describe the atmosphere as a bathtub filling with GHGs that, at some point, will overflow (Revkin, 2009). But this analogy neglects the immense increase in living standards humans have gained from burning fossil fuels. Perhaps it is better to think of the cumulative carbon cap as a vital and finite source of wealth on which our livelihood currently depends, like a well that currently provides our only source of water. Before our carbon allocation runs dry, we must transition to a never-before-experienced energy system that can support a wealthy and growing global economy that no longer burns fossil fuels and allows combustion products to remain in the atmosphere.³

It remains uncertain how much carbon society has left to freely emit. Cumulative anthropogenic emissions since 1780 total about 1 trillion tons of CO₂. If the carbon limit corresponds to a peak atmospheric concentration of roughly 450 ppm (60 percent higher than preindustrial levels), society can emit carbon for only about 25 more years at the current global rate. If the carbon limit corresponds to a concentration of 700 ppm (250 percent higher than preindustrial levels), society can emit for about two centuries at current rates but only about 30 years if the world emitted at the United States' current per capita rate.⁴

The goal of the UNFCCC might thus be usefully phrased as requiring a transition to a wealthy, growing, near-zero-GHG-emitting global economy as quickly as possible and consistently with other societal goals before exhausting the atmosphere's uncertain cumulative capacity to safely accept anthropogenic GHG emissions.

Long-Term Vulnerability Analyses of Two Different Strategies

Three types of near-term steps are commonly recognized as key to any effective strategy to eliminate emissions of GHGs:

³ Carbon capture and storage represents a new set of technologies that may allow burning fossil fuels without releasing the combustion products into the atmosphere.

⁴ Broecker (2007) and Allen et al. (2009) have considered cumulative carbon limits.

- Increase government support for research and development (R&D) on clean-energy technology.
- Establish policies that set a price on carbon emissions.
- Implement complementary measures that focus on particular economic sectors, such as energy efficiency in buildings and fuel-efficiency standards in transportation.

Greatly expanded clean-energy research is required because the technologies needed to support a thriving economy without GHG emissions do not currently exist.

The carbon price, whether implemented with a tax or with a cap-and-trade system, serves several purposes. In the near term, for example, it will encourage businesses and households to cut emissions with currently available approaches, such as energy efficiency, that could reduce emissions anywhere from 10 to 40 percent. It will also shift near-term investment in long-lived infrastructure, such as power plants and transportation, toward lower-emitting options. In the longer term, it will encourage significant private-sector investment in low-emitting technologies, enabled in part by the fruits of the government research.

The complementary measures are necessary because society has grown for two centuries without concern for the costs of carbon emissions so that no single price can now simultaneously motivate appropriate action across all sectors of the economy. For instance, the price necessary to change behavior in today's transportation sector would prove excessive and damaging for electric utilities.

It is also clear how these three actions would likely evolve over time. The carbon price would grow, the complementary measures fade, and the research continue as the world's energy, transportation, building, and other sectors transitioned to near-zero net GHG emissions.

These three actions and the vision of how they would evolve over time are widely accepted. The crux of the climate policy debate revolves around the pace of change, distributional issues involving what sectors and nations should bear near-term costs, and how to ensure the coordinated worldwide action that will ultimately be required. In particular, debate centers on how today's governments (or others) can best take practical steps to catalyze the decades of future activity required to eliminate GHG emissions.

One proposed strategy asks the world's nations to negotiate binding targets and timetables for the reduction of GHG emissions when the signatories to the UNFCCC next meet, in December 2009 in Copenhagen. The recent plan by the Commission of the European Communities (2009), focusing on European Union (EU) preparations for the Copenhagen negotiations, provides one exemplar of what we might call such a global-agreement strategy. The EU seeks to limit the global average temperature increase to no more than 2°C above pre-industrial levels. To achieve this goal, the plan calls for negotiating an international agreement with specific targets and timetables for emission reductions, for linking national regulations into an effective global market that sets a price for carbon, and for creating financing mechanisms needed for worldwide investments in low-carbon energy and infrastructure. Recognizing their different histories and current levels of development, the plan envisions that developed countries will commit to emission reductions of 30 percent below 1990 levels by 2020 while developing countries will limit the growth of their emissions to 15 to 30 percent below what they are otherwise forecast to be. The plan envisions coordinated national cap-and-trade systems, beginning in the developed countries, to set a carbon price and to enforce these caps. Revenues from permit auctions will help finance government R&D investments and sector-specific complementary measures.

The global-agreement strategy describes how these near-term actions might catalyze a long-term transition to near-zero emissions. Investments in technology development and diffusion will create new options and help spread best practices worldwide. Future international meetings under the UNFCCC will periodically revisit emission-reduction targets and adjust them over time. In particular, developing countries will adopt more-stringent emission caps in the years to come. The strategy assumes that a near-term global commitment to binding emission reductions will help foster norms against the emissions of GHGs. As these norms become firmly established, they will help compel future governments to meet their existing emission-reduction requirements and to recommit themselves to even more-stringent caps.

An alternative approach aims to invest large sums in the development of clean-energy technologies without a binding global agreement on a schedule for emission reductions. Activists Ted Nordhaus and Michael Schellenberger offer one of the more aggressive statements of what might be called a clean-energy revolution strategy (Shellenberger and Nordhaus, 2008). Motivated by doubts that government regulation can force deep cuts in GHG emissions as long as such reductions remain costly, this approach calls for major government investments, on the order of \$100 billion to \$200 billion annually,⁵ in science and technology research, as well as government procurement, and aims to develop zero-emitting energy sources that cost no more than energy from fossil fuels. The strategy calls for national governments in the developed world to create domestic carbon markets through carbon taxes or a cap-and-trade system. But, as their main goal, these programs would generate revenue to finance the technology investments. Rather than negotiate an international agreement that links these domestic programs together into a single global market, this strategy calls for discussions among a small group of the highest-emitting countries—the G8 + 5⁶—that aim to coordinate sector-specific, complementary measures for technology development and clean-energy deployment globally in a way that generates economic benefits for all parties.

The clean-energy revolution strategy describes how these near-term actions might catalyze a long-term transition to near-zero emissions. Once technological breakthroughs make possible inexpensive clean energy, economies worldwide will readily adopt it, along with any regulations needed to facilitate its use.

The global-agreement and clean-energy revolution strategies both include the same near-term actions—government R&D, a carbon price, and complementary measures—but embody two very different visions of how today's actions can best catalyze a long-term path to near-zero emissions. The long-term thinking in these two cases leads to different emphasis for near-term actions, resting on differing assumptions about the consequences of today's choices. To illuminate these differences, it proves useful to compare the results of vulnerability analyses using an approach called assumption-based planning (ABP) (Dewar, 2002). ABP identifies and compares the key assumptions underlying proposed plans, thereby helping decisionmakers to rigorously scan for potential vulnerabilities in policy proposals and to compare the vulnerabilities of different proposals. Policymakers can then use this information to develop plans more robust against future uncertainty and surprise.

⁵ This figure is for governments worldwide. The U.S. government spent about \$3.5 billion on energy R&D in 2005 (Nemet and Kammen, 2007). Interestingly, this \$100 billion to \$200 billion estimate is about the same as the Commission of the European Communities' estimate of the annual cost of meeting its plan's 2020 emission-reduction goals.

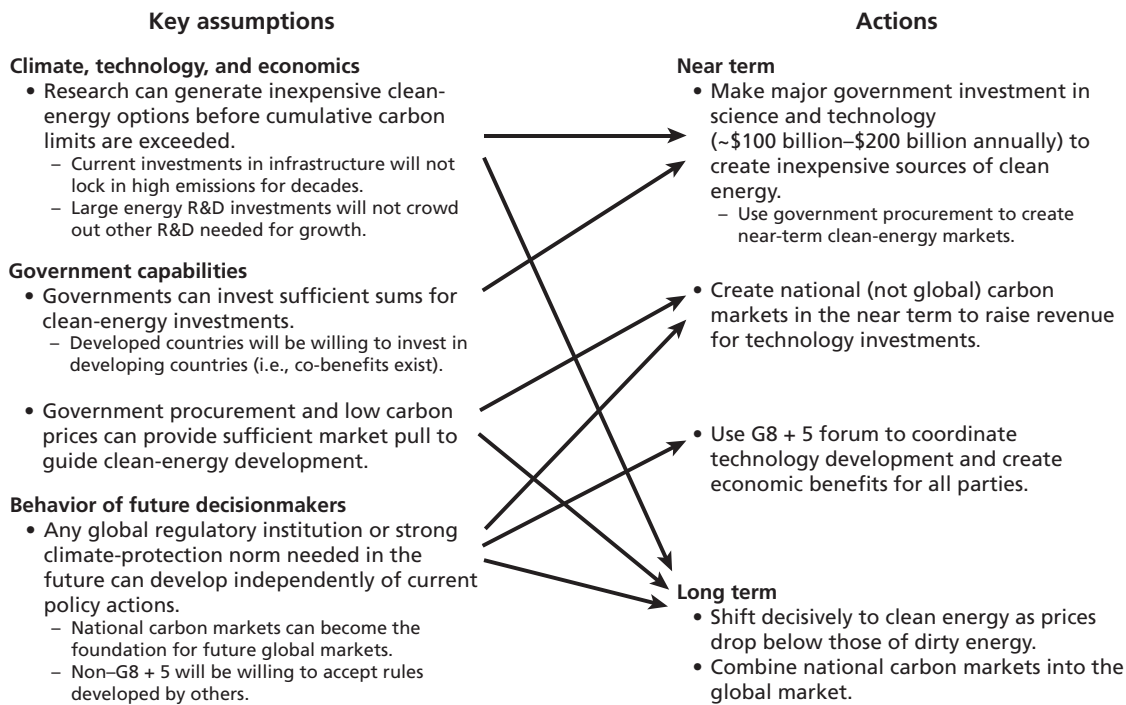
⁶ That is, the G8 countries plus China, India, Brazil, Mexico, and South Africa.

In brief, ABP begins with a proposed strategy, including its near-term actions and the goals they seek to achieve. ABP then identifies the vulnerable, load-bearing assumptions underlying the strategy. A *load-bearing assumption* is one whose failure would prevent the strategy from achieving its goals.⁷ A *vulnerable load-bearing assumption* is one that could plausibly fail within the expected lifetime of the plan. For example, many people had planned to use their 401(k) investments to maintain their current lifestyle in retirement. A load-bearing assumption underlying those plans was that their investments would retain sufficient value—an assumption that, for many, has proved vulnerable. In the present context, we will regard the global-agreement and clean-energy revolution strategies to have failed if near-term actions do not launch a process that leads to a near-zero-carbon economy before the exhaustion of the atmosphere’s cumulative emission limit or if the plan generates unnecessarily large economic costs in fostering such a transition compared to some other approach.

Figure 5.1 outlines the actions and key assumptions in the clean-energy revolution strategy, identified using the steps laid out in Dewar (2002). The actions summarize the steps just outlined. The key assumptions summarize what one needs to believe about the climate, technology, and economy; the capabilities of governments; and the behavior of future decisionmakers in order for the strategy to successfully meet long-term climate goals.

Not surprisingly, the clean-energy revolution strategy rests on the assumption that clean-energy technology will become available before the atmosphere exceeds its cumulative

Figure 5.1
Key Assumptions Underlying the Clean-Energy Revolution Strategy



RAND CF267-5.1

⁷ The architectural metaphor is meant to hold: A load-bearing assumption is like a load-bearing beam. Pull it out, and the roof caves in.

emission limit. It also rests on the assumption that the near-term investments made in long-lived dirty-energy infrastructure, before new clean-energy technology becomes available, will not irreversibly lock in a stream of future emissions that will necessarily exceed the atmosphere's cumulative limit. It also assumes that governments can effectively spend large sums on energy R&D and that these investments will not significantly crowd out research important to other social goals, such as health and economic growth.

The clean-energy revolution strategy also makes a number of important behavioral assumptions about how the plan's near-term actions will affect the choices of future decisionmakers. For instance, the strategy assumes that domestic regulatory systems, designed primarily to raise revenue, along with government clean-energy procurements, will provide sufficient certainty to motivate the private sector to make the necessary investments in clean-energy development and deployment. The strategy assumes that countries excluded from near-term G8 + 5 discussions will subsequently accept, or can be forced to accept, any global rules and institutions ultimately needed to adopt clean-energy technologies worldwide.

The strategy also makes important assumptions that best become clear in comparison with the global-agreement strategy. Imagine a future two decades hence in which clean energy still costs more than high-emitting fossil fuels but in which strong social norms had developed for climate protection and effective worldwide regulatory institutions that could translate these norms into efficient price signals to guide energy use and investment. Society might be well poised to transition to a near-zero-emission economy and consider the extra energy costs well spent. The near-term actions in the global-agreement strategy aim to help develop these norms and regulatory institutions (we discuss the assumptions underlying those claims later). In contrast, the clean-energy revolution strategy assumes that either (1) such a future is not sufficiently likely to influence near-term policy choices or (2) future climate-protection norms and global regulatory institutions will develop without the need for any near-term preparatory efforts.

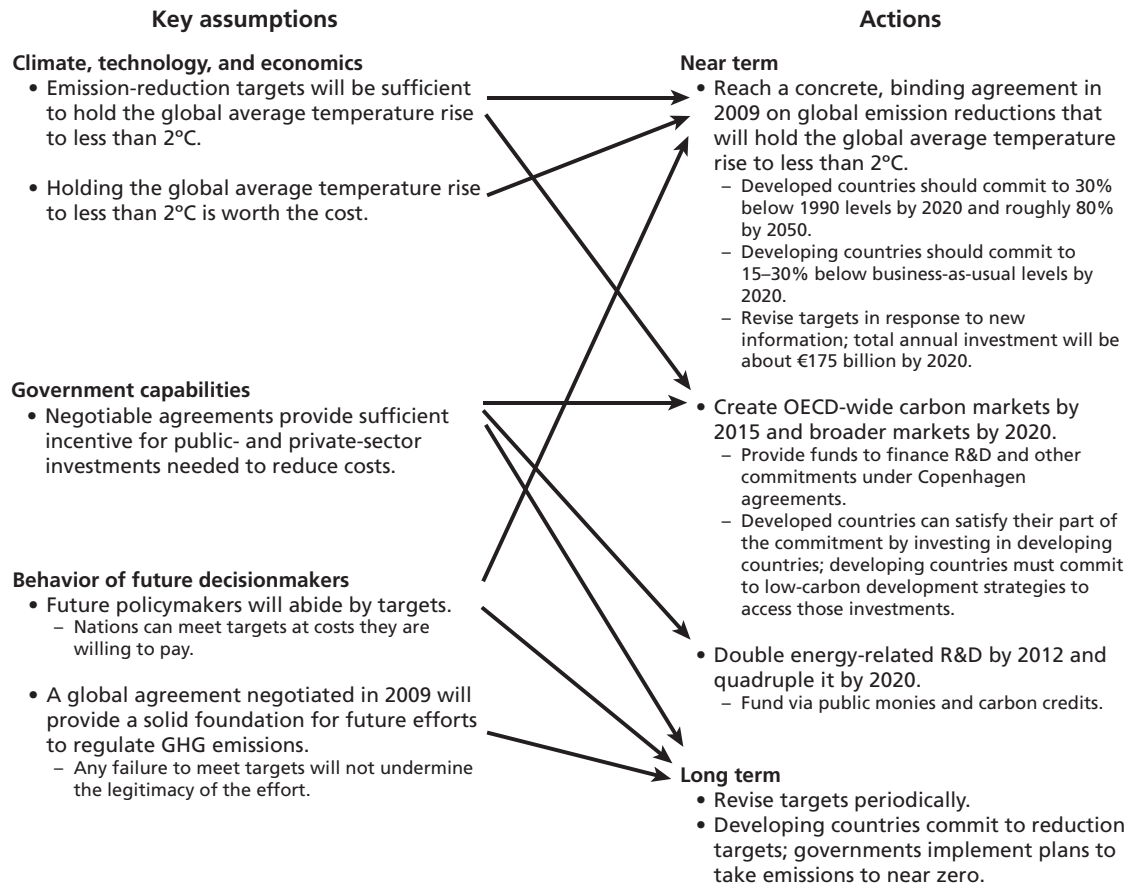
These assumptions seem vulnerable. For instance, some advocates of target-based strategies emphasize the importance of an "orderly and predictable schedule of GHG reductions [to] move the private sector to develop and deploy the new and advanced energy technologies of tomorrow" (USCAP, 2009, p. 2). In contrast, advocates of the clean-energy revolution strategy point to the role of government research and procurement, without any predictable long-term deployment schedule, in launching the Internet and IT revolution. But, given the long lifetime of its investments and commodity nature of its products, an energy-technology revolution may require more market certainty.

Neglecting the long-term consequences of current investments in high-emitting infrastructure may prove an even more vulnerable assumption. For instance, before the recent economic meltdown, China was building a new coal-fired power plant every week. Once built, such plants can emit for decades. Most coal plants built in the United States in the past century still remain in operation. If China builds new coal plants that run for even half that long, the clean-energy revolution strategy may prove unable to meet its long-term goals.

Finally, it seems entirely plausible that future climate-protection norms and global regulatory institutions will prove crucial to eliminating GHG emissions and that these norms and institutions will not develop quickly enough without near-term action.

Figure 5.2 lays out the actions and key assumptions in the global-agreement strategy. For instance, the strategy aims to hold the rise in global mean temperatures to less than 2°C and thus assumes that the proposed emission reductions will hold atmospheric GHG

Figure 5.2
Key Assumptions Underlying the Global-Agreement Strategy



RAND CF267-5.2

concentrations low enough to prevent a temperature rise in excess of that level. The strategy also assumes that governments' regulations can enforce such reductions at a cost their societies are willing to pay. In addition, the global-agreement strategy assumes that the world's governments can successfully negotiate an agreement in December 2009 that will inspire and compel future governments and the private sector to follow a path to a near-zero-emission economy. These assumptions also seem vulnerable.

First, the emission-reduction targets proposed in the global-agreement strategy may prove insufficient to meet the strategy's long-term goal of holding the global temperature rise below 2°C. As previously noted, the Intergovernmental Panel on Climate Change (IPCC)'s fourth assessment report (Bernstein, Pachauri, and Reisinger, 2007) gives a wide range of potential increases in global temperature so that even large emission reductions may fail to prevent large temperature increases. The IPCC ranges also likely underestimate the uncertainty, since potential, abrupt changes in the climate system, such as the release of methane gas from melting arctic tundra, could result in temperature increases even more rapid than expected.

Second, an agreement reached in December 2009 may fail to compel action from future decisionmakers and might even make their situation more difficult. Environmental treaties are generally weak. Most codify actions that participating nations have already decided to undertake, rather than force new actions upon them. More broadly, decisionmakers often find it

hard to bind the behavior of their successors. Nations reserve the right to withdraw from treaties, and national governments can walk away from commitments made by their predecessors. Political scientists study the conditions under which policy reforms can be sustained over long periods of time. For instance, Patashnik (2003) argues that, at a national level, general-interest legislative reforms can occur when a temporary convergence of elite and mass sentiment overcomes the opposition of more narrowly focused interests. The much-anticipated Copenhagen negotiations, sure to draw extensive media attention and public interest, may well represent a temporary convergence on the international scale resulting in intense pressure on governments to act in the general interest.

But mass sentiment can quickly dissipate once legislation passes (or agreement on a treaty reached) while the narrower interests persist. Out of the public eye, the latter may work slowly and successfully to undo the reforms. Examining cases in which reforms did and did not persist for decades, Patashnik (2003, p. 203) argues that “the long-term sustainability of the reforms may depend on the successful reworking of political institutions and the generation of positive policy-feedback effects, especially the empowerment of social groups with a stake in the reform’s maintenance.” For example, the United States’ Social Security program and the 1965 Voting Rights Act (Pub. L. No. 89-100) have lasted for decades because each empowered groups with a strong interest in maintaining the program. The airline industry initially opposed deregulation but came to support it once it had made significant investments in the hub-and-spoke routing encouraged by the new, deregulated environment. In contrast, the periodic attempts to simplify the income-tax code have left less-lasting impact because special interests soon fill the tax code with new complexity unopposed by any newly empowered advocates for maintaining the reform.

The global-agreement strategy suggests, though it does not explicitly describe, how it might create constituencies that will generate positive feedback tending to keep its reforms in place. The policies that signatory nations put in place to implement their emission-reduction targets may have the effect of creating business constituencies that have invested in and thus have an interest in retaining the system that justifies their investments. In addition, the treaty may solidify global norms and thus public support for emission reduction that may constrain the ability of future governments to back away from their commitments.

It is not hard to imagine, however, how the future political balance could shift against whatever agreement is reached in Copenhagen. Most straightforwardly, negotiators might set aggressive targets that prove costly in the decades ahead. If the costs of future emission reductions rise too high, public opposition could cause governments to abandon their commitments. Alternatively, some perceived failure could undermine the legitimacy of any global agreement. Emissions might fall at great expense and global average temperatures still rise more than 2°C, and, if disaster fails to strike, people may wonder why they made the effort. More plausibly, some nations might simply prove unable to meet their emission targets despite their best efforts, undercutting confidence in the agreement’s ability to control emissions.

More subtly, the political compromises necessary to reach an agreement with aggressive near-term targets may undermine the treaty’s ability to provide a solid institutional, legal, and politically sustainable foundation on which to build a long-term global effort to regulate GHG emissions. Negotiators will face pressure from environmentalists to mandate aggressive targets and pressure from finance ministers to limit costs. In principle, policy mechanisms can be constructed to provide a satisfactory balance between these competing objectives. But, under

pressure to reach agreement among nearly 200 nations, negotiators may be forced to make compromises that will complicate the lives of their successors.

Debates in the U.S. Congress over the Clean Air Act (Pub. L. No. 91-104) provide a classic example of this dynamic. To gain support from power-plant operators, legislators exempted existing plants from the new emission restrictions. They assumed that these plants would retire after, at most, a few decades but failed to recognize that the regulatory exemption created an incentive to avoid retiring the older plants.⁸ Similar dynamics might plague any agreement that emerges from Copenhagen. For instance, an agreement may use offsets and similar mechanisms to reduce near-term costs in ways that prove so complex and error prone that they divert investments in inappropriate directions and lead to scandals and fraud that undercut confidence in any treaty. It is clear that any regulatory framework for addressing climate change will need to evolve over time as new information becomes available, as emission reductions become ever larger, and as more nations need to take on binding commitments. But negotiators this December, under pressure to reach agreement on a plan whose emission-reduction targets might credibly hold the global average temperature increase under some low threshold, could easily enshrine principles, institutional designs, and legal commitments into a treaty that could make it difficult to appropriately adapt the framework over time.

The global-agreement and clean-energy revolution strategies, in offering two different visions for how the same set of near-term actions can best be configured to achieve long-term climate goals, thus present two different sets of risks.

As summarized in Table 5.1, the global-agreement strategy envisions that a near-term global agreement on targets and timetables for emission reductions, coupled with an international carbon market and with commitments and mechanisms for global investments in clean energy, will provide a framework for national policies, private-sector investment, and future regulations to eliminate GHG emissions. The strategy assumes that the world's governments can agree on a regulatory framework sufficiently stringent to drive the needed transformation of the energy system and sufficiently well-constructed to inspire and compel future governments and businesses to follow the course it lays out.

The clean-energy revolution strategy calls for large government investments in science, technology, and procurement to create zero-emitting technologies as inexpensive as current fossil-fuel sources. This strategy assumes that governments can guide the necessary investments without strong market forces, that the technology will arrive sufficiently quickly, and that current investment in high-emitting infrastructure will not lock in a long-term stream of emissions that exhausts the atmosphere's capacity to safely accept. The strategy also assumes that near-term policy does not need to promote the long-term development of climate-protection norms or build the foundation for effective future worldwide institutions for regulating GHGs.

Distinguishing Between Stretch and Legitimacy-Building Goals

This comparison suggests that both the global-agreement and clean-energy revolution strategies have significant, vulnerable assumptions that may affect their ability to achieve long-term

⁸ It remains an intriguing question whether attention to long-term thinking would have encouraged Congress to set a time limit (of perhaps 30 years) on existing plants' regulatory exemption and whether including such a multidecadal sunset clause would have imposed any significant political costs.

climate goals. We can now use insights from this comparison to suggest a strategy that might prove more robust.

As a first step, it proves useful to distinguish between two types of goals: stretch goals and legitimacy-building goals. The former inspire people to reach for some difficult-to-obtain objective. Those setting the goals would prove disappointed if the goals were often achieved, because that means the bar was not set high enough. The latter demonstrate the competence of the goal-setting organization. Those setting the goals consider it a failure if the goals are not met. For example, our research group conducted a product-planning study for an automobile firm considering a major augmentation of its product line (Lempert and Popper, 2005). It soon became apparent that different departments in the firm used goals for different purposes. The engineering and marketing departments used stretch goals to motivate their most creative employees. These departments laid out visionary goals, but the new product line would succeed even if they were only partially met. In contrast, the finance department promoted more-conservative targets, intending to meet all expectations created with its senior management and in the financial markets.

Transitioning to a wealthy, growing, near-zero-GHG-emission economy as quickly as possible clearly requires stretch goals. High-emitting fossil fuels have provided the primary source of energy for almost every economy since the start of the industrial revolution; it will likely take at least decades to replace them,⁹ and, yet, adverse impacts of climate change are likely already under way. However fast the transition to a near-zero-emission economy occurs, there will be reason to have wished it could have happened more quickly.

The clean-energy revolution strategy focuses on such stretch goals. It gives these goals to national governments, which would pursue them primarily by funding directed to their national innovation systems. A key assumption underlying this strategy is that such research can result in low-cost, low-emitting energy sources deployed throughout the global economy before the atmosphere's cumulative carbon limit is exceeded. The strategy assumes no need for legitimacy-building goals. National governments already have the legitimacy needed to conduct research, and the clean-energy revolution strategy relies on low price rather than changing values or global regulations for the world to adopt the resulting clean-energy technology.

In contrast, the global-agreement strategy relies on both stretch and legitimacy-building goals and gives both to a new set of international institutions. The strategy envisions a new global treaty with supporting institutions that will set stretch goals for emission reductions and that will build global norms for climate protection to help ensure that these policies continue into the future. Most of the vulnerable, load-bearing assumptions underlying this strategy flow from the confluence of the two types of goals in a single set of new and potentially fragile institutions. The treaty would bind an increasing number of nations to ever-larger reductions in large part by increasing the legitimacy of the view that a transition to near-zero emissions has become necessary. But holding the average global temperature rise below 2°C clearly represents a stretch goal. The global-agreement strategy runs the risk that any failure to negotiate clear plans to meet these aggressive goals, or any subsequent failure to implement these plans, may delegitimize the concept that it is necessary and possible to achieve a thriving, near-zero-emission economy.

⁹ Or learn to burn them without emissions.

A robust strategy may thus require placing stretch and legitimacy-building goals in different sets of institutions. Similar to the global-agreement strategy, this new approach might pursue an international agreement that sets targets and timetables for reducing emissions of GHGs. But, as its primary purpose, this effort would serve legitimacy-building goals, helping to establish global norms and supporting institutions dedicated to the proposition that the world should transition to a near-zero-emission economy as soon as possible. To reduce risk that these norms and institutions will fail to endure, the agreement would set targets at a level at which there is high confidence that they can be met. For instance, targets might focus on the not-insubstantial near-term gains possible in both developing and developed countries by more aggressively exploiting energy efficiency. The treaty should acknowledge, however, that such targets are unlikely to prevent significant impacts if the more-serious climate scenarios come to pass.

To speed reductions, the agreement should encourage national governments to set their own stretch goals, to begin transitioning toward zero emissions more quickly than required by the treaty. Both developed and developing countries could choose to more aggressively promote clean-energy technologies; slow investment in long-lived, high-emitting infrastructure; and begin to shift land use toward lower-emitting patterns. Similarly to the clean-energy revolution strategy, this new strategy would place responsibility for such actions with individual nations, expecting them to pursue such stretch goals from a mix of environmental concerns, various co-benefits, economic interest in clean-energy leadership, and concern with the future costs of lagging behind others.

The global agreement should encourage each of these incentives by putting in place a framework that encourages a race to the top.¹⁰ In part, just increasing the likelihood that global norms would solidify around the need for a near-zero-emission future would shift incentives on public and private actors. Some nations and businesses and groups within many nations would become constituencies for continuing the global energy revolution. More directly, freed from some of the focus on aggressive near-term targets, negotiators could turn their efforts to establishing a near-term institutional framework that, over time, would guide the integration of national efforts to reward those nations that advance the furthest. For instance, the treaty might establish procedures by which future emission-reduction targets for all may be adjusted downward to reflect demonstrated best practices. A global treaty might also describe the conditions under which a nation or region that had substantially reduced emissions could begin to impose carbon tariffs on those that had not.

This race-to-the-top strategy envisions a path by which its near-term actions catalyze a long-term transition to near-zero emissions that is different from the paths of the other two strategies. By reaching a global agreement on legitimacy-enhancing goals, the Copenhagen negotiations could increase the chances of establishing enduring international norms and institutions for climate protection. By establishing rules that would, in the future, reward nations that set and achieve stretch goals, the agreement could help provide incentives for a clean-energy revolution. In one scenario, national efforts will soon make low-cost clean energy readily available. In another scenario, clean energy remains expensive, but increasingly adverse impacts from climate change and strengthening norms for climate protection generate a political consensus to pay the costs. In both scenarios, the race-to-the-top strategy would set the

¹⁰ Rabe (2004) has explored why some U.S. states have moved forward with GHG reductions in advance of any national program mandating such reductions.

stage for a future path to near-zero emissions. The countries and industries that had advanced the furthest would create an increasingly strong constituency for continued reductions. Their citizens and customers would increasingly expect low emissions as the norm. With the necessary institutional infrastructure in place, the nations that advanced the clean-energy revolution could more easily ensure that the global standards and expectations for universal participation would successfully tighten over time.

Summary

Crafting near-term actions that launch the long-term transition to a wealthy, growing, near-zero-GHG-emitting economy represents, not surprisingly, a difficult challenge. Political scientists describe three general problems that complicate the task (Hovi, Sprinz, and Underdal, forthcoming). The time-inconsistency problem describes how today's policymakers cannot credibly ensure their successors' commitment to continuing emission reduction, leading the present generation to underinvest in such reductions because it cannot be sure that future policy will make these investments worthwhile. The domestic-policy problem describes the challenges that governments face in implementing policies with concentrated costs and dispersed benefits, since opponents of the former will prove more politically formidable than the proponents of the latter. Finally, the anarchy problem describes how a world with nearly 200 sovereign nations creates strong incentives for each nation to "free-ride" on the others' efforts to reduce emissions.

The clean-energy revolution strategy aims to address all three problems with government investments in science and technology that eliminate the cost of transitioning to a near-zero-emission economy. The global-agreement strategy aims to address them with binding agreements that inescapably commit future governments to reducing emissions and that create norms to increase the public's willingness to pay. The long-term vulnerability analysis presented here identifies key assumptions whose failure would prevent each strategy from reaching its long-term goals. The proposed race-to-the-top strategy attempts to address these vulnerabilities by adding a third element to the mix: The strategy suggests refocusing global negotiations away from explicit targets and toward policies that reward nations and firms that take leadership in the clean-energy revolution. As the number of participants grows, they would enlarge the political constituency that directly benefits from a transition to near-zero emissions, thus increasing both the credibility of future action and the costs of free riding.

Of course, this race-to-the-top strategy rests on its own key assumptions. It assumes that enough nations will adopt and meet stretch goals for a clean-energy revolution that laggards will be forced to follow (if for no other reason than to maintain access to consumers and markets in the low-emitting countries). It assumes that a global agreement focused on easily achievable, legitimacy-building targets can nonetheless promote norms for low emissions. It assumes that the negotiators in Copenhagen can create institutions that will give countries that have achieved success with clean energy credible leverage to raise future standards. It assumes that negotiators can begin to outline how future low-emitting nations might use trade rules and other barriers to protect themselves from those who fail to make the necessary investments. These assumptions remain vulnerable but perhaps offer a better wager than those underlying the global agreement and clean-energy revolution strategies.

Most importantly, no strategy to address climate change is likely to succeed without effective long-term thinking. Given the time scales of the challenge, today's actions to address climate change will prove significant only if they successfully shape the constraints and options available to future decisionmakers. Designing an effective near-term climate policy requires explicitly describing how various strategies intend to catalyze a long-term transition to near-zero emissions, carefully examining the assumptions underlying each vision, and choosing actions that seem best able to endure over the decades needed to reach our long-term goals.

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Workshop Agenda

Pardee Center Workshop on Shaping Tomorrow Today, March 17–18, 2009

Tuesday, March 17, 2009

Identifying Priority Long-Term Decisions

8:30 a.m.– 9:00 a.m.	Registration and coffee
9:00 a.m.– 9:30 a.m.	Plenary: Welcome and introduction
9:30 a.m.– 10:15 a.m.	Plenary: Introduction to backcasting exercise
10:15 a.m.– 10:30 a.m.	Break
10:30 a.m.– 12:00 p.m.	Small groups: Energy and climate backcasting exercise
12:00 p.m.– 1:30 p.m.	Lunch
1:30 p.m.– 2:45 p.m.	Plenary: Framework for LTPA
3:00 p.m.– 6:00 p.m.	Breakout sessions: Priorities for long-term decisions Human development (room 1232) International policy (room 1226) Climate and energy (room 1224)

Democracy and Long-Term Decisions (Dinner Program)

6:00 p.m.– 7:00 p.m.	Cocktails
7:00 p.m.– 9:00 p.m.	Dinner: “How can democracies make long-term decisions?” Gray Davis, former governor of California

Wednesday, March 18, 2009

Implementing Long-Term Decisionmaking

8:30 a.m.– 9:45 a.m.	Plenary: Current efforts at government foresight
9:45 a.m.– 10:30 a.m.	Plenary: Group reports on priorities for long-term decisions
10:30 a.m.– 10:45 a.m.	Break
10:45 a.m.– 11:45 a.m.	Panel: “How can policymakers implement/use these ideas?”
11:45 a.m.– 12:00 p.m.	Panel: Wrap-up

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