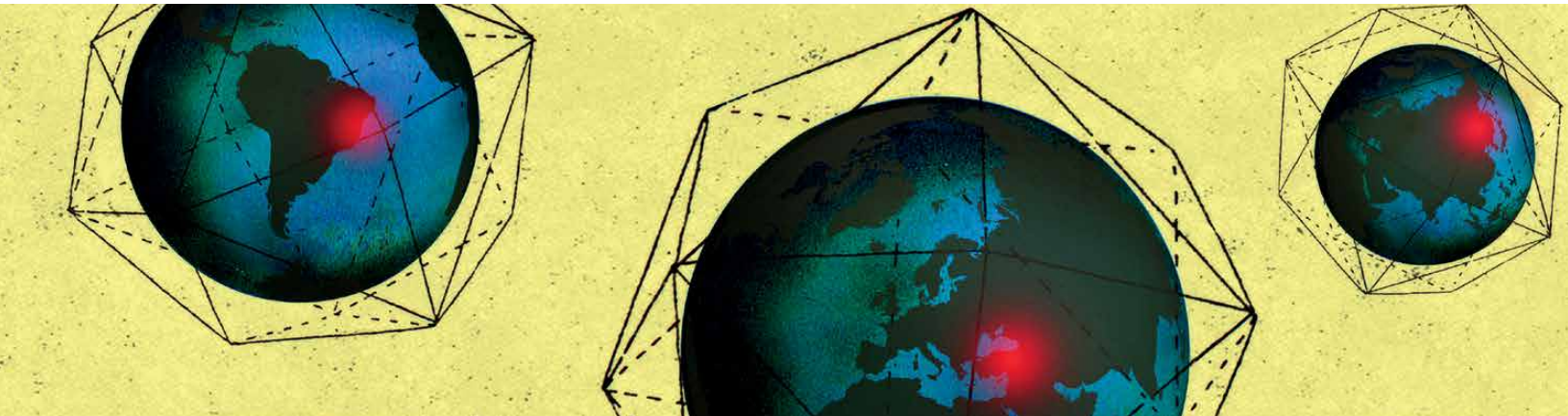


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Strategy, scenarios, and the global shift in defense power

As the strategic landscape shifts, an economic-scenario approach can help defense organizations grapple with uncertainty.

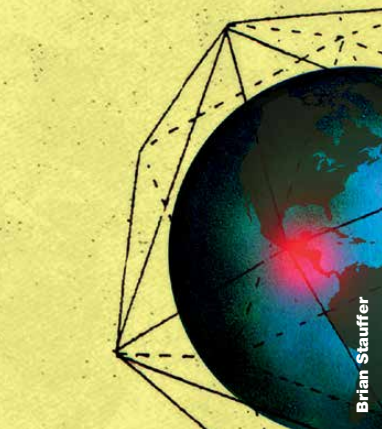
**Jonathan Ablett and
Andrew Erdmann**

The art of strategy, in defense as elsewhere, involves understanding possible futures to inform present decisions. Change, volatility, and uncertainty are perennial challenges to the defense strategist and are likely to increase in the coming years. Formulating strategy in these conditions will test planners in the public and private sectors alike.

To succeed, decision makers should look behind the headlines of the day to ask the right questions about what will affect their organization in the future. This requires considering the deeper underlying trends that will reshape the strategic landscape in the years ahead. Foremost among them is the shift in global economic power. Although often commented upon by

economists and pundits, many strategists focused on defense issues have not fully internalized this historic shift and its implications.

Here we offer a perspective on how strategists in defense organizations and aerospace and defense companies should approach this challenge. First, we describe how the profound shift in economic power since the end of the Cold War has already reshaped the world's strategic landscape, including the distribution of global defense spending. The potential evolution of these economic dynamics is fundamental to strategy. Predicting their future is, of course, impossible. Instead, we offer something more modest and practical: a new approach to scenario planning that is rooted in a deep understanding



of global economics. Such an understanding reveals the potential for unexpected scale and pace in the shift of defense spending from the United States and its treaty allies¹ to emerging economies.

The strategic landscape reshaped, 1991–2012

The past 20 years saw dramatic changes on the battlefield, even as some features endured, and the beginnings of an equally dramatic shift in economic power. In combination, these movements have altered the strategic landscape, and provide a glimpse into the future.

Continuity and change in military operations

For the world's defense and security organizations, history certainly did not end with the collapse of the Soviet Union and the cessation of the Cold War in 1991. We have since seen conflict on almost every continent, from the last major tank battle of the 20th century at 73 Easting in the Gulf War to numerous wars, clashes, and insurgencies in Europe, Asia, Africa, and the Americas. Since the attacks of September 11, 2001, attention has focused on the greater Middle East—Afghanistan, Iraq, and, increasingly, the struggles for control and influence in the aftermath of the Arab Spring.

The tempo of military operations has been relentless. Since 1991, for instance, the United States has embarked upon a new military intervention roughly every two years. North Atlantic Treaty Organization (NATO) forces have been at war in Afghanistan for over a decade. South Korean and Japanese forces have deployed for the first time to the Middle East. Meanwhile, the United Nations has launched a new peacekeeping operation every six months. Moreover, the duration of most of these operations has increased to five to ten years.²

Innovations in military technology and operations have marked these past two decades of conflict. Precision-guided munitions have evolved and demonstrated their effectiveness in conflicts beginning with the Gulf War and continuing in Kosovo, Afghanistan, and most recently NATO's Operation Unified Protector in Libya in 2011. Advanced missiles now pose particular threats to capital ships and fixed bases. Unmanned aerial vehicles (or remotely piloted air systems) are now standard components in many militaries' intelligence, surveillance, and reconnaissance (ISR) tool kits, and they increasingly serve as weapons platforms as well. Harnessing big data and employing advanced analytic techniques are other features of 21st century ISR. Cyberwarfare has moved from theory to practice.³

Militaries today confront adversaries who employ a full spectrum of tactics, from conventional to irregular and even criminal ("hybrid war"). Modern navies, for instance, cope with traditional and unconventional foes, including Somali pirates and asymmetrical threats such as terrorist suicide speedboats. Air forces are investing in fifth-generation fighters, even as they continue to provide workhorse logistical support for operations in the field. And for foot soldiers, despite the numerous technical advances in communications and equipment, the past decade has been largely spent relearning the lessons of counterinsurgency: "Walk. Stop by, don't drive by. . . . Situational awareness can only be gained by interacting face-to-face, not separated by ballistic glass or Oakleys."⁴ *Plus ça change, plus c'est la même chose.*

The power shift begins

Concurrent with these tactical and operational developments, tectonic plates moved at a deeper strategic level. A profound shift in economic

power began during this period—one that has already manifested itself in the distribution of traditional “hard” military power among the great powers. This shift will continue to reshape the strategic landscape in the years ahead.

Future historians will likely point to 2007–08 as an inflection point in global history. For the first time in over two centuries—since the start of the Industrial Revolution—the majority of the world’s economic growth took place in the developing world, driven in large part by China, India, and other Asian economies. In addition to favorable demographics and reforms to open emerging economies, increasing urbanization—especially in China—drove much of this growth. Significantly, 2008 was also the first time ever that a majority of people lived in cities. The pace of urbanization is staggering. More than 1.3 million people migrate every week to urban areas. And this historic migration will likely continue unabated for the next two decades, mainly in the emerging economies of Asia, Latin America, and, increasingly, Africa.⁵ The global economic crisis that began

in 2008 accelerated this shift in economic power from developing to emerging economies, as the BRIC countries (Brazil, Russia, India, and China) weathered the storm well and the developed economies of the United States, Europe, and Japan suffered and remain vulnerable more than four years later. Between 2009 and 2012, China’s economy grew over 30 percent and India’s 22 percent in real terms, whereas Germany’s grew 7.9 percent and the United States’s 7.1 percent.⁶ And in 2008, for the first time, a Chinese company led the world in international patent applications.

Taken together, economic and demographic forces drove the most rapid shift in human history in what the McKinsey Global Institute (MGI) calls the “economic center of gravity”—the geographic midpoint of global economic activity (Exhibit 1). MGI projects this movement to continue, at a slightly slower pace, for the next 15 years or so, when, by this measure, most of the regional imbalances ushered in by the Industrial Revolution will have been erased.

Future historians will likely point to 2007–08 as an inflection point in global history. For the first time in over two centuries the majority of the world’s economic growth took place in the developing world.

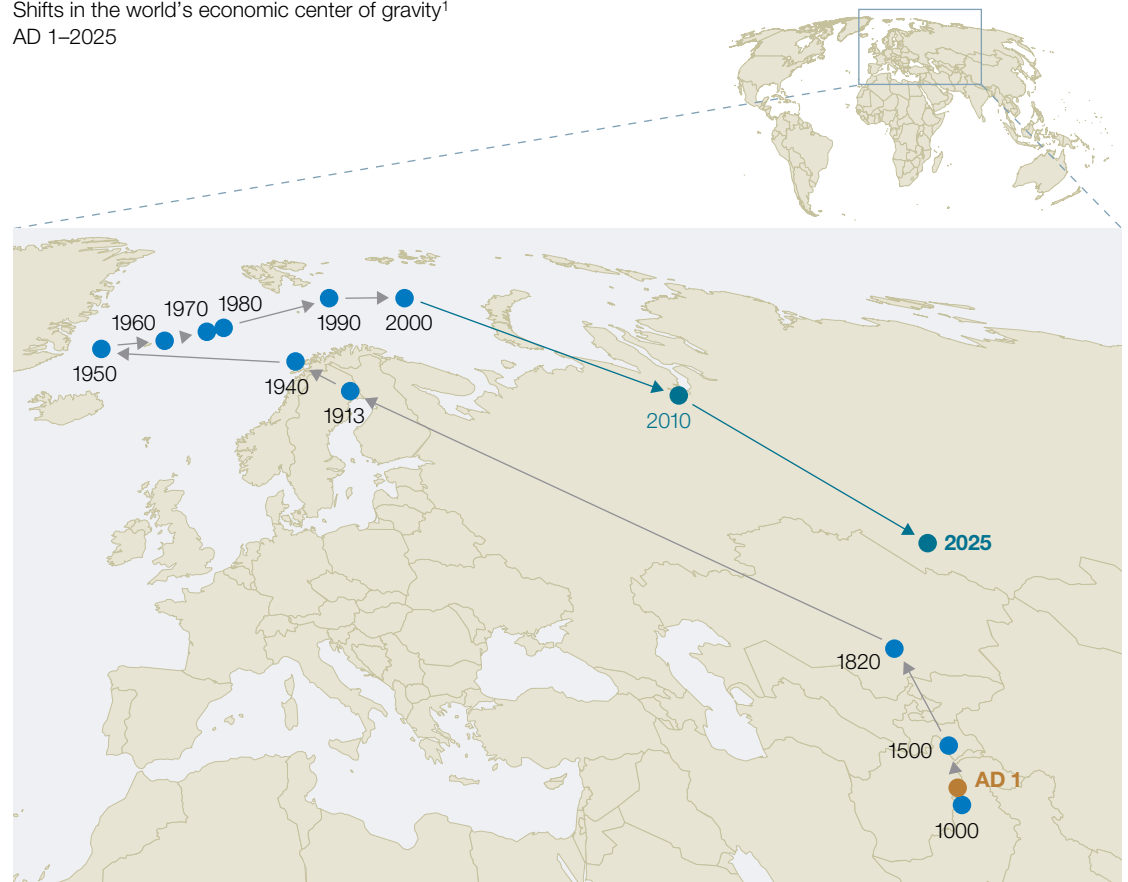
These economic trends have already started to reshape the global landscape of defense spending. To be sure, a nation's assessment of its security threats plays a critical role in shaping its defense spending in the near term. That said, a major country's military power flows in large part from

its underlying economic strength over the medium to long term: the faster a country's economy grows, the more likely its defense spending will increase as well. Despite widely different geopolitical complexities and economic dynamics, the countries with the

Exhibit 1

The ten years from 2000 to 2010 saw the fastest-ever shift in the world's economic center of gravity.

Shifts in the world's economic center of gravity¹
AD 1–2025



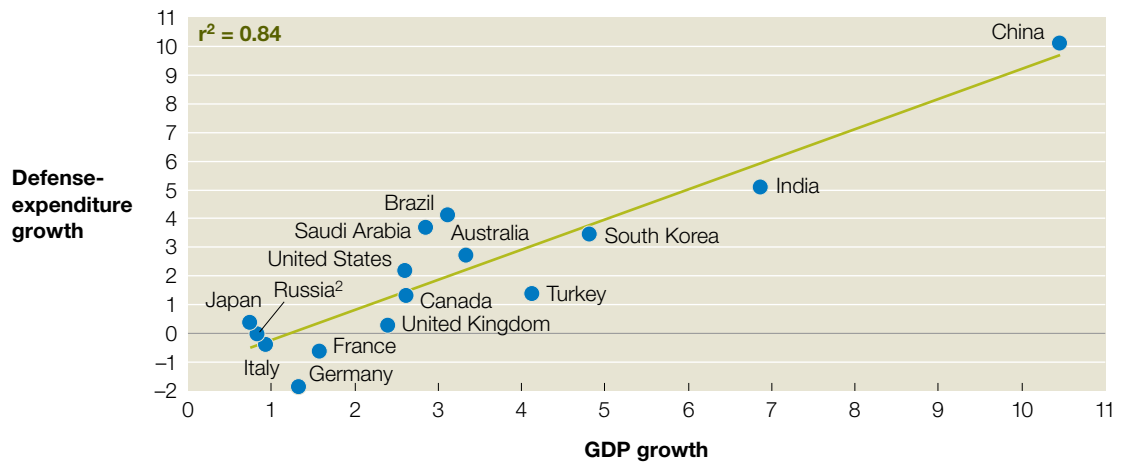
¹Calculated by weighting national GDP by each nation's geographic center of gravity; a line drawn from the center of the earth through the economic center of gravity locates it on the earth's surface. For detailed analysis, see Richard Dobbs et al., *Urban World: Cities and the Rise of the Consuming Class*, McKinsey Global Institute, June 2012, pp. 61–72.

Source: University of Groningen; McKinsey Global Institute analysis of data compiled by Angus Maddison

Exhibit 2

Growth in military spending and GDP are correlated over the long term.

Major military powers' GDP and military-expenditure real growth rates,¹ 1991–2011 compound annual growth rate, %



¹Includes the 15 nations with the largest defense budgets in 2011, representing ~83% of global defense spending.

²For Russia, 1992 defense spending used in place of 1991 due to data-availability issues.

Source: McKinsey's Global Growth Model; Stockholm International Peace Research Institute

largest defense budgets, which account for the vast majority of the world's defense expenditures, have fit this pattern since 1991 (Exhibit 2).

Other more subtle shifts in national power were also taking place between 1991 and 2011. R&D expenditures in all major economies nearly doubled in constant 2011 dollar terms, rising from roughly \$740 billion in 1991 to \$1.5 trillion in 2011. But just as we saw in defense spending, countries' R&D investments mirrored trends in their overall economic growth. Europe and Japan's combined share of global R&D expenditures declined by 11 percent in the 20 years after 1991. Meanwhile, China increased its share of global spending to 9 percent from 1 percent during the same period. Developing countries are thus emerging as true competitors to the developed economies not

only with regard to their economies' sheer scale but also their innovation and technical prowess.⁷ R&D spending matters: a country's R&D investments are strongly correlated with the quality of the military's equipment 25 years later.⁸ This suggests that in the future, developing countries will narrow the gap in quality between their military equipment and that of developed countries.

Glimpses of the future

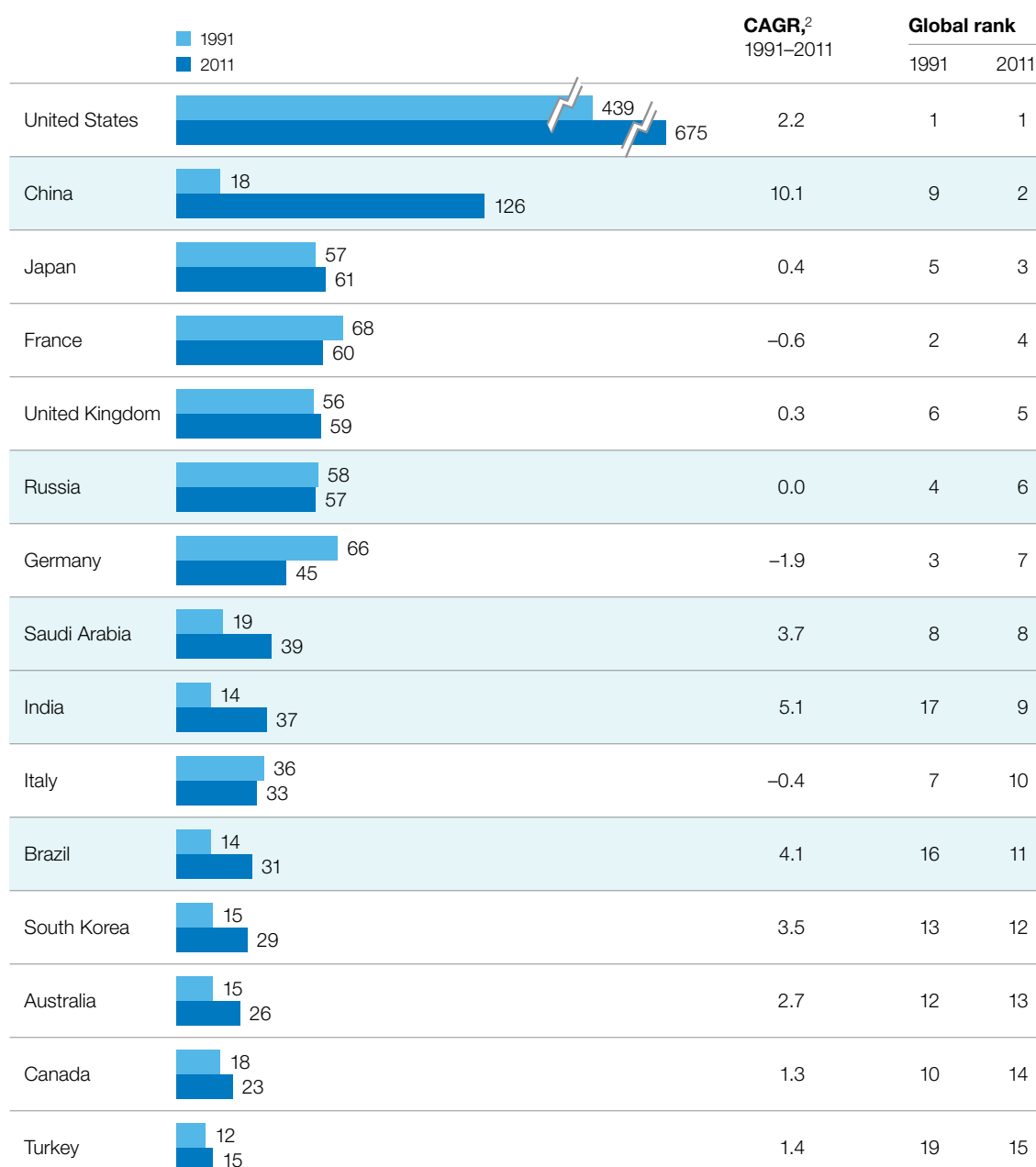
We have seen these dynamics play out around the world since 1991. Sustained operations and the increasing costs of modern weapons platforms have proved too much for many Western governments and their publics as they manage the aftermath of the global economic crisis and structural strains in their aging societies. For example, the United Kingdom's 2010 Defence

Exhibit 3

Developing countries have closed the gap in defense spending since the end of the Cold War.

1991 and 2011 annual defense spending, \$ billion,¹ %

■ Non-US treaty partner



¹All figures are in constant 2011 dollars, converted from historical data expressed in constant 2010 dollars, then adjusted for recent inflation and exchange-rate movements. See endnote 10 for more on the calculation method. For Russia, we used 1992 figures, as 1991 data were not available.

²Compound annual growth rate.

Source: McKinsey's Global Growth Model; Stockholm International Peace Research Institute; McKinsey analysis

and Security Review declared bluntly that its “inherited defense spending plans . . . [are] completely unaffordable” and that it needs to “confront the legacy of overstretch.”⁹ France’s earlier national-security review analyzed the changing strategic context and new priorities and thus, through a different logic, reached similar conclusions. The US Department of Defense (DOD), under Secretary of Defense Robert Gates, launched its own efficiencies campaign, which has accelerated under his successors. The planned reductions in the US defense budget in the next decade are literally on the scale of some countries’ GDPs. Other Western militaries are undergoing similar retrenchments. At the same time, however, China, other East Asian countries, India, Brazil, and other emerging economies have continued to increase not only their defense expenditures in real terms, as shown in Exhibit 3, but also, in many cases, the sophistication of their own defense industries.

Today, the United States remains the world’s preeminent military power in scale, sophistication, battle-tested experience, and global reach. US defense spending in 2011 was more than five times that of the next highest defense spender, China. America’s traditional allies also occupy important positions in the global defense landscape. Japan, France, and the United Kingdom ranked third, fourth, and fifth in defense spending in 2011. The momentum, however, is unmistakable: emerging economies are positioned to displace the other developed economies in the top tier of defense spenders. China’s rise in defense spending is starkest. In 2011 it spent \$126 billion, more than twice as much as the countries that are the next largest spenders: Japan, France, the United Kingdom, and Russia.¹⁰ Chinese authorities

announced in March 2013 that they plan to increase defense spending another 10.7 percent in 2013.¹¹

The direction is clear. Developed economies—and the world’s leading military establishments historically—have experienced relative decline vis-à-vis the major developing economies since 1991. Yet the scale, scope, and pace of change of the shift in economic power cannot be simply extrapolated from the recent past to understand the future. Instead, strategists will require a new approach to manage this era’s particular strategic uncertainties.

An economic-scenario approach

Scenario planning is an established tool for business and defense strategists.¹² Done right, scenario planning accounts for the major variables or drivers that could shape the future, in sufficient depth and vividness to enable strategists to draw out potential implications for the strategy and plans of their organizations. Scenarios are not meant to be predictive or comprehensive, covering all possible futures. Rather, the goals are to define a range of possibilities and identify important continuities among them, as well as significant uncertainties or risks that a strategy should address. Such an analysis, in turn, helps to frame critical questions and generate strategic insights that then shape the strategic decisions of today and adaptation tomorrow.

Today, defense scenarios typically start with geopolitical, security, or more operational assumptions or with a statement of guiding objectives (such as “Counter violent extremism, deter and defeat aggression, strengthen international and regional security, and shape the future force”; “US forces must be prepared

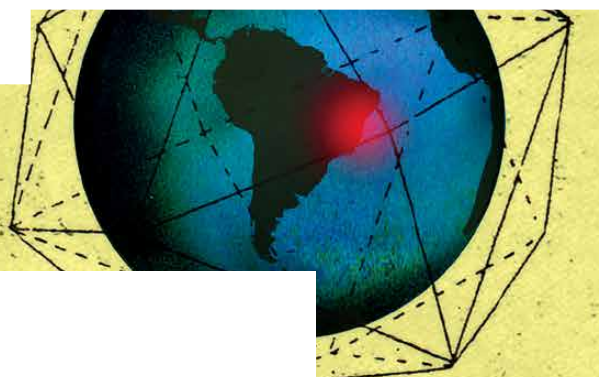
to fight ‘two and a half’ wars simultaneously”; or “Blue Force must be ready to counter Red Force in country X”). For example, the US DOD’s recent strategy documents—the February 2010 *Quadrennial Defense Review Report* and the February 2011 *National Military Strategy of the United States*—briefly review the changing strategic environment but do not offer alternative scenarios. The importance of this era’s economic forces, however, suggests that a different approach, one with a more explicit grounding in these new economic realities, is needed. National-security strategies typically do not explore the full implications of the shift in economic power now under way.¹³ The approach outlined here is designed to address this gap. The development of rich, sophisticated scenarios for the future course of the global economy provides its starting point. These scenarios, in turn, enable the mapping of changes in countries’ economic power in relative and absolute terms. The trends most immediately relevant for defense and security organizations—especially levels of defense spending and R&D investment—are then built upon these economic foundations.

We use a set of economic scenarios for the next decade built with McKinsey’s Global Growth Model (GGM)¹⁴ to illustrate this approach. The

GGM is a database and modeling tool that supports the construction of detailed economic scenarios down to the country level. Its variables span GDP and more than 100 others, including demographics, education levels, public debt, R&D investments, and urbanization rates.¹⁵

The baseline economic scenarios employed here are predicated on the assumption that major developed and emerging economies will develop with different growth rates—namely, developing economies will tend to grow at a significantly higher rate than developed economies. We emphasize these different outcomes and groups because, broadly speaking, the challenges faced by countries in each group are similar. Generally, advanced economies have struggled not only with the aftermath of the 2008 downturn but also with meeting their aging populations’ multifaceted challenges. Meanwhile, emerging markets have tried to sustain or accelerate growth through export promotion, the allocation of capital, continued economic reform, urbanization and industrialization, and other tactics.

The relative performance of these different groups of economies thus describes a range of four principal scenarios. The GGM scenarios



are bounded by emerging markets' growth rates (between 3 and 7 percent per year from 2013 to 2022) and advanced economies' growth at 1 to 3 percent annually. These growth rates define four broad-based scenarios shown in Exhibit 4: Global Growth Renewed, Advanced Economies Rebound, Emerging Economies Lead, and Global Lost Decade.¹⁶

Together, these scenarios portray different potential future international landscapes and

balances of economic power among the major economies. They make clear that the stakes are extraordinarily high for the health of the entire global economy. While growth continues across all scenarios, the difference in total global real GDP between the most favorable scenario (\$100 trillion, under Global Growth Renewed) and the least favorable one (\$84.5 trillion, under Global Lost Decade) is a staggering \$15 trillion per year in 2022. That is roughly equivalent to the US economy today.

Exhibit 4

Four scenarios describe possible paths for the global economy from 2013 to 2022.

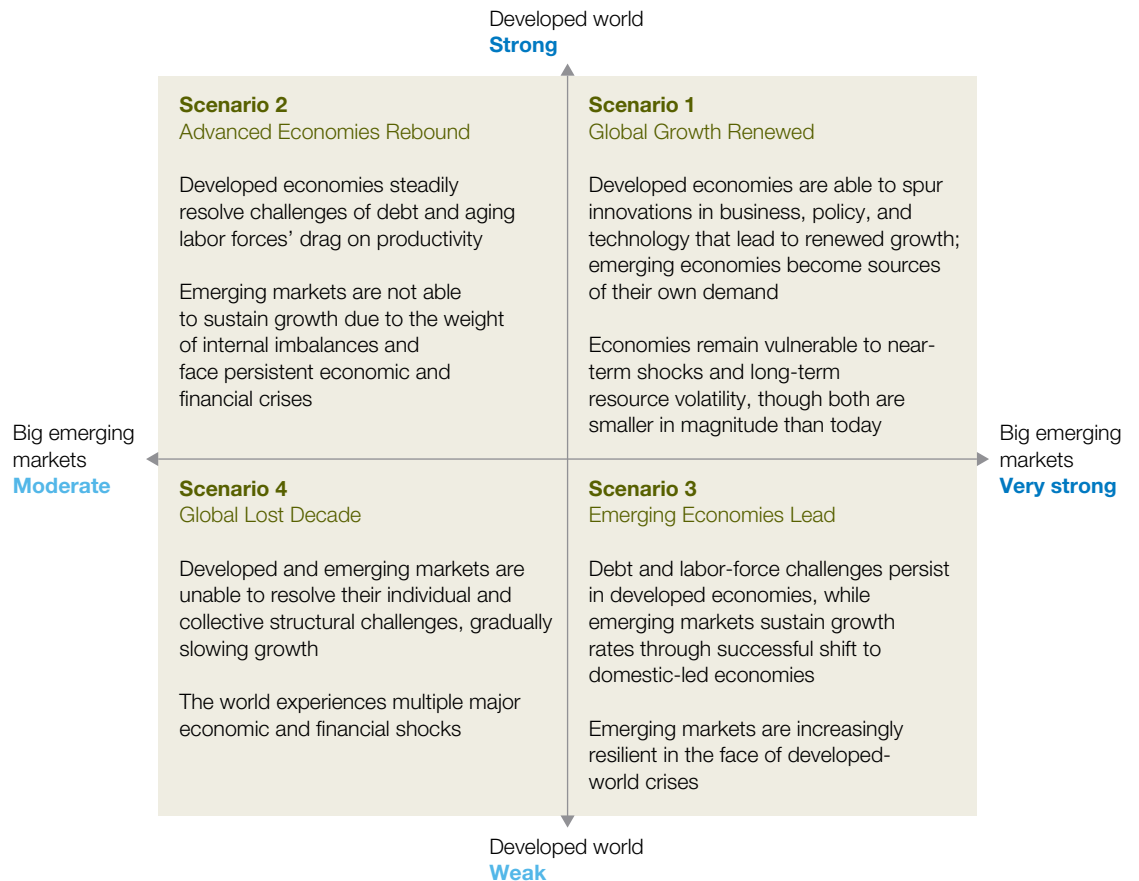
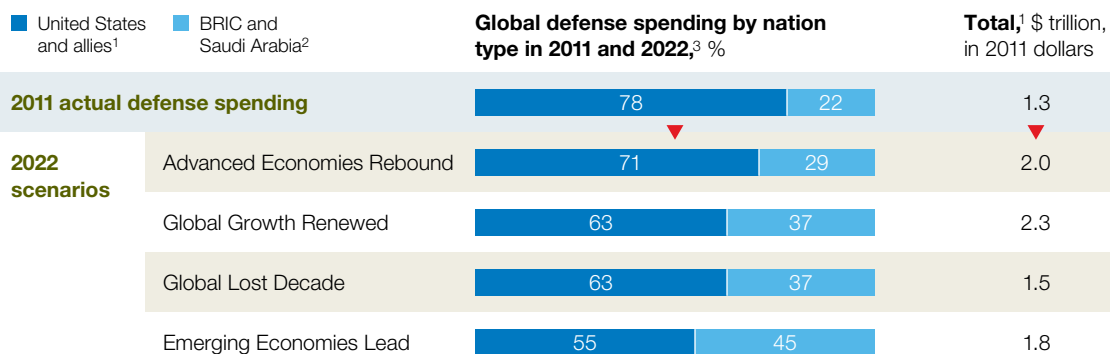


Exhibit 5

A substantial share of global defense spending will shift away from the United States and its traditional allies.



¹Includes the United States and its allies among the top 15 defense spenders (Australia, Canada, France, Germany, Italy, Japan, South Korea, Turkey, the United Kingdom, and the United States).

²Includes Brazil, Russia, India, China, and Saudi Arabia.

³Includes the 15 nations with the largest defense budgets as of 2011, representing ~83% of global defense spending.

Source: McKinsey's Global Growth Model; Stockholm International Peace Research Institute; United Nations Statistics Division

The scenarios also have quite different outcomes for the relative distribution of economic power among countries. Across all scenarios, the US economy remains the world's largest economy. China's rapid growth continues, but by 2022, it still does not equal the size of the US economy today. The absolute gap between the two narrows more or less depending on the scenario. The other major developing economies follow a similar pattern; Europe and Japan experience steady growth in the most favorable scenarios and stagnation in those that are less favorable.

Defense-spending scenarios to 2022

The four baseline economic scenarios paint very different possible futures for the world's major economies—and thus for their self-confidence, internal political stability, and the vision of their roles internationally. Geopolitical relations (for example, strains among past allies over burden

sharing or opportunities for new alignments among rising powers) would also vary under the different scenarios.¹⁷

To understand these implications, we analyzed global defense spending under the economic scenarios. We focus our analysis on the top 15 defense spenders in 2011. These countries account for the lion's share of global defense spending under any scenario (that is, nearly 85 percent in 2011) for the sake of simplicity. As mentioned, growth in countries' defense spending is strongly correlated (r-squared equals 0.84) with their underlying economic growth over longer periods of time. Therefore, we use each scenario's estimate of countries' real GDP and a country-specific correlation between defense spending and GDP to derive the percentage of each nation's real GDP devoted to defense spending in 2022 under each scenario.¹⁸

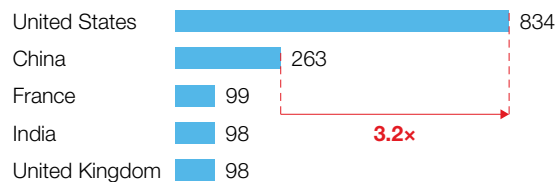
Exhibit 6

The difference between the two biggest defense spenders varies widely by scenario.

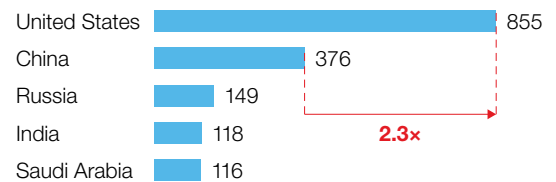
Estimated 2022 defense spending, \$ billion, in 2011 dollars

0.0x Difference between US and China defense spending

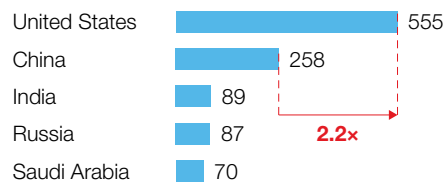
Advanced Economies Rebound



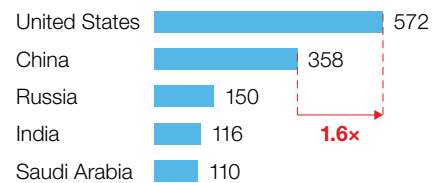
Global Growth Renewed



Global Lost Decade



Emerging Economies Lead



Source: McKinsey's Global Growth Model; Stockholm International Peace Research Initiative; McKinsey analysis

The likely changes in countries' relative share of global defense spending between 2011 and 2022 are striking (Exhibit 5). If we divide the 15 countries studied into the United States and its 9 treaty allies, and the emerging BRIC countries and Saudi Arabia, we see that while the US and its allies still account for the majority of defense spending in all scenarios in 2022, their relative advantage is eroded in all scenarios by emerging markets' higher rates of economic growth. Most dramatically, in the Emerging Economies Lead scenario, the United States and its treaty allies' relative advantage in global share of defense spending falls by 23 percentage points in a decade, dropping to 55 percent by 2022.

The scenarios likewise suggest dramatic shifts in defense spending in absolute terms. Defense spending in the BRIC countries and Saudi Arabia will increase significantly in all scenarios—from roughly \$290 billion in 2011 to between approximately \$550 billion and \$830 billion by 2022 (in constant 2011 dollars). The fate of the United States and its major treaty allies' defense spending is mixed, however. When the major developed economies fare well, their combined defense spending increases from a little over \$1 trillion in 2011 to more than \$1.4 trillion in 2022; when they fare poorly, in the Global Lost Decade and Emerging Economies Lead scenarios, their combined defense spending falls below \$1 trillion by 2022.

Exploring these scenarios for individual countries again shows shifts in defense spending away from the developed economies. Consider the top five defense spenders in each scenario (Exhibit 6). The United States and China maintain their one-two positions in total defense spending in all scenarios. In those scenarios in which US economic growth remains sluggish throughout the coming decade, its defense spending falls more than 15 percent in real terms. The United States’s relative advantage in defense spending over China, however, declines significantly from 5.4x in 2011 to between 3.2x and 1.6x in 2022. India enters the ranks of the world’s top five

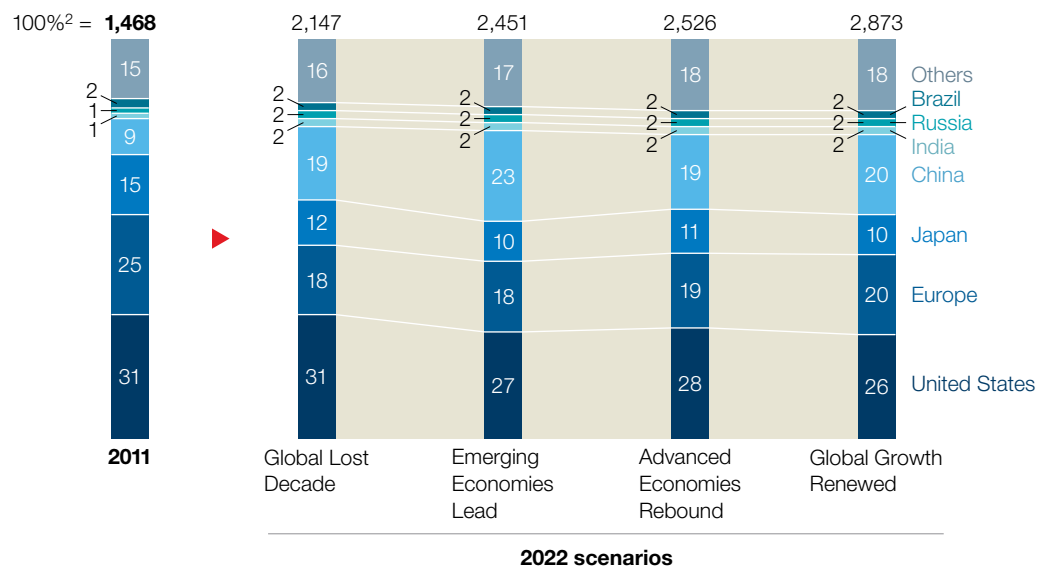
defense spenders in all scenarios (see “A bright future for India’s defense industry?” on mckinsey.com). Russia and Saudi Arabia round out the top five defense spenders in three of the four scenarios. Only in the Advanced Economies Rebound scenario do France and the United Kingdom—two of the US treaty partners—remain in the top five.

Considering total R&D investments across the different countries provides a rough measure of the dynamism of high-technology industries and innovation, and, as noted above, an indication of long-term trends in the quality of the military equipment the country makes (Exhibit 7).

Exhibit 7

The combined European, Japanese, and US share of global R&D investment will shrink in any scenario.

Global real R&D investment,¹ 2011 and 2022 scenarios, %, \$ billion, in 2011 dollars



¹Government, private-sector, and academic investment in research and development.

²Some figures do not sum to 100%, because of rounding.

Source: McKinsey’s Global Growth Model; OECD

Our scenarios show overall R&D investments tracking the trends seen in defense spending but at different rates. The United States retains its leadership position but by less than before, as emerging economies gain ground on the United States and its traditional allies. Most important, China's investments in R&D accelerate in the next ten years; in all scenarios, China more than doubles its share of global R&D investment. In the coming decade, we should expect China to place second only to the United States in total R&D investments, just as it became the world's second-biggest defense spender in the previous decade. China's rise in R&D is stunning: in all scenarios, it will increase its share of global R&D from roughly \$1 of every \$100 in 1991 to \$1 of \$5 spent in 2022. In doing so, it surpasses both Europe and Japan; their investments grow slowly in all scenarios. That said, Europe and Japan will remain major centers of global R&D into the 2020s because of their relatively robust starting point. Meanwhile, Brazil, India, and Russia also gain share, though at a much slower pace than China, and they will continue to lag behind Europe and Japan by a significant margin in 2022 (for example, Japan's R&D spending will remain roughly five times India's across the scenarios).

This economic-scenario approach enables strategists to assess other underlying factors should a particular analysis require it. These

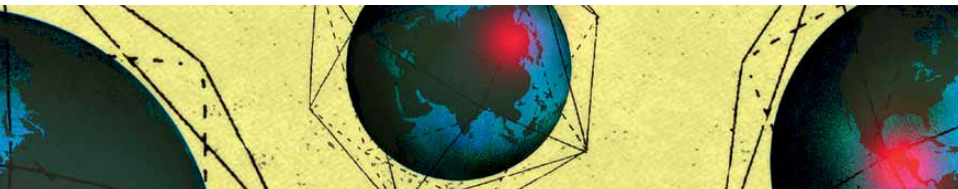
include public-debt burdens (for instance, high for most developed economies, with exceptions such as Australia), subtle variations among some countries' relative performance (for example, South Korea consistently punches above its weight with regard to defense spending and R&D), education levels (for instance, other countries continue to narrow the US lead in average number of years of education per person), and demographic trends.¹⁹

From using scenarios to framing the right questions

Decision makers in ministries of defense and corporate boardrooms require analytic tools to help them manage uncertainties. Without them, they risk falling prey to misguided confidence in a single, clear, but almost certainly erroneous prediction of the future, or they will be forced to rely on their gut. The economic-scenario approach outlined here is one such tool for the strategist's tool kit.

The economic-scenario approach highlights how the global strategic landscape may change in the coming decade. Such scenarios can help organizations identify the specific potential opportunities, risks, trade-offs, and outcomes that their strategies should consider.

From a defense official's perspective, such questions could include the following:



Ministries of defense and corporate boardrooms require analytic tools to help them manage uncertainties. Without them, they risk falling prey to misguided confidence in a single, clear, but almost certainly erroneous prediction of the future.

- What does it mean for the United States when the defense spending of its traditional treaty allies will continue to decline in relative, and perhaps absolute, terms? What capabilities might these allies be able to deploy in the future? What new security relationships might be needed to manage the shifting balance of defense power? What might be the implications of such shifts for US force structure, overseas basing, and diplomacy?
 - What does it mean for European countries' role in the world as their relative share of defense power shrinks? Will NATO's role in the world correspondingly retract? Will NATO's "out of area" operations become a thing of the past? Will individual European countries have effective expeditionary forces in the 2020s, or will limitations force them to decide among increased dependence on US support (for example, logistical and lift support), increased defense cooperation within Europe, and disengagement from traditional areas of influence such as Africa? What might be the implications of these different scenarios for the future affordability of independent nuclear-deterrence forces in France and the United Kingdom?
 - What does the wide range of possibilities for US defense spending in 2022 mean for Asian countries? How will such uncertainties shape their defense postures and diplomacy toward the United States, and one another?
 - What does it mean for emerging countries that for the next decade the United States will remain the global leader in military spending and R&D investments despite those countries' rapid growth? How relevant will European powers be in their strategic calculus? What security relationships should they prioritize to cope with the shifting strategic landscape?
- From an aerospace and defense executive's perspective, such questions could include the following:
- Which markets will matter most for a company's growth in the next ten years? What should be the relative balance among developed and developing markets in its portfolio?
 - What does the possible emergence of India and Saudi Arabia among the world's top five defense spenders suggest for a company's strategic priorities?

- How should a company manage the diversity of regulations and laws related to technology transfer, intellectual property, and local content provisions as it seeks to expand into specific developing markets? How should it manage its defense and civilian aerospace businesses in such markets in light of other diplomatic and commercial considerations? What innovative joint ventures, mergers, or other collaborations will fuel growth among aerospace and defense companies based in different countries?
- How should a company manage the wide range in potential US defense-spending futures in the coming decade (that is, a difference of roughly \$300 billion in annual defense spending between high and low scenarios in 2022)?
- How should a company leverage the continued robust R&D base in Europe, Japan, and the United States to serve both developed and developing aerospace and defense markets?
- How will developing countries' aerospace and defense industries "go global" and compete directly against more established Western players in defense markets around the world in the coming decade? What are the implications for Western companies' strategies, operations, and costs if many systems are produced for emerging markets?
- What should be a company's global manufacturing footprint in light of these trends and uncertainties in the coming decade?
- What skills and talents will a company need to succeed in the changed global defense landscape?

Asking the right questions is the starting point for any strategy. We are now living through an

unprecedented shift in global economic power. No one can predict precisely what this means for our future. Robust economic scenarios, however, can help strategists frame the right questions and trade-offs for their organizations, which is more helpful than aspiring to predict that which defies prediction. ○

¹Nations with which the United States has signed a collective-defense arrangement (state.gov).

²See James Dobbins, "Guidelines for nation builders," *Strategic Studies Quarterly*, Fall 2010, p. 15 (au.af.mil/au/ssq).

³For comprehensive surveys of such recent military developments, see *The Military Balance: 2011*, *The Military Balance: 2012*, and *The Military Balance: 2013*, International Institute for Strategic Studies.

⁴See Commander, NATO International Security Assistance Force/US Forces–Afghanistan, "Counterinsurgency guidance," August 1, 2010.

⁵See two reports from the McKinsey Global Institute, *Urban world: Cities and the rise of the consuming class*, March 2011, and *Urban world: Cities and the rise of the consuming class*, June 2012 (mckinsey.com); see also United Nations, *World Urbanization Prospects, The 2011 Revision*, March 2012 (un.org).

⁶Statistics on economic real growth are drawn from McKinsey's Global Growth Model (GGM).

⁷GGM, December 2012.

⁸Steven Bowns and Scott Gebicke, "From R&D investment to fighting power, 25 years later," defense special issue, *McKinsey on Government*, Spring 2010, pp. 70–5.

⁹*Securing Britain in an Age of Uncertainty: The Strategic Defence and Security Review*, October 2010, p. 15 (gov.uk).

¹⁰We employ the Stockholm International Peace Research Institute (SIPRI) historical defense-spending data set throughout these analyses for consistency and transparency. The SIPRI data set we used covers the 1988–2011 period, is measured in constant 2010 dollars, incorporates iterative revisions to maintain historical continuity for individual countries, and employs consistent defense-spending definitions across countries when appropriate (instead of relying upon only reported ministry-of-defense figures). For more, see sipri.org. We converted the SIPRI data into constant 2011 US dollars using economic data from the GGM. The conversion accounts for the variance between our 2011 global rankings and SIPRI's, which are estimated in constant 2010 US dollars.

¹¹"China boosts defense spending as military modernizes arsenal," *Bloomberg News*, March 5, 2013.

¹²The literature on scenario planning is now a veritable library. On the early development of scenario planning at Royal Dutch Shell Group, see Peter Cornelius, Alexander van de Putte, and Mattia Romani, "Three decades of scenario planning at Shell," *California Management Review*, Fall 2005, pp. 92–109; Art Kleiner, "The man who saw the future," *strategy+business*, Spring 2003 (strategy-business.com); Peter Schwartz, *The Art of the Long View: Paths to Strategic Insight for Yourself and Your Company*, New York: Doubleday, 1996; Pierre Wack, "Scenarios: Uncharted waters ahead," *Harvard Business Review*, September–October 1985, pp. 73–89; Pierre Wack,

“Scenarios: Shooting the rapids,” *Harvard Business Review*, November–December 1985, pp. 139–50; Ian Wylie, “There is no alternative to...,” *FastCompany*, July 2002 (fastcompany.com). See also Paul J. H. Shoemaker, “Scenario planning: A tool for strategic thinking,” *Sloan Management Review*, Winter 1995, pp. 25–40, and Charles Roxburgh, “The use and abuse of scenarios,” mckinsey.com, November 2009.

¹³ For an exception to this pattern, one that explores the forces shaping the international environment in the next two decades and integrates them into four scenarios with deliberately robust economic foundations, see the US National Intelligence Council, *Global Trends 2030*, December 2012 (dni.gov).

¹⁴ For more on the GGM, visit the Global Forces research center, on mckinsey.com.

¹⁵ For a detailed introduction to the baseline global economic scenarios and the technical capabilities of the GGM, see Jonathan Ablett, Lowell Bryan, Luis Enriquez, and Sven Smit, *Global Economic Scenarios for the Next Decade: Uneven Recoveries and Diverging Prospects*, December 2012; the paper is available from the authors of this article.

¹⁶ Recent experience has highlighted the fact that the fates of economies within each of these two groups could also diverge (for instance, the United States could recover while the eurozone fragments; China may prosper while India falters). We limit this illustration to the four core scenarios. For additional scenarios centered on potential variations in China and Europe’s economic fortunes, see Jonathan Ablett, Lowell Bryan, Luis Enriquez, and Sven Smit, *Global Economic Scenarios for the Next Decade: Uneven Recoveries and Diverging Prospects*, December 2012, available from the authors of this article. More extreme “black swan” events—such as renewed financial contagion, currency collapses, or a prolonged spike in global energy prices—can also be modeled with this technique, depending on an organization’s specific strategic challenges.

¹⁷ Our analysis here does not incorporate such geopolitical, political, and cultural elements. Such elements can be integrated along with the economic to provide richer, more robust, and more vivid scenarios that are tailored to a specific organization’s context and opportunities. For a discussion of some of the methodological considerations behind this approach and an example of an integrated economic-political-geopolitical scenario based on the GGM, see Andrew Erdmann, “Managing economic, political, and geopolitical uncertainty in the era of geo-economics,” The International Institute for Strategic Studies Geo-economics and Strategy Programme Conference, Manama, Bahrain, March 2012 (iiss.org).

¹⁸ To illustrate this economic-scenario approach, we employ simple, consistent assumptions based on historical data for each country (percent GDP committed to defense) to establish the ranges of their defense budgets under the different scenarios. These assumptions reflect the historical correlation between GDP growth and defense-spending growth, as detailed previously. We take a country’s historical high percent GDP committed to defense as measured during any five-year period between 1992 and 2010 for which we have consistent SIPRI data, and we then use that to estimate its defense budget in those scenarios where the country’s economy does well (for example, use the United States’s historical high percentage of GDP committed to defense under the Global Growth Renewed and Advanced Economies Rebound scenarios). Conversely, we employ the lowest five-year average for percent GDP committed to defense to estimate defense spending in those scenarios where the country’s economy does not perform well (for instance, use the United States’s historical low percentage of GDP committed to defense under the Global Lost Decade and Emerging Economies Lead scenarios). These are relatively conservative, not predictive assumptions. Prolonged economic difficulties, for example, could lead countries to shrink defense expenditures even more dramatically than during the post–Cold War drawdown. Conversely, the emergence of new strategic threats could lead some countries to historically high levels of defense spending.

¹⁹ Across scenarios, for instance, developed economies will confront challenging demographics as their populations age and the burden of growth is shouldered by a smaller portion of the population. Japan, in particular, will be under considerable strain. At the same time, China’s demographics with respect to dependency ratios are becoming more challenging—though still favorable in this decade relative to developed economies—while Brazil and India’s continue to improve.

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