The Rise and Fall of the Great Powers in the Twenty-first Century

China's Rise and the Fate of America's Global Position

Stephen G. Brooks and William C. Wohlforth

Unipolarity is arguably the most popular concept analysts use to assess the U.S. position in the international system that emerged in the wake of the demise of the Soviet Union in 1991.[1] The concept's origins lie in a major academic literature devoted to explaining large-scale patterns of behavior in international systems. The basic insight is that the number of powerful states or "poles" at the top significantly influences how international politics works. In recent years, however, the concept has been more likely to serve a rather different purpose: to gauge change in today's international system. In response to the financial crisis of 2008 and the continued economic ascent of China, pundits, policymakers, government analysts, and scholars frequently and prominently argue that the United States has tumbled from its dominant position and that a fundamental, system-altering power shift away from unipolarity is occurring. "Unipolarity is ending, has ended, or will soon end," goes the gist of much commentary, "and the system is reverting to multipolarity or bipolarity or apolarity" or whatever neologism the analyst wishes to propound.[2]

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1. Notable initial contributions include Charles Krauthammer, "The Unipolar Moment," *Foreign Affairs*, Vol. 70, No. 1 (Winter 1990/91), pp. 23–33; Ethan B. Kapstein and Michael Mastanduno, eds., *Unipolar Politics* (New York: Columbia University Press, 1999); and William C. Wohlforth, "The Stability of a Unipolar World," *International Security*, Vol. 24, No. 1 (Summer 1999), pp. 5–41.
2. The approach of a post-U.S., multipolar world is envisioned in best-sellers by the likes of

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In this article, we show that this approach to assessing changing power relations in today's international system is irreparably flawed, and we develop an alternative. The very qualities that make the concept of polarity helpful for capturing some key differences in how international systems work render it unhelpful for assessing changes within a given system. Use of the concept helps analysts understand why a world with one superpower is different in important ways from one with two superpowers or none, but it is too blunt an instrument to track change from one kind of system to another. On glaring display as the Cold War neared its end in the late 1980s, this pitfall of polarity is an even bigger problem today. Because China is unlike past rising powers and because the world in which it is ascending is also different in important ways from previous eras, careful thinking about how today's one-superpower world might change into something else is at a premium. Using a set of concepts and measures geared precisely to this challenge, we show that the United States will long remain the only state with the capability to be a superpower. Still, China's rise is real and change is afoot, and the arguments we develop herein will help analysts assess and classify this change without either downplaying or exaggerating its systemic significance.

We begin by demonstrating the ways in which the concept of unipolarity leads analysts astray when assessing changes in the distribution of capabilities in the international system. Three analytical pitfalls stand out: (1) use of the concept of polarity encourages dichotomous thinking—the world is either unipolar or multipolar (or bipolar)—and thereby feeds an artificial debate about whether everything is changing or nothing is changing;[3] (2) it demands

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Fareed Zakaria and Parag Khanna, as well as in forecasts by the National Intelligence Council and numerous prominent private sector analysts from Goldman Sachs to the Eurasia Group. See Zakaria, *The Post-American World* (New York: W.W. Norton, 2009); Khanna, *The Second World: How Emerging Powers Are Redefining Global Competition in the Twenty-First Century* (New York: Random House, 2009); National Intelligence Council, *Global Trends 2025: A Transformed World* (Washington, D.C.: Government Printing Office, 2008); and Ian Bremmer, *Every Nation for Itself: Winners and Losers in a G-Zero World* (New York: Penguin, 2012). Prominent scholarly treatments include Christopher Layne, "This Time It's Real: The End of Unipolarity and the Pax Americana," *International Studies Quarterly*, Vol. 56, No. 1 (March 2012), pp. 203–213; Amitav Acharya, *The End of American World Order* (New York: Polity, 2014); and Barry R. Posen, "From Unipolarity to Multipolarity: Transition in Sight?" in G. John Ikenberry, Michael Mastanduno, and William C. Wohlforth, eds., *International Relations Theory and the Consequences of Unipolarity* (New York: Cambridge University Press, 2012), pp. 317–341.

3. For studies that come closest to adopting the contrarian "nothing is changing" position, see Michael Beckley, "China's Century? Why America's Edge Will Endure," *International Security*, Vol. 36, No. 3 (Winter 2011/12), pp. 41–78; Michael Beckley, "The Unipolar Era: Why American Power Persists and China's Rise Is Limited," Ph.D. dissertation, Columbia University, 2012; Stephen G. Brooks and William C. Wohlforth, *World Out of Balance: International Relations and the Challenge of American Primacy* (Princeton, N.J.: Princeton University Press, 2008); Stephen G. Brooks and William C. Wohlforth, "Assessing the Balance," *Cambridge Review of International Affairs*, Vol. 20, No. 2 (June 2011), pp. 201–219; Robert J. Lieber, *Power and Willpower in the American Future: Why the United States Is Not Destined to Decline* (Cambridge: Cambridge University Press, 2012); Robert

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broad, transhistorical measures of the distribution of capabilities that inevitably fail to capture crucial shifts in the wellsprings of state power across time; and (3) the concept is ill equipped to capture the relationship between structure and agency—namely, how likely it is that state action can alter the system.

The second section presents a systematic examination of the distribution of capabilities tailored to twenty-first-century global politics and the requisites of superpower status. We find that the United States will long remain the world's sole superpower, but that China's economic ascent is a major change that deserves the intense focus it has attracted. It has put China in a class by itself, one that the polarity concept cannot capture: greater than other major powers such as Germany, Japan, and Russia but nowhere near a peer of the United States.

Third, we assess the speed with which China might transform the current one-superpower system into a different kind of system. We delineate three key differences from previous eras that invalidate analogies to the power transitions chronicled in Paul Kennedy's classic *The Rise and Fall of the Great Powers*.[4] First, unlike past rising powers, China is at a much lower technological level than the leading state. Second, the distance China must travel is extraordinarily large because the size of the U.S. military advantage is much bigger than the analogous gaps in previous eras. Third, the very nature of power has changed: the greatly enhanced difficulty of converting economic capacity into military capacity makes the transition from a great power to a superpower much harder now than it was in the past. This analysis yields a new framework for categorizing and assessing the stages China must traverse to rise from a great power to a superpower. The final section extracts the most important implications of our argument for international relations theory, debates on U.S. grand strategy, and the United States' military options for adjusting to China's rise.

How (Not) to Think About the Changing U.S. Global Position

For millennia, observers and practitioners have thought of states as occupying different positions or ranks in the international system.[5] By far the most attention has been directed toward the highest ranks: Which actors are at the

Kagan, *The World America Made* (New York: Vintage, 2012); and Josef Joffe, *The Myth of America's Decline: Politics, Economics, and a Half Century of False Prophecies* (New York: Liveright, 2014).
4. Paul Kennedy, *The Rise and Fall of the Great Powers* (New York: Vintage, 1989).
5. Adam Watson, *The Evolution of International Society: A Comparative Historical Analysis* (New York: Routledge, 1992); and Stuart J. Kaufman, Richard Little, and William C. Wohlforth, eds., *The Balance of Power in World History* (New York: Palgrave Macmillan, 2007).

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top and how many states are close to them? In the mid-twentieth century, this line of thought led to the concept of polarity, best exemplified by Kenneth Waltz's influential *Theory of International Politics*. For polarity scholars, the key to analyzing any international system is determining how many poles there are.[6] Does one state stand alone at the top (unipolarity)? Do two roughly comparable states stand significantly above all of the others (bipolarity)? Or do three or more roughly comparable states occupy the highest rung in the system (multipolarity)?

Notwithstanding the oft-lamented disdain that practitioners are said to have for political science concepts and decades of intense scholarly criticism of the real explanatory power of polarity, the concept has never been more popular both in academe and beyond.[7] Since 1990, articles about unipolarity have appeared at four times the rate that papers written on bipolarity during the Cold War era did. And although there are at least nine books wholly devoted to unipolarity, none has been written solely about bipolarity.[8] Pundits and government analysts routinely advance assertions about polarity, such as the National Intelligence Council's widely noted 2012 assessment that the "'unipolar moment' is over."[9] And unlike their Cold War predecessors, the highest-level policymakers in some of the world's most important countries do so as well. Chinese President Xi Jinping and Russian President Vladimir Putin are just two leaders who periodically put forward assessments about the polarity of the system: In May 2014, Putin argued flatly that "[t]he model of a unipolar

6. In addition to Kenneth N. Waltz, *Theory of International Politics* (Reading, Mass.: Addison-Wesley, 1979), see especially Morton A. Kaplan, *System and Process in International Politics* (New York: ECPR, 1957); Karl W. Deutsch and J. David Singer, "Multipolar Power Systems and International Stability," *World Politics*, Vol. 16, No. 3 (April 1964), pp. 390–406; Randall L. Schweller, "Tripolarity and the Second World War," *International Studies Quarterly*, Vol. 37, No. 1 (March 1993), pp. 73–103; Edward D. Mansfield, "Concentration, Polarity, and the Distribution of Power," *International Studies Quarterly*, Vol. 37, No.1 (March 1993), pp. 105–128; and Ted Hopf, "Polarity, the Offense Defense Balance, and War," *American Political Science Review*, Vol. 85, No. 2 (June 1991), pp. 475–493. For a comprehensive discussion of the polarity literature, see Barry Buzan, *The United States and the Great Powers: World Politics in the Twenty-First Century* (Cambridge: Polity, 2004).

7. Related theories of hegemony, power transition, and systemic leadership as applied to China's rise and the problem of systemic change have been critiqued and developed elsewhere. They avoid some, but not all, of the pitfalls of the polarity framework. See, for example, William R. Thompson and David P. Rapkin, *Transition Scenarios: China and the United States in the Twenty-First Century* (Chicago: University of Chicago Press, 2013); Steve Chan, *China, the U.S., and the Power-Transition Theory: A Critique* (New York: Routledge, 2008); and William C. Wohlforth, "Gilpinian Realism and International Relations," *International Relations*, Vol. 25, No. 4 (December 2011), pp. 499–511.

8. Article data are taken from Thomson Reuters Web of Science, http://wokinfo.com/; book count is authors' estimate.

9. National Intelligence Council, *Global Trends 2030: Alternate Worlds* (Washington, D.C.: Office of the Director of National Intelligence, 2012), p. x, http://globaltrends2030.files.wordpress.com/2012/11/global-trends-2030-november2012.pdf.

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world has failed. . . . The world is multipolar."[10] And in November 2014, Xi noted that there is a "growing trend toward a multipolar world."[11]

Barry Buzan's observation that the concept of "[p]olarity has been hugely influential in public debates about international relations" thus applies much more strongly to the era of unipolarity than to bipolarity's heyday.[12] Yet, in an ironic twist, the concept is routinely used to discuss the very subject for which it is particularly ill suited: change in the international system. Indeed, Waltz himself could not have been clearer on this point: "[R]ealist theory is better at saying what will happen than in saying when it will happen."[13] That statement followed the embarrassing experience of the 1980s, when no one seemed to grasp that the bipolar era was drawing to a close. The concept of polarity could not substitute for—and indeed often drew analysts away from—the fine-grained analysis of the distribution of power needed to estimate how close the system was to structural change.[14] Few engaged in today's debate about whether unipolarity is about to end think back to the latter Cold War and ask whether scholars might be making the same mistakes again. Then the issue was Soviet decline: How far did the Soviet Union have to fall for the system to cease being bipolar? Now the issue is China's rise: How high does China need to climb before the system changes?

WHAT'S WRONG WITH (UNI)POLARITY?

The context is new, but three interrelated analytical perils of polarity on display in the latter Cold War persist today. First is the bluntness of measures. The concept of polarity invites an exercise in comparative statics: measuring how capabilities are distributed in multipolar versus bipolar versus unipolar settings. That kind of analysis requires metrics that can be used over long spans of time, such as economic size, military spending or personnel, or composite indicators that aggregate a number of different measures. Use of these metrics

10. "Vladimir Putin Warns Sanctions on Russia Will Backfire on West," *Telegraph*, May 23, 2014, http://www.telegraph.co.uk/news/worldnews/europe/russia/10851908/Vladimir-Putin-warns-sanctions-on-Russia-will-backfire-on-West.html.
11. Jane Perlez, "Leader Asserts China's Growing Importance on Global Stage," *New York Times*, November 30, 2014, http://www.nytimes.com/2014/12/01/world/asia/leader-asserts-chinas-growing-role-on-global-stage.html?_r=0.
12. Buzan, *The United States and the Great Powers*, p. 45.
13. Kenneth N. Waltz, "Structural Realism after the Cold War," *International Security*, Vol. 25, No. 1 (Summer 2000), p. 27. See also Kenneth N. Waltz, "Reflections on *Theory of International Politics*: A Response to My Critics," in Robert O. Keohane, ed., *Neorealism and Its Critics* (New York: Columbia University Press, 1986), p. 343.
14. Stephen G. Brooks and William C. Wohlforth, "Power, Globalization, and the End of the Cold War: Reevaluating a Landmark Case for Ideas," *International Security*, Vol. 25, No. 3 (Winter 2000/01), pp. 5–53.

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requires making strong "all else being equal" assumptions. The wellsprings of national power change over time, however, complicating the use of such measures for any but the most broadly conceived inquiry.[15] Although it is possible to address such objections by adding measures that account for historical context, as long as one is thinking in terms of polarity there are limits to how much one can fine-tune the measures to the military, technological, and geopolitical realities of a given setting. As we demonstrate in detail elsewhere, in the latter Cold War widely used capabilities indexes did not take into account the rising importance and complexity of technology in military capabilities as well as implications of economic globalization for state power. As a result, they overlooked crucial changes that were undermining Soviet power and thus bipolarity.[16]

The second analytical problem concerns the interaction between structure and agency. As Waltz stressed, polarity theory "cannot say when 'tomorrow' will come because international political theory deals with the pressures of structure on states and not with how states will respond to the pressures."[17] Yet as the 1980s experience clearly showed, assessing the robustness or longevity of any structure demands answers to questions about how sensitive that structure is to policy choice.[18] Determining the likely longevity of bipolarity in the latter Cold War required an assessment of the nature and scale of the systemic challenge the Soviet Union faced. The polarity concept was of little help because it could not distinguish between the challenges of the mid-twentieth century, which could be met with massive increases in raw industrial inputs, and those of the century's end, which could not.[19] To be sure, no international relations theory could be expected to predict the brittleness of the Soviet system and thus the dramatic effects of Mikhail Gorbachev's agency, but the fact that Gorbachev did not have readily available policy options to sustain the Soviet Union's global position was hugely important.[20] Similarly, international relations theory cannot answer questions about the robustness of the Chinese political or economic system. But to assess the longevity of a one-superpower world, we need know whether the Chinese leadership is now or is likely soon

15. Ashley J. Tellis et al., *Measuring National Power in the Postindustrial Age* (Santa Monica, Calif.: RAND Corporation, 2000).
16. Brooks and Wohlforth, "Power, Globalization, and the End of the Cold War"; and Stephen G. Brooks, *Producing Security: Multinational Corporations, Globalization, and the Changing Calculus of Conflict* (Princeton, N.J.: Princeton University Press, 2005).
17. Waltz, "Structural Realism after the Cold War," p. 27.
18. Robert Jervis, *System Effects: Complexity in Political and Social Life* (Princeton, N.J.: Princeton University Press, 1999).
19. See the analysis in Brooks and Wohlforth, "Power, Globalization, and the End of the Cold War"; and Brooks, *Producing Security*, pp. 112–125.
20. Brooks and Wohlforth, "Power, Globalization, and the End of the Cold War."

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to be in a position to match or negate the United States' global power position simply by allocating more resources to the generation of global power capabilities.[21] The polarity concept is not equipped to make this assessment.

Third, polarity focuses the mind on the major thresholds that define different system structures and so fosters dichotomous thinking. In 1989 Waltz insisted that "the Cold War is rooted in the postwar structure of international politics and will last as long as that structure endures."[22] The system was either bipolar or multipolar. In *Theory of International Politics*, Waltz grappled with the issue of Soviet decline, but the concepts he developed provided no guidelines for determining the stages states must traverse to become—or cease being—poles. The problem is even more salient now. Much has changed since the mid-1990s as a result of the increase in China's power. So is the current system bipolar? Almost no one thinks so. Is it multipolar? Most scholars, at least, are not ready to affirm that. So, is everything the same as it was in 1995 or 2000? The answer is also clearly no. It follows that any conceptual framework for addressing change in an international system dominated by one state should not force dichotomous thinking.

As we show in greater detail elsewhere, contemporary conceptualizations of unipolarity are little better at overcoming these analytical perils than their predecessors of thirty years ago.[23] Approaches to unipolarity are now legion, and they often lead to radically different answers to the question of whether the world still is (or ever was) unipolar. But if they hew to the structural premises of the theory, they all suffer from all or most of the three analytical perils we have identified. Nuno Monteiro defines unipolarity as a system with only one great power that can "engage unaided in sustained politico-military opera-

21. We focus on China's agency because implicit assumptions about how rapidly Beijing might transform latent into actual capabilities are widespread. The next most significant potential agency effect arguably might be a U.S. choice to cease maintaining the capabilities of a superpower. Yet this is a remote possibility: even the most ardent proponents of grand strategic retrenchment do not advocate such a course. For example, Benjamin H. Friedman, Brendan Rittenhouse Green, and Justin Logan describe a U.S. post-retrenchment defense posture as sustaining "a U.S. military with global reach far exceeding any rival." See Friedman, Green, and Logan, "Debating American Engagement: The Future of U.S. Grand Strategy," *International Security*, Vol. 38, No. 2 (Fall 2013), p. 189. Barry R. Posen's preferred grand strategy calls for a military posture that preserves U.S. global "command of the commons," and "retains the capability to reengage on the Eurasian landmass in a timely fashion and to organize coalitions against expansionist states" if need be, as well as to "retaliate quickly and effectively against direct attacks on the United States." See Posen, *Restraint: A New Foundation for U.S. Grand Strategy* (Ithaca, N.Y.: Cornell University Press, 2014), p. 162.

22. Kenneth N. Waltz, "The Origins of War in Neorealist Theory," in Robert I. Rotberg and Theodore K. Rabb, eds., *The Origin and Prevention of Major Wars* (Cambridge: Cambridge University Press, 1989), p. 52.

23. See Stephen G. Brooks and William C. Wohlforth, *America Abroad: The United States' Global Role in the 21st Century* (Oxford: Oxford University Press, forthcoming), chap. 3.

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tions in at least one region of the globe beyond its own."[24] John Mearsheimer agrees that unipolarity is a system with only one great power, but he argues that to be a great power a state need only be able to put up a "serious fight" against the leading state.[25] Other scholars treat unipolarity as a system with one great power that has amassed more than half of the system's capabilities and therefore is impossible to counterbalance.[26] In previous work, we argued that "an international system is unipolar if it contains one state whose share of capabilities places it in a class by itself compared to all other states."[27]

These (and other) approaches have utility for answering some questions, but when used to assess change in and robustness of the system, they hamstring today's analysts in the same ways as bipolarity led their predecessors astray in the 1980s. Their broad sweep tends to compel the use of blunt measures of power, and they lack the conceptual apparatus to distinguish a structure easily affected by agency from one resistant to such influence. Of necessity, they set thresholds, have little to say about changes within the bounds of those thresholds, and therefore induce dichotomous thinking. By Monteiro's conceptualization, the system will remain unipolar so long as the United States remains the only state with very substantial global power projection capacity. China could grow to have an economy twice the size of the United States'—or even five or ten times as large—and possess a comparable scientific-technological capacity, but as long as Beijing chooses not to use those resources to develop a superpower's military capability, the world will remain unipolar. Monteiro's theory thus cannot capture the difference between a world in which no state has a realistic chance of matching or negating U.S. global power and a world in which a rising state could potentially be in a position to bring about structural change. For Mearsheimer, the threshold for being a great power is so low that the polarity concept can shed no light on any question having to do with changes in international politics since 1991: the world was multipolar then, in his view, and remains so today. The same is true for the 50-percent-of-capabilities threshold: given that no state has ever achieved this, uniplolarity

24. Nuno P. Monteiro, *Theory of Unipolar Politics* (Cambridge: Cambridge University Press, 2014), p. 48.
25. John J. Mearsheimer, *The Tragedy of Great Power Politics* (New York: W.W. Norton, 2001), pp. 4, 404.
26. See the discussion in James Lebovic, "The Unipolar Elusion: The Neglected Limits to U.S. Global Military Capability," paper presented at the annual meeting of the International Studies Association, San Francisco, California, March 26–29, 2008. For related arguments, see also R. Harrison Wagner, "What Was Bipolarity?" *International Organization*, Vol. 47, No. 1 (Winter 1993), pp. 77–106; and David P. Rapkin, William R. Thompson, and Jon A. Christopherson, "Bipolarity and Bipolarization in the Cold War Era: Conceptualization, Measurement, and Validation," *Journal of Conflict Resolution*, Vol. 23, No. 2 (June 1979), pp. 261–295.
27. Brooks and Wohlforth, *World Out of Balance*, p. 13.

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remains irrelevant to ongoing changes in international politics. China's rise reveals the main shortcoming of our previous approach: it does not specify how much of a shift away from a lopsided concentration of power must occur before it is no longer reasonable to view the system as unipolar.

THE SOLUTION: 1+Y+X

We seek to capture the structural nature of debates about the current international system. At the same time, however, we want to avoid the three pitfalls of polarity for assessing change.

Barry Buzan's "1+X" terminology for describing system structure helps in this regard. On the basis of his formulation, his conclusion (as of 2004) was that the United States was the "only superpower and there are no other plausible candidates on the horizon for that status for at least a couple of decades" and that there were four great powers.[28] Key for Buzan, as for us, is the distinction between superpowers and great powers, which reduces to the formers' "broad-spectrum capabilities exercised across the whole of the international system."[29] Great powers, by contrast, lack such capabilities, although they may aspire to achieve them. The very notion of an "X" term for the great powers means that the specific number does not alter the system's basic properties. The rise of, say, India to great power status could increase the X term, and the decline of an existing great power could decrease it—without altering the fundamental nature of the system. To do that, the number of superpowers has to change.

The 1+X framework needs modification, however. In part because the gap in capabilities between great power and superpower is so large in today's system, it is necessary to carefully differentiate between great powers that are not in a position to bid for superpower status and those that are. We need to be open to the possibility of a 1+Y+X system, in which one or more Y powers

28. Buzan, *The United States and the Great Powers*, p. 69. Buzan coded Russia, China, Japan, and the European Union (EU) as great powers. Although there are understandable reasons to take issue with his coding, the overall usefulness of his 1 + X framework does not depend on it.

29. Buzan, *The United States and the Great Powers*, p. 69. We borrow the term but not the other parts of Buzan's framework, which melds behavior and capabilities and also adopts an overly blunt approach to measuring capabilities. Attempts to eschew the superpower category create a number of conundrums. Thus, Monteiro's superpower-like definition of a great power compels him to lump states such as Russia, India, Israel, Pakistan, and North Korea into an unwieldy "major power" category. In turn, Mearsheimer's low bar for achieving great power status places, for example, Cold War–era Britain and Belize in the same rank. Mearsheimer also recognizes that the United States today is no normal great power. According to the terms of his theory, the difference is that the United States is the one great power that has attained regional hegemony, has the capability to project power into other key regions, and pursues a grand strategy of preventing any other great power from following suit. We prefer the term "superpower."

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have the potential to rise to superpower status or are moving in this direction and thus need to be differentiated from the other great powers. Again, this distinction is crucial because the main question is not the size of the X term, but whether the superpower term is 1, >1, or <1. With alarmist rhetoric about unipolarity's end, observers are saying that China has risen and is no longer just another X power. Missing thus far is a proper understanding of the more germane questions: What position has China achieved and how quickly can it further ascend the ladder?

Measuring the Distribution of Capabilities in the 21st Century

What capabilities make a state a superpower and, more generally, how should the distribution of power in the system be measured today? We come to these questions after more than a decade of thinking and research in which we have employed a broad-based conception of measurement. Our previous efforts focused on three core elements of material power: (1) military capacity, (2) economic capacity, and (3) technological capacity.[30] Such a broad-based approach is imperative, in part because no single element of power can capture the full array of resources a state may bring to the pursuit of its goals in international politics. States with skewed portfolios of capabilities are less capable of acting in different arenas and more dependent on a limited policy toolkit. Moreover, each of the core elements of power interacts with the others in potent ways. Economic capacity is a necessary condition of military power, but it is insufficient; technological prowess is also vital, especially given the nature of modern weaponry. Technological capacity also magnifies economic capability, and military capability also can have spinoffs in both the economic and technology arenas. Furthermore, military capability can have indirect but important implications for furthering a leading state's economic interests. To highlight any one element at the expense of others is to miss these key interactions.

In the end, assessing change today calls for a Goldilocks approach to measurement: one conducted at a sufficient level of generality to answer enduring

30. The literature on state power makes a basic distinction between power as material resources and power as the ability to realize ends. See, in particular, David A. Baldwin, *Paradoxes of Power* (New York: Basil Blackwell, 1989). Following the practice of many scholars, our measurement efforts use the term power in the former sense, to denote the resources on which a government can draw. When discussing power in the latter sense, we bracket undeniably important elements that are hard if not impossible to measure before they are used or tested (e.g., the unity or resolve of a population, or the overall organizational competence of a government). For more on our approach, see Brooks and Wohlforth, *World Out of Balance*, pp. 12–13, 27–35, 40–44; Stephen G. Brooks and William C. Wohlforth, "American Primacy in Perspective," *Foreign Affairs*, Vol. 81, No. 4 (July/August 2002), pp. 21–23; and Wohlforth, "The Stability of a Unipolar World," pp. 10–18.

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Table 1. Defense Expenditures for the Major Powers, 2014

	Defense Expenditures ($billion)	% Great Power Defense Expenditures	% World Defense Expenditures	Defense Expenditures % of GDP	Defense R&D Expenditures ($billion)
United States	610.0	50.5	34.0	3.5	78.6
China	216.0	17.9	12.0	2.1	n.a.
Japan	45.8	3.8	2.6	1.0	1.0
Germany	46.5	3.9	2.6	1.2	1.2
Russia	84.5	7.0	4.8	4.5	n.a.
France	62.3	5.2	3.5	2.2	1.3
Britain	60.5	5.0	3.4	2.2	2.1
India	50.0	4.1	2.8	2.4	n.a.
Brazil	31.7	2.6	1.8	1.4	n.a.

SOURCES: Sam Perlo-Friedman et al., "Trends in World Military Expenditure, 2014" (Stockholm: Stockholm International Peace Research Institute), http://books.sipri.org/files/FS/SIPRIFS1504.pdf; and Organization for Economic Co-operation and Development, *OECD Main Science and Technology Indicators, 2014* (Paris: OECD, 2014), pp. 76–77.

NOTES: Data are estimated for China's, Germany's, and Russia's defense expenditures for 2014 as well as for their defense expenditures as percentages of their gross domestic product (GDP). Research and development (R&D) expenditures are for 2012.

questions about the nature of the international system, but much more detailed and attuned to the requisites of superpower status in the twenty-first century than popular broad aggregates or single metrics. In particular, our approach to measurement focuses not just on the size of the power gap, but also on the overriding question of the speed with which it might be overcome. In the subsections that follow, we assess the core components of state capability, moving beyond findings and measurements that are standard in the literature to highlight new measures with novel implications.[31]

MILITARY CAPACITY

The standard approach to measuring the distribution of military power is to compare defense expenditures, as in table 1.[32] Studies relying on this approach, however, have thus far failed to address an important objection: the

31. This section condenses the analysis in Brooks and Wohlforth, *America Abroad*, chap. 2.

32. This is an updated version of the chart in Brooks and Wohlforth, *World Out of Balance*, p. 29. Data on China's military research and development (R&D) expenditures, which have also been rising, are not available. A recent estimate suggests, however, that China's spending may approach $6 billion per year, which would make China the second-highest-spending state in the world. Nevertheless, this spending would still only be around 7 percent of the United States'. See Richard Bitzinget et al., "Locating China's Place in the Global Defense Economy," in Tai Ming Cheung, ed., *Forging China's Military Might: A New Framework for Assessing Innovation* (Baltimore, Md.: Johns Hopkins University Press, 2014), p. 202.

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amount that a state decides to spend on its military is a choice, and it may be misleading to use such numbers to capture something that is supposed to be a constraint on choice.[33] China's military expenditures have increased rapidly since 2000, and U.S. military spending has taken a sharp downward turn since 2010. Thus, the ease with which states can alter their military spending suggests that using this measure to assess how the international setting shapes states' decisions over time has significant limitations.

The degree to which this is a problem depends on the time frame one is thinking about and the speed with which other resources can be converted into military capabilities. No matter what a state decides, its ability to create new military capabilities in the short term—say, a year or two—is very limited. As the time horizon stretches to decades and generations, more and more elements of military capability become matters of choice as long as the state has the requisite pool of resources from which to draw. The length of that horizon—the gap between a choice to attain some capability and the creation of that capability—is a function of the technology of production. Some goods are intrinsically harder to produce than others. Monteiro makes a useful analogy to Alfred Marshall's theory of production in which, "[i]n the short term, price adjustments depend entirely on demand, because supply is fixed. In the medium term, price adjustments can be made by increasing supply, within the limits of firms' productive capacity. Increases in supply beyond this limit require investments in additional productive assets and can therefore only be achieved in the long term." Monteiro consequently stresses that "we must distinguish between a state's present military capabilities, its ability to convert other elements of power into additional military capabilities, and its ability to generate additional elements of power that can then be converted into military capabilities."[34] The latter two components are not matters of choice but are powerfully constrained. Analysts of international politics can treat military capability just as economists treat supply in some of their models: as a relatively inflexible external constraint in the short term, and even in the medium and longer terms in some sectors.

Military spending therefore does reflect something important: long-term investment in the capacity to generate military power. Cumulated over years and decades, military spending can yield capabilities that are very hard to

33. This critique is advanced in Charles L. Glaser, "Why Unipolarity Doesn't Matter (Much)," *Cambridge Review of International Affairs*, Vol. 24, No. 2 (June 2011), p. 135 n. 4; and Posen, "From Unipolarity to Multipolarity," p. 320.

34. This quotation is drawn from an early draft of Monteiro, "Theory of Unipolar Politics," Yale University, January 2013, p. 41. Monteiro's analysis of this issue on p. 38 of the published version of *Theory of Unipolar Politics* omits the sentences that discuss Alfred Marshall.

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match even for a state with a lot of money to spend. This is especially true today, given the dramatically increased complexity and difficulty of both producing and using advanced weaponry. In sum, annual military expenditures measure a flow—but flows over many years produce a stock of military capability.

To capture this dynamic, it is useful to examine the key military capacity that allows the United States to act as a superpower. The ideal place to start is Barry Posen's influential study of the "command of the commons," arguably the best overall guide to understanding the nature of military power among the top tier of states today. The command of the global commons—that is, the sea (outside littoral regions), space, and air (above 15,000 feet)—is "the key military enabler of the U.S. global power position," Posen stresses.[35] He helpfully provides guidelines for measuring the United States' command of the commons, identifying four components—command of the sea, command of space, command of the air, and the infrastructure of command—and notes the main elements of military capacity that are relevant for each. When Posen wrote his article in the early 2000s, U.S. command of the commons was so self-evident that it was essentially unnecessary to measure the different components of this index. Yet the rise of China has since so altered the conversation that it is important to take a close look at how the United States matches up with other states using Posen's criteria.

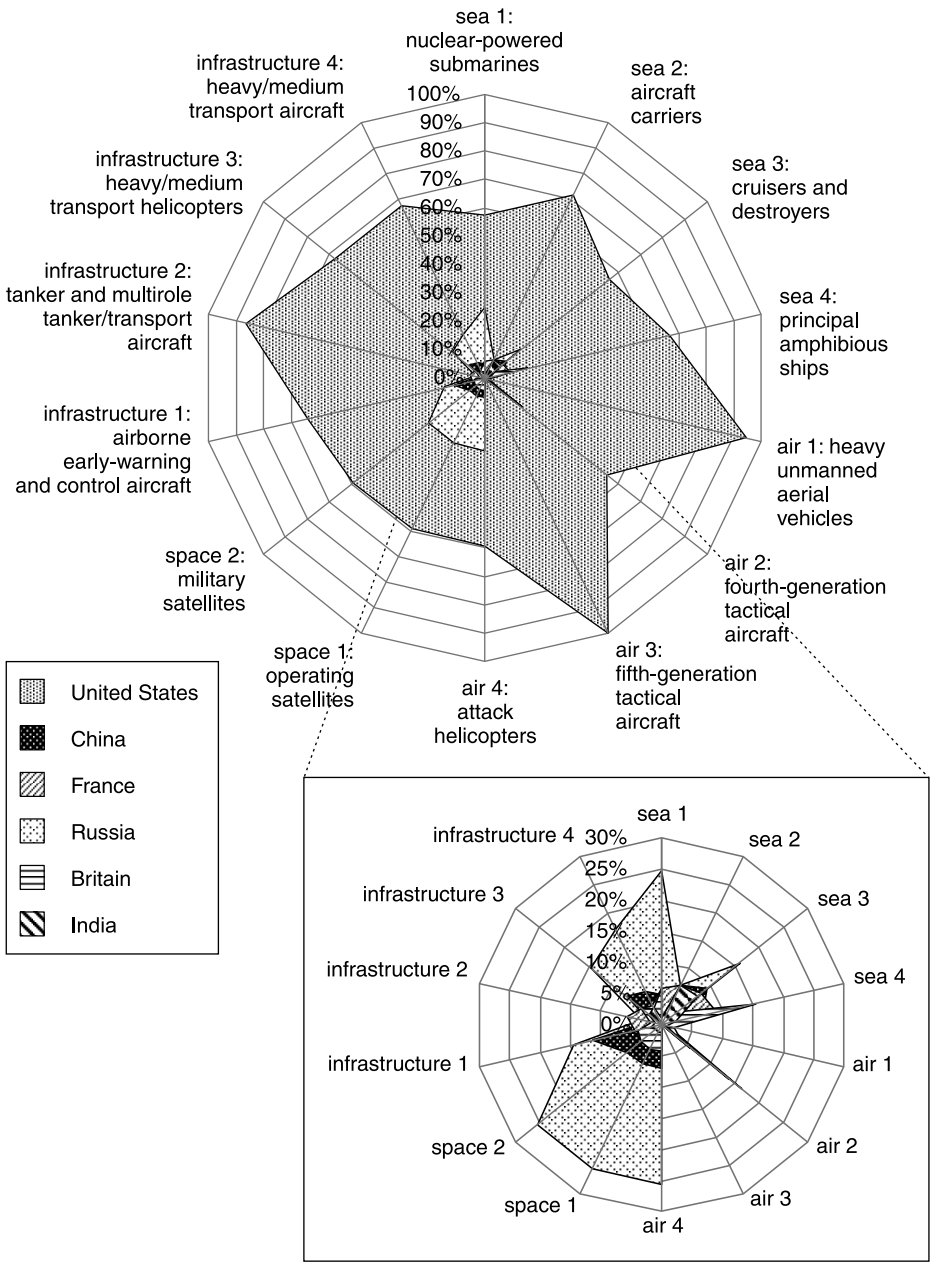
Figure 1 plots the full range of relevant indicators as a distribution, showing the share of each key component possessed by each of the six major powers. Regarding the United States' command of the sea, in addition to the two indictors that Posen highlights—aircraft carriers and nuclear attack submarines—two other pertinent indicators of power projection capacity are amphibious ships and the number of cruisers and destroyers. Posen cites two indicators on command of the air: drones and military aircraft that allow for the use of precision-guided munitions. Regarding space, Posen zeroes in on civilian and especially military satellites as providing vital sources of information for conducting military operations throughout the world.[36] And regarding the infrastructure of command—a necessary condition of command of the commons—Posen highlights military installations in foreign countries, military transport ships, long-range airlift aircraft, and aerial tankers as basic

35. Barry R. Posen, "Command of the Commons: The Military Foundation of U.S. Hegemony," *International Security*, Vol. 28, No. 1 (Summer 2003), p. 8.

36. Note that the United States "commands" space in the sense of having a commanding position in exploiting space for military purposes. In space, however, the United States is less able to deny entry to other states' militaries, including Russian and Chinese antisatellite capabilities, than it is in the air and sea commons. U.S. command of the air is restricted to the air over the commons (it excludes airspace over the territory of the few states with top-end air defense).

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Figure 1. Command of the Commons, Distribution of Six Major Powers

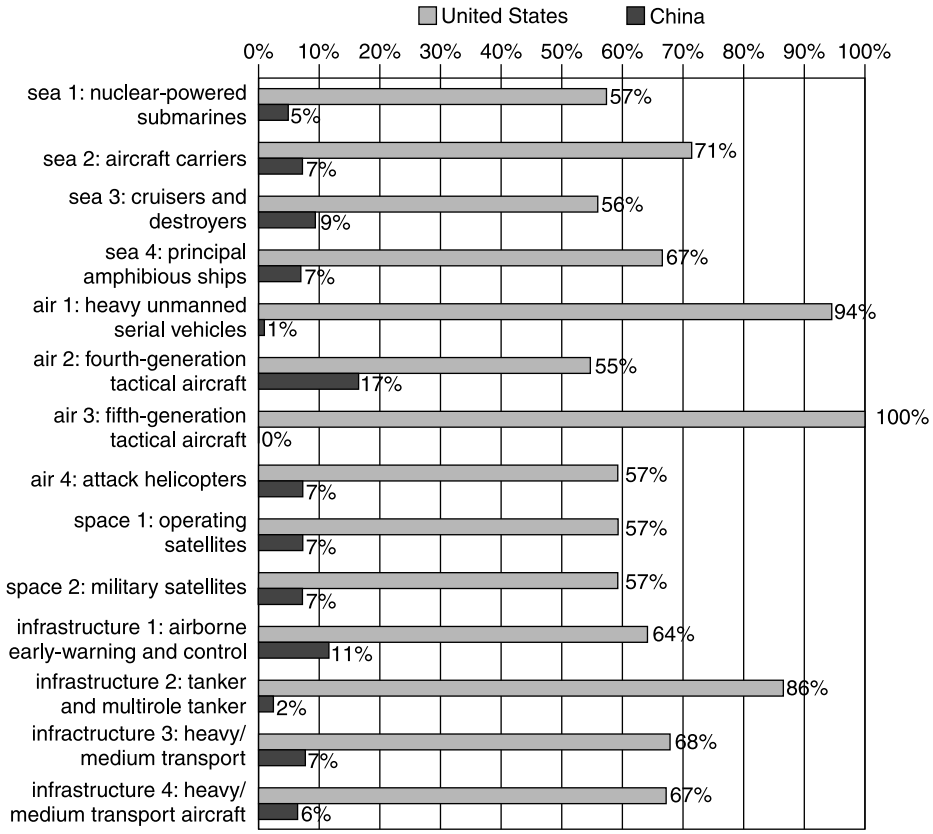


SOURCES: International Institute for Strategic Studies, *The Military Balance*, Vol. 113, No. 1 (London: IISS, 2013); and Union of Concerned Scientists, *UCS Satellite Database*, http://www.ucsusa.org/nuclear_weapons_and_global_security/solutions/space-weapons/ucs-satellite-database.html (consulted on March 22, 2014).

NOTES: Data for nuclear-powered submarines and cruisers and destroyers are from 2013. Aircraft carriers and principal amphibious ships are from 2014. Data for heavy unmanned aerial vehicles and attack helicopters are from 2014. Data on fourth- and fifth-generation tactical aircraft are from 2013. Satellite data include launches through January 31, 2014.

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Figure 2. Command of the Commons, the United States and China as Percentages of Six Major Powers



NOTE: Calculated from data in Stephen G. Brooks and William C. Wohlforth, "Moving Beyond Unipolarity? China's Rise and the Fate of America's Global Position," *International Security*, Vol. 40, No. 3 (Winter 2015/16), p. 20, fig. 1.

building blocks of this infrastructure. The United States has a ramified network of military bases throughout the world and is peerless this regard. Figure 1 shows the extent of the gap between the United States and other countries for the other indicators.

The inset in figure 1 also shows the distribution for the X powers, suggesting how large Russia's military power would loom in a hypothetical world without the United States. Figure 2 then breaks out the U.S.-China comparison. Note that the raw counts in these figures account for neither the United States'

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overall qualitative advantage nor its qualitative and quantitative advantages in nuclear weaponry.[37]

The key takeaway is that compared to any previous era except the years between 1991 and the early 2000s, the overall gap in the military realm remains unprecedented in modern international relations. Defense spending figures make this look obvious, but scholars caution that they may exaggerate the significance of the gap because states with growing economies might decide to spend more to close it. Although Chinese military expenditures are rapidly increasing, our more finely grained measures show that, if anything, defense spending understates the global military gap.

technological capacity

Recent analyses by Michael Beckley and others have already undermined hyperbole about the significance of China's technological rise.[38] The implications of these analyses for the U.S.-China technological comparison are strengthened when we foreground the key distinction between inputs and output. Inputs can be thought of as a country's material investments in and infrastructure for technological development as well as its stock of human capital (which reflects the education, skills, tacit knowledge, and health of its populace[39]).

The first two columns of table 2 below show gross expenditures on research and development (R&D) and R&D as a share of gross domestic product (GDP).[40] The third column presents a broad information and communication technologies infrastructure index constructed by Cornell University, INSEAD, and the World Intellectual Property Organization (an agency of the United Nations). These numbers confirm the United States' unique combination of large-scale (massive gross expenditures) and highly developed infrastructure. China's annual spending on R&D) is increasing rapidly, however, rocketing

37. A notable example in this regard concerns nuclear attack submarines (SSNs): Chinese SSNs are relatively noisy, whereas U.S. SSNs have "already reached absolute levels of silencing." See Owen R. Coté, "Assessing the Undersea Balance between the U.S. and China," working paper (Cambridge, Mass.: Security Studies Program, Massachusetts Institute of Technology, February 2011), p. 28, http://web.mit.edu/ssp/publications/working_papers/Undersea%20Balance%20WP11-1.pdf. See also the discussion in Ronald O'Rourke, "China Naval Modernization: Implications for U.S. Navy Capabilities—Background and Issues for Congress" (Washington, D.C.: Congressional Research Service, June 1, 2015), pp. 11–12.

38. Beckley, "China's Century?" pp. 64–74.

39. United Nations University International Human Dimensions Programme on Global Environmental Change (UNU-IHDP) and United Nations Environment Programme (UNEP), *Inclusive Wealth Report 2012: Measuring Progress toward Sustainability* (Cambridge: Cambridge University Press, 2012), p. 16.

40. On the trade-offs among different R&D measures, see National Science Foundation, *Science and Engineering Indicators 2012* (Arlington, Va.: National Science Foundation, 2012), p. 3, http://www.nsf.gov/statistics/seind12/c4/c4s8.htm.

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Table 2. Technological Inputs

	Gross Expenditure on R&D as a Share of GDP (%)	Gross Domestic Expenditures on R&D (PPP, in billions)	Cornell/ INSEAD/WIPO Information & Communication Technologies 2014 Index Score (out of 100)	Number of Scientific and Engineering Doctoral Degrees Granted per Year	2010 Human Capital Level (in billions of constant 2005 U.S.$)
United States	2.85	429.1	83.0	32,649	99,641
China	1.84	208.2	36.1	31,410	13,447
Japan	3.39	146.5	78.1	7,396	33,645
Germany	2.88	93.1	74.3	11,989	25,576
Russia	1.09	35.0	60.6	15,714	6,391
France	2.24	51.9	72.7	8,220	19,118
Britain	1.77	39.6	86.5	11,055	19,079
India	0.76	24.3	25.9	7,982	9,355
Brazil	1.16	25.3	51.6	5,470	8,968

SOURCES: National Science Board, *Science and Engineering Indicators, 2014* (Arlington, Va.: National Science Board, 2014), pp. 4–19; International Monetary Fund, *World Economic Outlook Database*, October 2013, http://www.imf.org/external/pubs/ft/weo/2013/02/weodata/index.aspx; Cornell University, INSEAD, and the World Intellectual Property Organization (WIPO), *The Global Innovation Index, 2014: The Human Factor in Innovation* (Fontainebleau, Ithaca, and Geneva: Cornell University, INSEAD, and WIPO, 2014), pp. 135–282; and United Nations University—International Human Dimensions Program and United Nations Environment Program, *Inclusive Wealth Report, 2014: Measuring Progress toward Sustainability* (Cambridge: Cambridge University Press, 2014).

NOTES: GDP stands for gross domestic product. PPP stands for purchasing power parity. Gross expenditure on research and development (R&D) is for 2011, except for Brazil, which is for 2010.

from $25 billion to more than $200 billion between 2000 and 2011, while the United States' increased more gradually, from $260 billion to $425 billion.[41]

Beyond the magnitude of resources devoted to technological advancement, the skill levels of the people who use a country's resources and infrastructure to generate technological innovation is another key input.[42] The fourth column of table 2 shows China's eye-catching annual number of science and engineering doctoral degrees, a figure whose dramatic rise over the past decade has received much attention. At this point, however, China is still only at 13 percent

41. National Science Foundation, "National Patterns of R&D Resources: 2011–12 Data Update" (Arlington, Va.: National Science Foundation, December 2013), http://www.nsf.gov/statistics/nsf14304/content.cfm?pub_id=4326&id=2.

42. See, for example, Paul M. Romer, "Endogenous Technological Change," *Journal of Political Economy*, Vol. 94, No. 5 (1990), pp. 1002–1037.

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of the U.S. overall level of human capital, as is shown in the last column of table 2 (which reports the UN's comprehensive human capital measure).[43]

As in the case of defense spending, the significance of any increase in technological inputs by China depends on the size of the existing overall technology gap and the speed with which increased inputs can be expected to yield sufficiently increased output to begin to place China in the same technology league as the United States. Where does China stand on technology output? "High-technology exports" are frequently mentioned in stories highlighting China's rise.[44] As Beckley correctly underscores, China's technological capacity should not be measured using high-technology exports given the extent to which foreign companies drive Chinese exports.[45] Half of all Chinese exports currently consist of "processing trade" (in which parts are imported into China for assembly into finished products and are then exported); the vast majority of these exports (84 percent in 2010) are not controlled by Chinese firms but by foreign companies (mostly affiliates of multinational corporations from highly developed countries).[46]

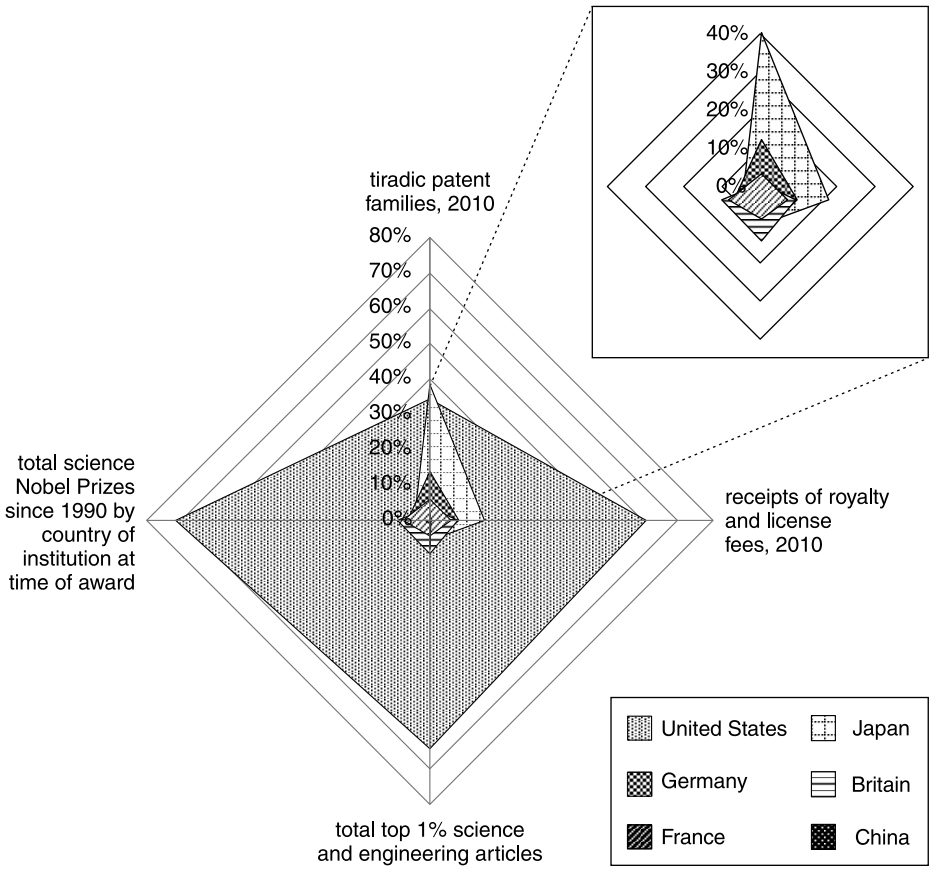
Figure 3 presents technological output and influence measures that are reliably national in origin for all the countries concerned. The number of triadic patent families (which measure a set of patents taken out in the United States, Europe, and Japan to protect an invention) is widely accepted as a measure of technological competitiveness. Even more probative are royalty and license fees, which show that China has barely begun to register as a source of innovative technologies. The recent geographic distribution of top-cited articles in science and engineering tells the same story, as does the recent distribution of Nobel Prizes in science.

Taken together, these indicators underscore the technological dominance of the United States. Of all the figures noted above, this reality is arguably best captured by royalty and license fee data, which reveal that the United States is by far the leading source of innovative technologies (its $105 billion in receipts of royalty and license fees are four times higher than those of the next highest state, Japan), whereas China is a huge importer of these technologies and exports almost nothing (less than $1 billion). As in the military realm, enough is

43. For a further discussion of the strategic significance of this large gap in human capital, see Michael Beckley, "The Unipolar Era: Why American Power Persists," book manuscript, Tufts University, September 2015, chap. 5.
44. See, for example, David Wertime, "It's Official: China Is Becoming a New Innovation Powerhouse," *Foreign Policy*, February 6, 2014, http://www.foreignpolicy.com/articles/2014/02/06/its_official_china_is_becoming_a_new_innovation_powerhouse.
45. See the discussion in Beckley, "China's Century?" pp. 67–69.
46. Organization for Economic Cooperation and Development (OECD), *China in Focus: Lessons and Challenges* (Paris: OECD, 2012), p. 73.

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Figure 3. Technological Output and Influence Indicators



SOURCES: National Science Board, *Science and Engineering Indicators* (Arlington, Va.: National Science Foundation: 2014). Data for individual European Union countries supplied by the National Science Foundation; Russia data from Vladimir Pislyakov and Elena Shukshina, "Measuring Excellence in Russia: Highly Cited Papers, Leading Institutions, Patterns of National and International Collaboration," *Journal of the Association for Information Science and Technology*, Vol. 65, No. 11 (November 2014), pp. 2321–2330; and Organization for Co-operation and Economic Development; Nobel Media AB, Lists of Nobel Prizes and Laureates, http://www.nobelprize.org/nobel_prizes/ (consulted on March 24, 2014).

NOTES: Science Nobel Prizes are for those awarded in physics, chemistry, and physiology or medicine; European Union and Russia data for cited articles are from 2008; U.S. data are from 2012.

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changing to feed a narrative about China closing the technological gap. The key point, however, is that the core changes are on the input side—most notably, China's growing R&D expenditures—and not on the output side. Given that the overall technological gap between China and the United States is so massive, the process of closing it will be lengthy. The United States' unique combination of massive scale and technological prowess will be a long-term feature of the distribution of capabilities.

ECONOMIC CAPACITY

Converting economic output into military power and technological capacity is a complex and time-consuming process, but to emphasize that undeniable reality is not to gainsay the importance of raw economic heft in the measurement of state power. The United States retains the world's biggest, richest, and most productive economy, but China is rapidly approaching it in economic size by conventional measures and is entering the ranks of middle-income countries (see table 3).[47] As figure 4 shows, China's share of global GDP has grown dramatically, from 4.5 percent in 2000 to 11.3 percent in 2014. Projecting economic growth is fraught with uncertainty, but analysts agree that China's remarkable sprint to middle-income status is actually the easy step; moving from middle-income to high-income status is a much bigger challenge.[48] Beyond the fact that China now faces a wide range of pressing internal challenges—including its polluted environment, corruption, absence of a social safety net, inefficient state enterprises, rapidly aging population, and the rising demands of its middle class—the more general point is that most countries fail to escape the "middle-income trap," and even those that do so then begin to grow much more slowly. Hence, the debate concerns not whether but by how much China's growth rate will slow.[49]

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47. Table 3 updates the chart in Brooks and Wohlforth, *World Out of Balance*, p. 29. On our choice of GDP estimators, see pp. 40–42.

48. See, for example, David Dollar, "China's Rebalancing: Lessons from East Asian Economic History," working paper (Washington, D.C.: Brookings Institution, October 2013), pp. 11–12, http://www.brookings.edu/research/papers/2013/10/02-china-economic-lessons-dollar; Barry Eichengreen, Donghyun Park, and Kwanho Shin, "Growth Slowdowns Redux: New Evidence on the Middle-Income Trap," No. 18673 (Cambridge, Mass.: National Bureau of Economic Research [NBER], January 2013), http://www.nber.org/papers/w18673; Barry Eichengreen, Donghyun Park, and Kwanho Shin, "When Fast-Growing Economies Slow Down: International Evidence and Implications for China," *Asian Economic Papers*, Vol. 11, No. 1 (Winter/Spring 2012), pp. 42–87; and Homi Kharas and Harinder Kohli, "What Is the Middle Income Trap, Why Do Countries Fall into It, and How Can It Be Avoided?" *Global Journal of Emerging Market Economies*, Vol. 3, No. 3 (September 2011), pp. 281–289.

49. A recent World Bank forecast of 6 percent average growth over the next fifteen years probably captures the mean assessment. See World Bank and Development Research Center of the State Council, People's Republic of China, *China 2030: Building a Modern, Harmonious, and Creative Soci-*

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Table 3. Economic Indicators for the Major Powers, 2014

	GDP, Current Prices ($billion)	% Great Power GDP, Current Prices	% World GDP, Current Prices	GDP Per Capita, Current Prices	Public Debt (% GDP)	Hours Worked (per person in employment)	Productivity ($ GDP per hour worked)
United States	17,418	36.0	22.5	54,596	71.2	1,789	67.4
China	10,380	21.5	13.4	7,588	15.1	n.a.	n.a.
Japan	4,616	9.6	6.0	36,331	231.9	1,729	41.5
Germany	3,859	8.0	5.0	47,589	74.7	1,371	62.3
Russia	1,857	3.8	2.4	12,925	13.4	1,985	25.9
France	2,846	5.9	3.7	44,538	95.3	1,489	62.7
Britain	2,945	6.1	3.8	45,653	79.1	1,677	50.5
India	2,049	4.2	2.7	1,626	51.3	n.a.	n.a.
Brazil	2,353	4.9	3.0	11,604	59.3	n.a.	n.a.

SOURCES: International Monetary Fund, *World Economic Outlook Database* (Washington, D.C.: International Monetary Fund, April 2015), http://www.imf.org/external/pubs/ft/weo/2015/01/weodata/index.aspx; Central Intelligence Agency, *CIA World Factbook*, https://www.cia.gov/library/publications/the-world-factbook/ (consulted August 8, 2015); Organization for Co-operation and Economic Development, "OECD Employment Outlook, 2015, Statistical Annex" (Paris: OECD, 2015); and Organization for Co-operation and Economic Development, *Level of GDP Per Capita and Productivity*, http://stats.oecd.org/Index.aspx?DataSetCode=PDB_LV (consulted August 8, 2015).

NOTES: Gross domestic product (GDP) figures for China, Germany, and Russia are International Monetary Fund Staff staff estimates. GDP per capita figures for China, Germany, Russia, and India are International Monetary Fund staff estimates. Public debt is estimated for 2014. Hours worked are for total employment and are for 2014 except for France, which is for 2013. Productivity figures for the United States, Japan, Russia, and France are estimated.

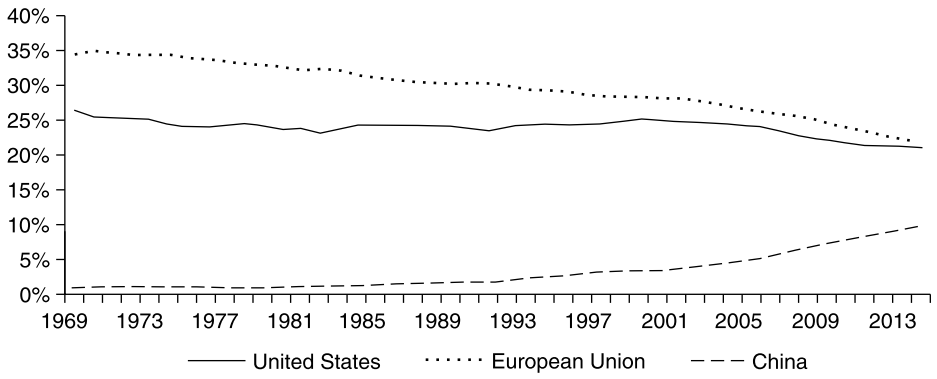
What the existing literature has not yet done, however, is to adequately scrutinize the validity of using GDP to assess the China-U.S. power gap on the global stage. This exercise is crucial given the degree to which this one measure drives the narrative of China's rise. Yet as a way of gauging the role a country plays in the world economy—with all the implications for a state's power that follow—using GDP is becoming increasingly problematic. As Diane Coyle emphasizes, GDP "is a measure of the economy best suited to an earlier era."[50] Developed in and for the era of mass production, GDP, Coyle

ety (Washington, D.C.: World Bank, 2013), p. 9. For a noteworthy lower-bound forecast (4 percent), see Lant Pritchett and Lawrence H. Summers, "Asiaphoria Meets Regression to the Mean," No. 20573 (Cambridge, Mass.: NBER, October 2014), http://www.nber.org/papers/w20573. For a prominent example of the upper-bound forecast (7.5–8 percent), see Jamil Anderlini, "Justin Lin Criticizes China Growth Pessimists," *Financial Times*, July 29, 2013, http://www.ft.com/intl/cms/s/0/3e62c9de-f83e-11e2-b4c4-00144feabdc0.html#axzz3MkxsfC7j.

50. Diane Coyle, *GDP: A Brief but Affectionate History* (Princeton, N.J.: Princeton University Press, 2014), p. 121.

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Figure 4. Real Historical Gross Domestic Product, 1969–2014



SOURCE: United States Department of Agriculture Economic Research Service, http://www.ers.usda.gov/data-products/international-macroeconomic-data-set.aspx.

argues, is increasingly misleading because it does not adequately capture the significance of information, sustainability, and economic globalization.[51] Coyle's general argument echoes those made recently by numerous other economists.[52]

Regarding information, Michael Mandel argues that "official economic statistics dramatically undercount the growth of data-driven activities."[53] The more knowledge based an economy is, the more that GDP underestimates its size. Mandel estimates that calculating GDP with information as a distinct category alongside goods and services would have added slightly more than 0.5 percent to real U.S. GDP growth in 2012.[54]

In turn, economic globalization creates a key statistical problem for GDP because so many goods are no longer made in a single country but instead are constructed using global supply chains. Estimating China's economic weight on the world stage is thus particularly difficult because, as stressed above, the

51. Ibid., p. 122.
52. See, for example, UNU-IHDP and UNEP, *Inclusive Wealth Report 2012*; and Joseph E. Stiglitz, Amartya Sen, and Jean-Paul Fitoussi, *Report by the Commission on the Measurement of Economic Performance and Social Progress, 2009* (Paris: Institut National de la Statistique et des Études Économiques, 2009), http://www.insee.fr/fr/publications-et-services/default.asp?page=dossiers_web/stiglitz/documents-commission.htm.
53. Michael Mandel, "Beyond Goods and Services: The (Unmeasured) Rise of the Data-Driven Economy" (Washington, D.C.: Progressive Policy Institute, October 2012), p. 2, http://www.progressivepolicy.org/wp-content/uploads/2012/10/10.2012-Mandel_Beyond-Goods-and-Services_The-Unmeasured-Rise-of-the-Data-Driven-Economy.pdf.
54. Ibid.

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huge presence of multinational corporations in China plays a significant role in how it engages with the global economy.[55] The more general point here is that there is a need to take into account the significance of globalization when analyzing the relative economic power of the world's most powerful countries.

The premise of Sean Starrs 2013 study is indeed that a fundamental limitation of recent discussions about the changing distribution of power "is not taking globalization seriously. . . . We cannot rely on national accounts to meaningfully assess power in the global political economy."[56] Starrs shows that U.S. multinational corporations are at the forefront of geographically dispersing their production activities and that "American corporations account for by far the most dominant profit-shares across the most sectors than corporations for any other country, especially in sectors at the technological frontier."[57] He notes further that these profit-share data significantly underestimate the extent of U.S. dominance in the global economy, because they are based on the assumption that U.S. investors only own U.S. firms. Yet he shows that U.S. investors also own considerable amounts of the shares of corporations in other countries; as Starrs underscores, the fact that "American firms combined own 46 percent of all publicly listed shares of the top 500 corporations in the world . . . signifies how globalized American economic power has become. Chinese capital, by contrast, is almost entirely nationally contained. . . . Chinese ownership of non-Chinese-domiciled firms in the top 500 is negli-

55. A telling, well-documented example in this regard is the value of Apple iPhone and iPad, both of which are assigned to China because they undergo final assembly there. In their careful analysis of the iPhone's and iPad's global supply chain, Kenneth L. Kraemer, Greg Linden, and Jason Dedrick conclude: "While these products, including most of their components, are manufactured in China, the primary benefits go to the U.S. economy as Apple continues to keep most of its product design, software development, product management, marketing and other high-wage functions in the U.S. China's role is much smaller than most casual observers would think. . . . Only $10 or less in direct labor wages that go into an iPhone or iPad is paid to China workers. So although each unit sold in the United States adds from $229 to $275 to the U.S.-China trade deficit (the estimated factory costs of an iPhone or iPad), the portion retained in China's economy is a tiny fraction of that amount." See Kraemer, Linden, and Dedrick, "Capturing Value in Global Networks: Apple's iPad and iPhone," University of California, Irvine, University of California, Berkeley, and Syracuse University, July 2011, pp. 2, 6, http://pcic.merage.uci.edu/papers/2011/value_ipad_iphone.pdf.

56. Sean Starrs, "American Economic Power Hasn't Declined—It Globalized! Summoning the Data and Taking Globalization Seriously," *International Studies Quarterly*, Vol. 57, No. 4 (December 2013), p. 817, 825.

57. Ibid., p. 820. A recent report underscores how China is in a fundamentally different competitive position: "Although China has indigenous technological capabilities to produce competitive products in labour intensive sectors such as apparel, this capability is still limited in high technology sectors where it relies heavily on imported inputs. . . . China's competitiveness within GVCs [global value chains] is still concentrated in processing and assembling activities. Its role as the world's assembler, however, allows China to generate only limited value added compared to other countries engaging in more technology and knowledge intensive activities within GVCs." See OECD, *China in Focus*, pp. 76–77.

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gible."[58] In turn, he finds that not only are U.S. shareholders by far the top owners of U.S. corporations, but that Americans are also top owners of the twenty largest European firms.[59] Because American firms own such a large percentage of many of the world's top corporations, and because American citizens own the vast majority of the shares of American firms, Starrs finds that 41 percent of all global household assets are held by Americans—a fact that, he argues, further demonstrates the globalized nature of U.S. capital and economic power.[60]

Regarding sustainability, GDP statistics do not reliably reflect whether current economic growth occurs in ways that harm the environment and thereby comes at the expense of future growth. Although GDP does count the depreciation of man-made objects such as machines and roads, it does not count the depreciation of the physical environment. Decades ago, developed countries such as Japan and the United States were sufficiently prosperous to begin to address issues such as clean air, clean water, and the prevention of toxic waste dumping as the need became pressing. China is in a different situation: it "is more like a teenage smoker with emphysema. The costs of pollution have mounted well before it is ready to curtail economic development."[61] That China does far less to protect its local environment than more developed countries is well acknowledged.[62] What is less well acknowledged is that this lack of environmental protection leads to an overestimation of China's economic growth rate.

By how much would Chinese economic growth have to be adjusted downward if GDP better accounted for environmental damage? The Chinese government itself answered with a "conservative" estimate in the mid-2000s, when it created a "Green GDP" measure that recalculated GDP to reflect the cost of pollution: "[The] first report estimated that pollution in 2004 cost just over 3 percent of the gross domestic product, meaning that the pollution-adjusted growth rate that year would drop to about 7 percent from 10 percent."[63] Other estimates are much less conservative. In 2006 Zhu Guangyao, deputy chief of China's State Environmental Protection Agency (SEPA), stated

58. Starrs, "American Economic Power Hasn't Declined," p. 824.
59. Ibid.
60. Ibid., p. 825.
61. Joseph Kahn and Jim Yardley, "As China Roars, Pollution Reaches Deadly Extremes," *New York Times*, August 26, 2007, http://www.nytimes.com/2007/08/26/world/asia/26china.html?pagewanted=all&_r=0.
62. China ranks 118th (out of 178 countries) on the comprehensive Environmental Performance Index and 176th on air quality. See "Country Rankings," *Environmental Performance Index* (New Haven, Conn.: Yale University, 2014), www.epi.yale.edu/epi/country-rankings.
63. Kahn and Yardley, "As China Roars, Pollution Reaches Deadly Extremes."

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that environmental damage was "roughly 10 percent of the country's gross domestic product."[64] A 2001 World Bank study found that "pollution is costing China an annual 8–12% of its . . . GDP in direct damage, such as the impact on crops of acid rain, medical bills, lost work from illness, money spent on disaster relief following floods and the implied costs of resource depletion."[65] And a 2007 study produced by the World Bank and SEPA found that the total cost of just two forms of pollution—air and water pollution—by themselves amounted to 5.8 percent of China's GDP.[66] Ultimately, China's long-term significance on the world stage will not be as great as its current GDP growth statistics would seem to indicate because they do not properly account for the economic costs of its present method of environmentally harmful growth and the extent to which current growth comes at the expense of the country's long-term economic growth potential.

Thus, although China's economic rise is important, measuring it with GDP underestimates the economic gap between the United States and China. This is partly because the costs of environmental damage are not properly factored into GDP. In turn, the more knowledge based and globalized a country's production is, the more GDP underestimates its size; the more an economy resembles the mid-twentieth-century manufacturing model for which the GDP measure was originally developed, the fewer such distortions GDP entails. China's economy is clearly of the latter type, while the U.S. economy is among the world's most knowledge based and globalized.[67]

Given the significance of these distortions associated with GDP, there would ideally be an alternative measure that could be used for making more appropriate comparisons between states that are as divergent as the United States and China. A promising potential candidate that at least partially avoids some of these distortions is the UN's newly inaugurated "inclusive wealth" measure. Although not without its flaws, this measure represents economists' most systematic effort to date to create a rigorous and transparent measure of a state's stock of wealth. Inclusive wealth measures a country's stock of assets in three areas: "(1) manufactured capital (roads, buildings, machines, equip-

64. "Pollution Costs Equal 10% of China's GDP," *China Daily*, June 6, 2006, http://www.chinadaily.com.cn/china/2006-06/06/content_609350.htm.
65. "A Great Wall of Waste," *Economist*, August 19, 2004, http://www.economist.com/node/3104453.
66. World Bank and State Environmental Protection Administration of China, *Cost of Pollution in China: Economic Estimates of Physical Damages* (Washington, D.C.: World Bank, 2007), p. xvii, http://siteresources.worldbank.org/INTEAPREGTOPENVIRONMENT/Resources/China_Cost_of_Pollution.pdf.
67. We develop additional arguments for why U.S. power on the world stage is augmented by its position in the global economy in Brooks and Wohlforth, *America Abroad*, chaps. 9–10.

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ment), (2) human capital (skills, education, health), and (3) natural capital (sub-soil resources, ecosystems, the atmosphere)."[68] Unlike GDP, which is a measure of the flow of goods and services for a specified time period (typically a short one), inclusive wealth aims to provide information on the state of a country's capital stock for generating wealth over the long term: "Inspecting the stocks of produced capital, natural capital and human capital, it shows how much wealth a country can potentially create, not just how much is being made right now. . . . The index's transition from measuring flows to accounting stocks provides an intergenerational understanding of well-being and wealth."[69] Based on this inclusive measure, the United States' wealth amounted to almost $144 trillion in 2010—a level 4.5 times higher than China's level of inclusive wealth in 2010 ($32 trillion).[70] Although economists did not create this inclusive wealth measure to capture what international relations scholars call "latent power"—that is, the key resources that exist within a state that a government can draw upon to build up military power and otherwise compete with other states geopolitically—it clearly captures this construct much better than GDP does.[71]

Why It Will Long Be a One-Superpower World

Analysts are right to herald China's rapid economic ascent as a harbinger of the country's changing position in the international system. Superpowers are extremely uncommon, and only an exceedingly improbable combination of large-scale and rapid growth can put a state in a position such as China's: moving in the direction of having the latent material capacity to match the superpower. There is no other candidate today. Indeed, after China the most

68. UNU-IHDP and UNEP, *Inclusive Wealth Report 2014: Measuring Progress toward Sustainability* (Cambridge: Cambridge University Press, 2014), p. 15.
69. This quotation is drawn from a description of the merits of the inclusive wealth measure presented in Inclusive Wealth Project, "The Better Indicator" (Bonn: International Human Dimensions Programme on Global Environmental Change, n.d.), http://inclusivewealthindex.org/inclusive-wealth/#the-better-indicator. See also UNU-IHDP and UNEP, *Inclusive Wealth Report 2014*, p. xx. In discussing the inauguration of the inclusive wealth measure, the *Economist* usefully underscores in this regard that GDP "is a measure of income, not wealth. It values a flow of goods and services, not a stock of assets. Gauging an economy by its GDP is like judging a company by its quarterly profits, without ever peeking at its balance-sheet. Happily, the United Nations this month published balance-sheets for 20 nations [that] included . . . [the] stock of natural, human, and physical assets. . . . By putting a dollar value on everything from bauxite to brainpower, the UN's exercise makes all three kinds of capital comparable and commensurable." See "The Real Wealth of Nations: A New Report Comes Up with a Better Way to Size Up Wealth," *Economist*, June 30, 2012, http://www.economist.com/node/21557732.
70. UNU-IHDP and UNEP, *Inclusive Wealth Report 2014*, pp. 220, 226.
71. We thank Jonathan Markowitz for a series of helpful conversations on this issue.

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plausible candidate would be the European Union, but it is far from being a state and its integration trajectory has stalled; moreover, its economic trajectory (like Japan's and Russia's) is moving in the wrong direction. At the same time, however, moving toward having the latent material capacity to match the superpower and actually attaining this status are two different things. Whereas one might presume that approaching the economic size of the United States would position China to be able to seek superpower status, we conclude that the gap between economic parity and a credible bid for superpower status should be measured over many decades.[72] If the scales are to level out such that there are two or more roughly comparable states at the top—as was the norm for centuries—we thus expect it will be a long time coming.

Determining the precise economic and technological levels that a state must attain to have sufficient latent material capacity to bid for superpower status is not a straightforward process. If a rising state's economy and its technological level match the leading state's, then it will obviously be in a position to bid for superpower status. What if, however, the rising state is not equal to the leading state in one or both dimensions? If the rising state is comparable to the leading state technologically but is around half of the latter's economic size, then history would suggest that it could be in a position to bid for superpower status; this was basically the situation regarding the Soviet Union during the first half of the Cold War (though Moscow required a totalitarian state to distill the needed resources and also challenged the United States in a very different military technological environment than the current one). We have shown, however, that the relevant question today is: What if the rising state has attained a significant level of economic size relative to the leading state but is at a fundamentally lower level technologically?

There is no modern historical precedent to help answer this question: the recent rising states of note—namely, the United States in the nineteenth and early twentieth centuries, Germany in the early twentieth century, and the Soviet Union in the middle of the twentieth century—were not at dramatically different technological levels from that of the leading state. As a result, in assessments of the relative power of Germany or the United States vis-à-vis the United Kingdom and the Soviet Union vis-à-vis the United States, technology essentially faded into the background: the crucial issues became the

72. Two prominent recent studies of the U.S.-China power relationship that also analyze multiple components of power reach overall assessments generally consistent with this conclusion. See Thomas J. Christensen, *The China Challenge: Shaping the Choices of a Rising Power* (New York: W.W. Norton, 2014); and David Shambaugh, *China Goes Global: The Partial Power* (Oxford: Oxford University Press, 2013).

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size of the economies of these rising states and how much they tried to distill their wealth into military power. But when the leading and rising states diverge technologically to a dramatic degree, as is the case today, a critical question is whether the latter has the technological capacity to produce and field a defense force that can effectively match up with the former's. This question is relevant regardless of the era under examination; but for reasons that we discuss below, it is especially relevant now given the extraordinarily complicated nature of much modern weaponry. In this respect, Tai Ming Cheung underscores that China faces "an enormous task of remaking a defense establishment that is still more suited to fighting a Vietnam-era conflict than a 21st century engagement."[73]

Posen's analysis of the command of the commons again helps frame our assessment of the gap between China's economic rise and its potential to attain the capabilities of a superpower. In his examination of the unique set of assets that the United States has developed to sustain this commanding position, he points to four central attributes: (1) a large scientific and industrial base; (2) the specific mix of military systems accumulated over the past few decades of procurement; (3) the ability acquired over decades to coordinate the production of needed weapons systems; and (4) the particular skills and associated technological infrastructure the United States has painstakingly developed to be able to effectively employ these weapons in a coordinated manner.[74]

scientific and industrial base

Posen stresses that the development of the "specific weapons needed to secure and exploit command of the commons . . . depend[s] on a huge scientific and industrial base." Having a much larger scientific and industrial base than any other state has enabled the United States to "undertake larger projects than any other military in the world."[75] There is no reason to think that China will soon be able to develop anything comparable, mainly because it is at a fundamentally different technological level from that of the United States. Although China is rapidly enhancing its technological inputs, it faces significant limits on its ability to quickly translate them into a dramatic improvement in its overall technological capacity. Educating many more science and engineering students, for example, requires increasing the number of institutions that can provide appropriate and useful training far beyond the level that China has

73. Tai Ming Cheung, "Modernizing the People's Liberation Army: Aims and Implications," in Shaun Breslin, ed., *Handbook of China's International Relations* (London: Routledge, 2010), p. 115.
74. Posen, "Command of the Commons," p. 10.
75. Ibid.

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now. On this issue, the World Bank and Development Research Center of the State Council of China conclude bluntly that China's "massive expansion of enrollment . . . has strained instructional capacity" and that "the quality of the training is weak, and many graduates are having difficulty finding employment."[76] In turn, rapidly augmenting spending on R&D is unlikely to produce dramatically improved technological capacity if it is not embedded within an institutional structure that fosters innovation—something that China is very far from having. As the World Bank and Development Research Center of the State Council of China report, "China has seen a sharp rise in scientific patents and published papers, but few have commercial relevance and even fewer have translated into new products or exports. . . . A better innovation policy in China will begin with a redefinition of government's role in the national innovation system, shifting away from targeted attempts at developing specific new technologies and moving toward institutional development and an enabling environment that supports economy-wide innovation efforts."[77]

MIX OF WEAPONS ACCUMULATED THROUGH DECADES OF PROCUREMENT

The particular mix of weapons the United States has accumulated to sustain command of the commons has taken a long time to develop and procure. The main reason is that the ever-growing complexity of many top-end weapon systems has greatly increased their development time. For example, as the number of parts and lines of code associated with the production of aerospace vehicles increased, the development time of these weapons concomitantly increased—from roughly 5 years in the 1960s to around 10 years in the 1990s. Today, "combat aircraft projects take between 15 and 20 years from research to production," while "the current development cycle for military and intelligence satellites from the initiation of basic research to field deployment is approximately twenty years."[78]

As a result, even if another state has the scientific and industrial base and the skills needed to produce these military systems, it will necessarily be a very long time before it possesses them given the time they take to produce. Consider that it is projected to take up to seventeen years for the United Kingdom to develop a nuclear submarine successor to its current Trident system. And the United Kingdom has some significant advantages over China:

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76. World Bank and Development Research Center of the State Council of China, *China 2030*, p. 176.
77. Ibid., pp. 35–36.
78. Tai Min Cheung, "Conclusions," in Cheung, ed., *Forging China's Military Might*, p. 276; and Tai Ming Cheung, *Fortifying China: The Struggle to Build a Modern Defense Economy* (Ithaca, N.Y.: Cornell University Press, 2009), p. 249

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most notably, it has had a longer range of experience producing advanced systems and it receives extensive, direct assistance from the United States in weapons production. In areas where China is far behind the United States in military technology and where the systems in question take a long time to develop, even if all goes well China will need many years of cumulative effort to be in a position to potentially close the gap created by the United States' own cumulative effort over many decades. Nuclear attack submarines (SSNs) are a particularly telling case in point. China is now capable of producing SSNs that are roughly comparable to the kinds of SSNs the United States built in the 1950s; since then, however, the United States has invested hundreds of billions of dollars and six decades of effort to put itself in a position to design and manufacture its current generation of Virginia-class submarines, which have achieved absolute levels of silencing.[79]

"systems integration" in weapons systems' design and production

The third attribute Posen highlights is that the ability to supervise the production of the kinds of military systems that give the United States command of the commons requires "significant skills in systems integration and the management of large-scale industrial projects."[80] Many top-end weapon systems today demand an extraordinarily high level of precision in the design and production process—a requirement that has eluded China in many areas. As Richard Bitzinger and his colleagues conclude, "Aside from a few pockets of excellence, such as ballistic missiles, the Chinese military-industrial complex has appeared to demonstrate few capacities for designing and producing relatively advanced conventional weapons systems. Especially when it comes to combat aircraft, surface combatants, and ground equipment, the Chinese generally have confronted considerable difficulties in moving prototypes into production, which has resulted in long development phases, heavy program delays, and low production runs."[81]

China's successes in military modernization attract much more attention

79. Authors' interview with William Murray, U.S. Naval War College, Newport, Rhode Island, July 9, 2015. For a thorough assessment of the large qualitative gap between U.S. and Chinese SSNs, see Coté, "Assessing the Undersea Balance between the U.S. and China." See also the chart in O'Rourke, "China Naval Modernization" that systematically compares the acoustic quietness of current Chinese and Russian SSNs

80. Posen, "Command of the Commons," p. 10.

81. Bitzinger et al., "Locating China's Place in the Global Defense Economy," p. 172. See also Tai Ming Cheung's recent review of China's defense production capacity, which concludes that "the Chinese defense industry presently lacks the necessary scientific and technological capabilities" to be able to "develop sophisticated . . . weapons that are able to match those of the United States and other advanced rivals." See Cheung, "Conclusions," in Cheung, *Forging China's Military Might*, p. 277.

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than its failures—or its decisions not to attempt to compete. As a result, analysts underestimate the difficulty of gaining the kind of system integration skill for managing the design and production of the range of top-end systems needed to project significant military power globally. The actors involved in U.S. defense production decisions have painstakingly accumulated this kind of systems integration skill over decades.[82] Just being "very good" in the production and/or design of many top-end systems will not be sufficient—at least in a conflict with a technologically superior competitor.[83] Fighter jets provide a telling example. Christina Larson underscores that the "problem with Chinese- and Russian-construction stealth fighters is that if there's a bolt out of place, it shows up on a radar signature. Russian and Chinese construction is typically much looser" than U.S. stealth fighter construction.[84] Notably, excellence in production and design must be achieved in all elements of a fighter. China's advanced aircraft program has attained many successes, but the significance of these accomplishments is greatly undermined by China's lack of ability to produce a capable engine. Robert Farley stresses that "the problem with Chinese engines is that they've been remarkably unreliable. Engines require extremely tight tolerances in construction; even small errors can lead to the engine burning out."[85] Regarding China's fifth-generation fighter program, Jesse Sloman and Lauren Dickey underscore that "engines are a critically important component of any fighter aircraft. . . . [W]ithout a reliable, high-performance turbofan engine to power them," the fifth-generation fighter program "will be crippled."[86] Because of deficiencies in engine power, China's fourth-generation fighter, the J-15, can have only a partial fuel load or only a very low missile-load when it takes off from an aircraft carrier.[87] As Gabe Collins and Andrew Erickson note, China's "inability to domestically mass-produce modern high-

82. See Peter Dombrowski and Eugene Gholz, *Buying Military Transformation: Technological Innovation in the Defense Industry* (New York: Columbia University Press, 2006), pp. 111–135; Harvey M. Sapolsky, "Inventing Systems Integration," in Andrea Prencipe, Andrew Davies, and Michael Hobday, eds., *The Business of Systems Integration* (New York: Oxford University Press, 2003), pp. 15–34; and Eugene Gholz, "Globalization, Systems Integration, and the Future of Great Power War," *Security Studies*, Vol. 16, No. 4 (October/December, 2007), pp. 615–636.

83. A well-documented illustration of this dynamic comes from the 1991 Gulf War: various technological advantages of U.S. M1 tanks meant that they were in a position to "detect and destroy Iraqi vehicles from outside the Iraqis' maximum range." See Daryl G. Press, "Lessons from Ground Combat in the Gulf: The Impact of Training and Technology," *International Security*, Vol. 22, No. 2 (Fall 1997), p. 139.

84. As quoted in Christina Larson, "With a Stealth Fighter, China Points to Advances in Its Arms Industry," *New York Times*, November 11, 2014.

85. As quoted in ibid.

86. Jesse Sloman and Lauren Dickey, "Why China's Air Force Needs Russia's SU-35," *Diplomat*, June 1, 2015, http://thediplomat.com/2015/06/why-chinas-air-force-needs-the-su-35.

87. Wendell Minnick, "Chinese Media Takes Aim at J-15 Fighter," *Defense News*, September 28, 2013.

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performance jet engines" means that the Chinese must continue to use Russian-made engines in its tactical aircraft; and yet, Russian jet engine producers are "a distant second in quality" to the "top jet engine producers [which] are all located in the U.S. and Western Europe."[88]

Ultimately, there is a big difference between China's ability to make improvements in select areas where it was already in a strong position to become very capable and its ability to effectively design and produce systems across the range of key systems needed for global power projection; achieveing the latter goal will be very hard, and even if China succeeds, it will take an extremely long time.[89] A fundamental reason why is that attaining the necessary knowledge and experience to produce these kinds of top-end systems is "largely a product of a costly and time-consuming process of trial and error."[90] In general, China has most consistently made rapid advances in those kinds of weapons systems—such as missiles—in which the learning curve is relatively small. In a number of other areas that are more complicated and require much greater skill in design and production—such as aircraft engines—even extremely high levels of effort and resources have so far not given China the capability to mass-produce effective systems that are comparable even to the kinds that the United States and the Soviet Union began fielding three decades ago in the final phase of the Cold War.[91] And in many other areas, perhaps most notably SSNs and antisubmarine warfare, Chinese decisionmakers appear to have recognized that they are nowhere close to being in a position to manage the production of top-end systems and so have decided not to devote a significant level of effort.[92]

As one of us has stressed previously, a related consideration is that having the requisite design skills and domestic production for modern weaponry must also be complemented by an ability to tap into global production net-

88. Gabe Collins and Andrew Erickson, "Is China about to Get Its Military Jet Engine Program Off the Ground?" *China Wall Street Journal*, May 14, 2012, http://blogs.wsj.com/chinarealtime/2012/05/14/is-china-about-to-get-its-military-jet-engine-program-off-the-ground. As Jesse Sloman and Lauren Dickey emphasize, the Russian engines that China relies on "are no longer cutting edge. The designs of these fighter engines date back more than thirty years and they were intended to be used in aircraft that are much lighter than the new models being tested today." See Sloman and Dickey, "Why China's Air Force Needs Russia's SU-35."

89. We thank Tai Ming Cheung, Daryl Press, and Riqiang Wu for helpful conversations on this issue.

90. Brooks, *Producing Security*, pp. 121–122, 235. For a discussion of why stealing via cyber espionage will not allow China to sidestep this painstaking process, see the discussion in Mauro Gilli, "The Struggle for Military-Technological Superiority: Complexity Systems Integration and the Technological Challenges of Imitation," Ph.D. dissertation, Northwestern University, 2015; and Brooks and Wohlforth, *America Abroad*, chap. 3.

91. Collins and Erickson, "Is China about to Get Its Military Jet Engine Program Off the Ground?"

92. We thank Riqiang Wu for a series of very helpful conversations on the issues raised in the previous three sentences.

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works in key dual technologies. States unable or unwilling to pursue globalization in weapons-related production will not be on the leading edge in military technology given the complexity of much modern weaponry, whose production now generally demands access to a global supply base.[93] In part because of restrictions on access to key technologies from Western countries, Chinese defense firms have thus far made only tentative steps toward pursuing globalization in weapons-related production.[94] But even if Chinese defense firms had full access to needed inputs from Western firms and sought them out, it is highly doubtful that many of them would be able to fully exploit such linkages anytime soon: it is extremely difficult, and thus requires a very long time, for firms to gain the requisite experience and capacity to manage the complex global supply chains associated with today's leading-edge weapons, given that they typically involve a mind-bogglingly large number of subcontractors and technological partners.[95]

skills and infrastructure for effectively using advanced weaponry

Finally, Posen highlights the particular set of personnel skills and technological infrastructure needed to effectively use weapons systems in the coordinated manner that gives the United States command of the commons. As he stresses, the "development of new weapons and tactics depends on decades of expensively accumulated technological and tactical experience embodied in the institutional memory of public and private military research and development organizations."[96] More specifically, Posen notes that the United States' ability to use these kinds of weapons systems depends vitally on the "military exploitation of information technology," and "the military personnel needed to run these systems are among the most highly skilled and highly trained in the world."[97] In the assessment of Chinese military analyst Ren Xiao, "because of the comparatively weak foundation and low starting point for modernization and the incomplete condition of mechanization, the process of informatization in the PLA [People's Liberation Army] remains at an initial stage, and the modernization level still lags substantially behind that of the world's military powers."[98]

Using the kind of advanced weapons the United States has is so daunting in

93. Brooks, *Producing Security*, pp. 76–78, 80–128.
94. See Bitzinger et al., "Locating China's Place in the Global Defense Economy"; and Cheung, *Fortifying China*, especially pp. 245–246.
95. See Brooks, *Producing Security*, p. 78.
96. Posen, "Command of the Commons," p. 10.
97. Ibid.
98. As quoted in Andrew S. Erickson and Michael S. Chase, "Informatization and the Chinese People's Liberation Army Navy," in Phillip C. Saunders et al., eds., *The Chinese Navy: Expanding Capabilities, Evolving Roles* (Washington, D.C.: National Defense University Press, 2011), p. 263.

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part because the individual systems are so complex. But more important, these systems need to be used as part of a cohesive package, which places a premium not just on information gathering but also on coordination and delegation. Whether China can develop an ability to employ advanced systems in a way that would allow its forces to effectively match up with U.S. forces is unclear. Any effort to do so, however, would involve a long-term process that would be hampered by the highly centralized, hierarchical structures of China's military, which does not emphasize either delegation or flexibility and thus impairs the ability of lower-level actors to make decisions.[99] Moreover, China's lack of warfighting experience, in combination with deficiencies in the training of Chinese military personnel, greatly impedes the military's progress toward developing an ability to effectively coordinate during operations.[100]

tracking china's trajectory

We have argued that observers in the latter Cold War would have been on sounder analytical ground had they moved beyond bipolarity toward a finer-grained analysis of the distribution of capabilities and the challenges the Soviet Union faced in keeping up with the United States. The analysis here puts us in a position to move today's debate beyond the confines of the unipolarity concept by highlighting the three structural barriers that will make China's path to peer status with the United States steeper and longer than those faced by rising states of the past. We already highlighted that China's technological level is comparatively lower vis-à-vis the system's leading state than were those of previous rising states.

The second structural barrier is the technological environment in which China is ascending: the level of difficulty and complexity of both developing and using top-end military equipment is higher than it was in previous eras; consequently it is now much harder to convert economic capacity into military capacity.[101] Compare today's situation to that of the 1930s, when Germany was in a position in a few short years to shift from being a largely disarmed power

99. Andrew S. Erickson and Michael S. Chase, "Information Technology and China's Naval Modernization" *Joint Forces Quarterly*, Vol. 50, No. 3 (2008), pp. 24–30. See also the discussion of the critical importance of delegation and flexibility for using advanced systems in Dombrowski and Gholz, *Buying Military Transformation*, pp. 17–18.

100. In this regard, a recent assessment by the People's Liberation Army Navy concludes: "At present, the simulation devices used by naval units in their military training on the whole cannot satisfy the actual military training needs and still lag behind the development of armaments. The insufficiency of simulation training devices has become a major 'bottleneck' that restrains efforts to build fighting capacity in naval units." Quoted in Erickson and Chase, "Informatization and the Chinese People's Liberation Army Navy," p. 263.

101. This barrier is discussed in Brooks, *Producing Security*, especially pp. 234–240; and Brooks and Wohlforth, "Power, Globalization, and the End of the Cold War," especially pp. 36–37.

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to a state that was militarily capable of single-handedly conquering Europe and nearly subduing the Soviet Union. Today such rapid progress is possible in some select areas, and these are the kinds of areas in which China has concentrated much of its effort. But in other domains—including those containing many of the kinds of systems needed to develop global power projection capacity—military expansion requires capacities that must be painstakingly developed and nurtured; even then, their acquisition cannot be taken for granted. And if China does someday develop these attributes and seeks to become a military peer of the United States, the long lead times for many of the systems that we have discussed mean that the results would not come to fruition for a long time, even if all goes well. Chinese defense planners clearly recognize this reality. As Tai Min Cheung writes, "While China's leaders urge the PLA and defense economy to catch up with the world's advanced military powers as quickly as possible, military planners are more cautious and do not envisage developing the mix of capabilities required to be an advanced military information power until at least the middle of the 21st century at the earliest."[102]

The third structural barrier in China's path to superpower status is that the gap separating its military capabilities from those of United States is much bigger than analogous gaps were in previous eras.[103] As Yan Xuetong underscores, although China's "economy has found global impacts. . . . [t]he components of Chinese national strength are imbalanced. . . . It is far more difficult for Chinese comprehensive national strength to catch up with that of U.S. than for its economy to do so. . . . Its military capabilities, the weakest link in terms of national power, have hardly gone beyond perimeter defense."[104] The United States is the only state that has for decades made the investment in military capacity that allows it to produce and effectively use the full range of weapons systems and associated infrastructure needed for global power projection. Particularly in today's technological environment, the choices the United States has made over long spans of time regarding the development of its military capacity have created a structural goalpost that will not be easy for China to reach, especially given that many of the kinds of systems in which China lags take so long to produce.[105] In combination with the current nature

102. Cheung, "Modernizing the People's Liberation Army," p. 124.
103. This was previously documented in Wohlforth, "Stability of a Unipolar World;" and Brooks and Wohlforth, *World Out of Balance*, pp. 22–59.
104. Yan Xuetong, "A Bipolar World Is More Likely Than a Unipolar or Multipolar One," *China Focus* (online), April 20, 2015, http://www.chinausfocus.com/foreign-policy/a-bipolar-world-is-more-likely-than-a-unipolar-or-multipolar-one/#sthash.A4ZC7TiS.dpuf.
105. Notwithstanding the fact that much U.S. military spending does not go toward the accumulation of a larger stock of weapons or the infrastructure for using them, the numbers do convey a

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of military technology, decades of massive U.S. investments in key military capabilities now present formidable barriers to entry.[106] This would be true even if China were not chasing a moving target, but in reality "the technological goalposts of weapons development are constantly moving; as certain nations, particularly the United States, advance the state of the art in defense technology, they create new metrics for defining what is meant by 'advanced' military systems."[107] That China has to chase a moving target represents a very significant constraint on its quest for military competitiveness. Regarding naval capabilities, for example, Bitzinger et al. conclude that "based on the current trajectory, it seems unlikely that China can catch up with the established naval [science and technology (S&T)] leaders unless the latters' defense S&T capabilities erode over time under financial constraints."[108]

This analysis yields three benchmarks between where China is now and when it will be in a position to emerge as something like a peer of the United States on the global stage. The first benchmark is when it has enough economic resources to try to displace the United States as the sole superpower. With roughly 60 percent of U.S. GDP, China appears to have met or to be in range of meeting this benchmark, although our analysis of the biases inherent in that measure as well as the huge gap in inclusive wealth between China and the United States are cautionary notes.[109] And in any case, achieving this benchmark is not as significant as it was for past rising states. Without sufficient technological capacity, a large pool of economic resources alone will not enable China to bring the one-superpower world to an end.

Thus, the second benchmark is when China has enough economic resources and technological capacity to be in a position to attempt to match or negate U.S. global power. China has very far to go to reach this benchmark, and an

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sense of this gap: during the 2000–14 period, the United States cumulatively spent $8.7 trillion on defense, whereas China spent $1.5 trillion in constant 2011 U.S. dollars. See Stockholm International Peace Research Institute (SIPRI), "Military Expenditure Database" (Stockholm: SIPRI, 2015), http://www.sipri.org/research/armaments/milex.

106. We underscored the significance of this point in Brooks and Wohlforth, *World Out of Balance*, p. 38.

107. Bitzinget et al., "Locating China's Place in the Global Defense Economy," p. 172

108. Ibid., p. 184

109. Even the Soviet Union, which used totalitarianism to compensate for relative backwardness through ruthless extraction of resources from its populace, was richer vis-à-vis the United States during the peak of the Cold War than China is today. By Angus Maddison's estimates, in 1960 the Soviet Union's per capita GDP was 35 percent of the U.S. figure; today the International Monetary Fund (IMF) puts China's per capita GDP at 13 percent of that of the United States in exchange-rate conversion and 22 percent by purchasing power parity (PPP) conversion. See Maddison Project (2013 version), http://www.ggdc.net/maddison/maddison-project/home.htm; and IMF World Outlook Database April 2015, http://www.imf.org/external/pubs/ft/weo/2015/01/weodata/index.aspx.

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ongoing task will be to carefully monitor its technological progression. Such an effort will involve both quantitative measures of the kind surveyed in the previous section as well as qualitative assessments. An especially important indicator will be whether China can build effective, replicable prototypes of the core military systems that it would need to be able to project power globally. Within the context of two of the examples discussed above, it would be revealing if China gains the capacity to mass-produce capable jet engines and produce SSNs that are relatively quiet.

The third benchmark is when China does not merely have the latent economic and technological capacity to develop the full range of systems needed for global power projection, but has procured these systems and has also learned how to use them effectively in a coordinated manner. This capability would require not just the needed weapons systems but also the information architecture that is now a requisite for effective battlefield management.

Conceptually, therefore, the gap between China and the United States can essentially be disaggregated as follows:

$$\text{great power} \rightarrow \text{emerging potential superpower} \rightarrow \text{potential superpower} \rightarrow \text{superpower}$$

In the 1990s and early 2000s, there was little need to differentiate China from the other great powers, such as Russia. But with its dramatic economic ascent, China has risen to the second level—what we term the "emerging potential superpower" level—in which it either has or is on track to have enough economic capacity to be able to bid for superpower status but does not yet have the technological capacity to do so. If China can ascend technologically to the point where it has both the requisite economic and technological capacity to be capable of mounting a broad challenge to the United States in the military realm, it would then reach the third level, or the "potential superpower" level. At this level, China would have sufficient latent material capacity to match the superpower. For the reasons discussed above, any effort by China to rise still further and reach a comparable level to the United States—the superpower level—will be fraught with difficulty and will require a lengthy amount of time.

China has risen from the position that it held in the 1990s, a change that eludes the unipolarity concept. In the terminology we borrowed from Barry Buzan, the system has shifted from 1 superpower plus X great powers to 1+1+X, with China occupying a middle category as an emerging potential superpower. Our more finely grained analysis of this distribution of capabilities has shown that the past experience of rising powers is a poor guide for as-

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sessing the longevity of this situation. For decades, the one-superpower character of the system will not be vulnerable to a decision by China to seek a superpower's capabilities.

Implications for Theory, Grand Strategy, and the U.S. Military Posture

Does it matter all that much if the world has moved from 1+X to 1+1+X, with China in a class by itself as the one state that might someday emerge as a potential superpower? To answer this question, we derive key implications of China's rise from great power to emerging potential superpower for international relations theory, grand strategy, and the military posture of the United States.

BALANCE OF POWER THEORY IN A 1+1+X WORLD

Arguably the oldest theoretical proposition about international politics, the balance of power has been central to debates about the functioning of a one-superpower world almost from its inception. The initial claim that uniplolarity was especially unstable because it would invoke particularly strong balancing reactions was ultimately largely supplanted by the opposite view: that by making systemic counterbalancing prohibitively costly, the post-1991 distribution of capabilities renders balance of power theory essentially inoperative.[110] This proposition rests on two key systemic features: the historically unprecedented power gap between the United States and the X powers, and the fact that the former is located in North America while the latter are all clustered in and around Eurasia.[111]

How does China's rise affect this claim? Geography obviously remains constant, but if the aggregate power gap is conceptualized and measured in the standard way the polarity concept invites, then it might appear to be closing sufficiently to invalidate the argument that balance of power theory no longer applies. We have shown that the critical "all else equal" assumptions that approach requires are untenable. Unlike past rising powers, China is at a

110. For the initial argument, see Christopher Layne, "The Unipolar Illusion: Why New Great Powers Will Rise," *International Security*, Vol. 17, No. 4 (Spring 1993), pp. 5–51; and Kenneth N. Waltz, "The Emerging Structure of International Politics," *International Security*, Vol. 18, No. 2 (Fall 1994), pp. 44–79. For the latter claim, see Wohlforth, "The Stability of a Unipolar World"; Brooks and Wohlforth, *World Out of Balance*; and Kier A. Lieber and Gerard Alexander, "Waiting for Balancing: Why the World Is Not Pushing Back," *International Security*, Vol. 30, No. 1 (Summer 2005), pp. 109–139.

111. See Wohlforth, "The Stability of a Unipolar World." Wohlforth stresses that because threat is a function of distance, efforts by other powers to generate capabilities to match those of the United States or to negate its ability to act as a superpower will elicit regional counterbalancing.

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much lower technological level than the leading state, and thus its ability to distill raw economic resources into top-end military capabilities is much more constrained. In addition, the nature of technology itself has changed to make it even harder for new entrants to match the military capabilities of the leading state.[112] Ultimately, the military and technological hurdles to internal balancing by China will remain formidably high for decades. Our analysis thus confirms that true counterhegemonic balancing—creating an equipoise in the system by either matching or negating the United States' superpower capabilities—will long remain effectively out of reach for China, which alone among states has the scale and raw economic heft to make counterbalancing even a notional option. Moreover, the absence of such global balancing matters: it enables freedom of action for the United States and dramatically constrains choices for all others.[113] U.S. security policy remains essentially unconstrained by a significant Chinese ability to "channel a rivalry away from [Chinese] territory and challenge [the United States] in far-flung locations,"[114] while China and all the X powers must concentrate their resources on navigating a local security environment shaped by U.S. power.[115]

These barriers to balancing via internal efforts leave external balancing—alliances—as the only potential route back to global equilibrium anytime soon. Our move away from standard comparative statics measurements, however, illustrates how improbable that option remains. If capabilities are presented as simple aggregates such as GDP or military spending that can be added up as states combine in alliances, it might seem easy to shift the polarity of the system. If we look instead at the number of superpowers and the underlying capabilities needed to produce them, however, a very different picture emerges. The kinds of capabilities and investments needed to be a twenty-first-century superpower require the politically and organizationally integrated setting only

112. To be sure, technological and organizational barriers to generating some kinds of capabilities were still formidable in the nineteenth and twentieth centuries, requiring up to a generation of concerted effort. See, for example, James R. Holmes and Toshi Yoshihara, "Hardly the First Time," *U.S. Naval Institute Proceedings*, Vol. 139, No. 4 (April 2013), pp. 22–27; and Michael C. Horowitz, *The Diffusion of Military Power: Causes and Consequences for International Politics* (Princeton, N.J.: Princeton University Press, 2010).

113. "Global balancing" is the term Evan Braden Montgomery uses to denote systemwide balancing, which he contrasts with what he calls "local balancing"—that is, balancing within a particular region. See Montgomery, "Contested Primacy in the Western Pacific: China's Rise and the Future of U.S. Power Projection," *International Security*, Vol. 38, No. 4 (Spring 2014), p. 125.

114. Ibid.

115. Among other implications, this means the United States is still able to impose a "distant" blockade on China. See the helpful discussion in Llewelyn Hughes and Austin Long, "Is There an Oil Weapon? Security Implications of Changes in the Structure of the International Oil Market," *International Security*, Vol. 39, No. 3 (Winter 2014/15), pp. 178–180.

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a state can foster. It remains exceedingly unlikely that any alliance of great powers could replicate that kind of setting.

To say that balance of power theory is inoperative does not mean that there are no other forces pushing the international system back toward balance or that so-called local balancing is somehow precluded. The growth of China's economy has nothing to do with balance of power theory, but it is pushing in the direction of balance. And as China has grown, so has its ability to defend itself—not only territorially but also against some kinds of potential intimidation by the United States. The claim that the United States is unconstrained by global balancing means, in practice, that the barriers to balancing are so high for China and the X powers that Washington would have to go to improbable lengths to cause those states to seek to try overcome them. It follows that a deep asymmetry in the system remains: the United States does not face, in practice, a systemic balancing constraint, whereas the other powers do.

In contrast to the unipolarity concept, however, the stages that bridge the great power–superpower gap presented here suggest that the balancing constraint is not an either/or proposition. As an X power traverses the gap, its costs of balancing decline and the constraint on the reigning superpower comes gradually into play. To be sure, a level-2 power—an emerging potential superpower—lacks a realistic global balancing option vis-à-vis the system's sole superpower. As it acquires both the technological and economic requisites and ascends to level 3—a potential superpower—it incrementally begins to be in a position to choose whether to build counterbalancing capacity. And even in level 2, at some stage balance of power theory may come—notionally, at least—into play, as the rising state's efforts to advance its military capacity in its own region may help create the preconditions that hasten the day when true global balancing becomes feasible. Whether such local balancing speeds or slows a power's journey from level 2 to 3 remains an open question: resources devoted to countering a superpower locally cannot be used immediately for countering its global power, yet they may lay the groundwork for future global capacity. Moving beyond unipolarity thus opens a new research agenda on the ways in which and degree to which balance of power theory comes back into play as X powers rise.

The main implication of our analysis of the distribution of capabilities, however, is that a massive lag exists between any systemic incentive to balance the United States and the realistic ability of other powers to do so. In contrast to the current setting, the classical European systems in which balance of power theory developed featured much smaller aggregate capabilities gaps between leading states and challengers, technology that allowed for comparatively swift transformation of resources into top-end military capability, con-

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tending states at roughly the same technological level, and geography that placed contenders in close proximity and thus vitiated the distinction between local and global balancing. In such systems a leading state was often on tenterhooks, sensing that its position was inherently unstable and easily matched by others. That was the kind of world in which balance of power dynamics could quickly emerge against a leading state as an immediate, dangerous, and powerful constraint. The contrast to today's world is stark.

U.S. GRAND STRATEGY IN A 1+1+X WORLD

As the global landscape shifts, so does the debate on U.S. grand strategy. Scholars used to weigh "alternatives from neo-isolationism at one extreme to neo-imperialism on the other," Evan Montgomery observes, but now "there is little support for a retreat from the world and little appetite for remaking foreign nations. As a result, the mainstream grand strategy debate has come down to a pair of options: deep engagement or offshore balancing."[116] Indeed, our analysis suggests further refinement. The reining in of ambitions that Montgomery detects is consistent with our assessment of the shift in the distribution of capabilities over the last two decades, which is altering in ways that incentivize a focus by the United States on its existing core of defensive commitments that undergird the current international system. Deep engagement's academic defenders have confused matters, however, by conflating a focus on these core commitments with the strategy the United States has actually followed for the past quarter century. In our work with John Ikenberry, for example, we repeatedly refer to the "current grand strategy of deep engagement," but go on to describe the many virtues of a foreign policy stance that is considerably more limited than Washington's actual post–Cold War agenda: shoring up the traditional alliances to defend core national security interests and buttressing the institutional and economic order.[117] Those essentially defensive missions of securing allies and sustaining the favorable institutional and economic order—have often taken a back seat in favor of a broader set of aims that includes preventing humanitarian crises and spreading liberal values: a stance that might be called "deep engagement plus." Hence the grand strategic debate is not two-sided, but instead has three distinct options: a pullback from existing commitments, a focus on deep engagement, and deep engagement plus.[118]

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116. Montgomery, "Contested Primacy in the Western Pacific," p. 118.
117. Stephen G. Brooks, G. John Ikenberry, and William C. Wohlforth, "Don't Come Home, America: The Case against Retrenchment," *International Security*, Vol. 37, No. 3 (Winter 2012/13), pp. 7–51.
118. Brooks and Wohlforth, *America Abroad*, chap. 6, outlines this distinction in greater detail.

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A systemic analysis such as ours cannot fully resolve such debates, but it does yield implications. When we assess the distribution of capabilities through the 1+X lens, it becomes clear that the United States is and will long remain the only state that can pursue a grand strategy of deep engagement, which requires the capacity to sustain credible security guarantees with allies across oceans. China's rise to the emerging potential superpower level does not alter this structural reality. And the United States' unique position is a profoundly important background feature of the international system; the United States currently has defense pacts with sixty-eight countries—a security network that spans five continents, contains a quarter of the earth's population, and accounts for nearly three-quarters of global economic output.[119] Were another state able to sustain a comparable network of alliances, or were the United States unable to do so, the world's security setting would be dramatically altered. The unipolarity-is-ending narrative misses the fact that change of that order is not likely for decades.

Change of a subtler kind has occurred, however. China's rise to an emerging potential superpower does not render deep engagement impossible, as the unipolarity-is-ending narrative would suggest. At the same time, the counterclaim that unipolarity is not ending misses the fact that China's rise presents the United States with trade-offs that did not exist in the 1990s. In particular, as maintaining the core commitments gets more challenging, the trade-offs between focusing on deep engagement versus a more expansive deep engagement–plus stance become more severe. As Richard Betts argues, "For a quarter century, Washington had the luxury of concentrating on second- and third-order challenges: rogue states, medium-sized wars, terrorists, peacekeeping operations, and humanitarian relief. But the time has come to focus again on first-order dangers. Russia is back, and China is coming."[120] The changing scales of global power do not make a more expansive deep engagement–plus stance impossible, and the United States may decide that its security or values require it, but they do raise the relative salience of sustaining the core commitments. The result is to put the spotlight on the debate over whether the United States can and should sustain those commitments or seek to extricate itself from all or most of them, as advocates of retrenchment advise.[121]

This article cannot resolve the "should" question, but it does ratify Betts's answer to the "can" question.[122] If, as Betts argues, the "United States' top pri-

119. Michael Beckley, "The Myth of Entangling Alliances: Reassessing the Risks of U.S. Defense Pacts," *International Security*, Vol. 39, No. 4 (Spring 2015), p. 7.
120. Richard K. Betts, "Pick Your Battles: Ending America's Era of Permanent War," *Foreign Affairs*, Vol. 93, No. 6 (November/December 2014), p. 23.
121. See, for example, Posen, *Restraint*.
122. We develop a systematic answer to the "should" question in Brooks and Wohlforth, *America*

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ority should be the defense of long-standing allies in Europe and Asia," then our analysis of the commanding U.S. power position supports his claim that "[g]lobal primacy still gives the United States more room for maneuver than it had during the Cold War."[123]

U.S. MILITARY POSTURE IN A 1+1+X WORLD

Military requirements that might seem daunting for deep engagement plus become far more modest if the aim is to pursue the defensive goals of deep engagement. The term "unipolarity" came into widespread use at a time of extraordinary U.S. military dominance, entailing not only command of the commons, but also immense freedom of action in which the United States could contemplate a wide array of military strategies against potential major power adversaries. As we have discussed, this once unparalleled freedom of action is now declining, especially in China's near abroad. China's rapid augmentation of its antiaccess and area-denial (A2/AD) capabilities has greatly raised the United States' costs and risks of operating its aircraft and surface ships (but not its submarines) in China's near seas,[124] foreclosing some military options Washington retained in the past.[125]

The challenge that China's newfound local military capability presents to the United States depends on its strategic goals. If the United States' aim is to regain all military options that it enjoyed in the 1990s, then the challenge can appear daunting, demanding potentially expensive and/or risky U.S. counteraction. With its emphasis on a "disrupt, destroy, and defeat approach," the much debated AirSea Battle Concept reflects this mentality.[126] Yet if the United States focuses on reinforcing deep engagement, the military aim would be defensive: securing regional allies and preserving the favorable institutional

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Abroad, chaps. 5–10. Our initial answer to this question is provided in Brooks, Ikenberry, and Wohlforth, "Don't Come Home, America."

123. Betts, "Pick Your Battles," pp. 22, 24.

124. As Coté notes, quiet U.S. submarines can still "operate freely in Chinese coastal waters." Given the inherent difficulty of antisubmarine warfare (ASW) in shallow waters combined with China's very poor ASW capacity—as well as the lengthy amount of time required to upgrade this capacity and the challenges that China would face in doing so—this situation is unlikely to change for many years. See Coté, "Assessing the Undersea Balance between the U.S. and China," p. 3.

125. An excellent recent analysis is Montgomery, "Contested Primacy in the Western Pacific."

126. Sam LaGrone and Dave Majumdar, "The Future of Air Sea Battle," *USNI News*, October 30, 2013, http://news.usni.org/2013/10/30/future-air-sea-battle. On escalation risks, see especially Avery Goldstein, "First Things First: The Pressing Danger of Crisis Instability in U.S.-China Relations," *International Security*, Vol. 37, No. 4 (Spring 2013), pp. 49–89. See also the analysis of the AirSea Battle strategy and alternatives to it in Aaron L. Friedberg, *Beyond AirSea Battle: The Debate over U.S. Military Strategy in Asia* (New York: Routledge, 2014). Note that the AirSea Battle concept did not initially include a role for the Army and that the Pentagon has now incorporated it within the strategy and relabeled the strategy Joint Concept for Access and Maneuver in the Global Commons (JAM-GC).

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and economic order. The requirements for continuing such a defensive stance appear, by all accounts, to be manageable and sustainable.

Reflecting the changed military reality owing to China's rise—in particular, its rapidly augmented capacity to strike targets with accurate missiles—a growing number of analysts argue that the United States' core defensive goals of deterrence and security provision can be well served by a denial strategy. Using terms such as "mutual denial," "sea denial," "maritime denial," and the "mutually denied battlespace strategy," analysts posit that the United States can and should develop strategies and postures to avoid the need to undertake potentially escalatory strikes on the Chinese mainland of the type purportedly envisioned in AirSea Battle. They posit that the United States should take advantage of maritime geography to "deter Chinese land or maritime aggression and, failing that, deny China the use of the sea inside the first island chain (a conceptual line from Japan to Taiwan and the Philippines) during hostilities."[127]

A central notion undergirding the approach is A2/AD in reverse: to curtail the ability of China's military to operate within the first island chain during a conflict (and thereby prevent the Chinese from prevailing in scenarios such as an attack on Taiwan or an effort to close or control key strategic waterways) by employing the same basic strategy and mix of capabilities—mines, mobile antiship missiles, and so on—that China itself has used to effectively push U.S. surface ships and aircraft away from its coast.[128] These analysts also empha-

127. Jeffrey E. Kline and Wayne P. Hughes Jr., "Between Peace and the Air-Sea Battle: A War at Sea Strategy," *Naval War College Review*, Vol. 65, No. 4 (Autumn 2012), pp. 35–41. Of key strategic significance is that these islands are relatively closely grouped together and are all in friendly hands. See, for example, James Holmes, "Defend the First Island Chain," *Proceedings*, April 2014, http://www.usni.org/magazines/proceedings/2014-04/defend-first-island-chain. As Coté stresses, "The maritime geography in question is at least as favorable as that which the U.S. successfully exploited during the Cold War." See Coté, "Assessing the Undersea Balance between the U.S. and China," p. 12.

128. On using a reverse A2/AD approach regarding China, see, for example, Holmes, "Defend the First Island Chain"; Toshi Yoshihara and James R. Holmes, "Asymmetric Warfare, American Style," *Proceedings*, April 2012, http://www.usni.org/magazines/proceedings/2012-04/asymmetric-warfare-american-style; Toshi Yoshihara, "Going Anti-Access at Sea: How Japan Can Turn the Tables on China" (Washington, D.C.: Center for a New American Security, September 2014), http://www.cnas.org/sites/default/files/publications-pdf/CNAS%20Maritime2_Yoshihara.pdf; James R. Holmes, "Strategic Features of the South China Sea: A Tough Neighborhood for Hegemons," *Naval War College Review*, Vol. 67, No. 2 (Spring 2014), pp. 30–51; William S. Murray, "Revisiting Taiwan's Defense Strategy," *Naval War College Review*, Vol. 61, No. 3 (Summer 2008), pp. 13–38; James Holmes and Toshi Yoshihara, *Defending the Strait: Taiwan's Naval Strategy in the 21st Century* (Washington, D.C.: Jamestown Foundation, 2011); Jim Thomas, "Why the U.S. Army Needs Missiles: A New Mission to Save the Service," *Foreign Affairs*, Vol. 92, No. 3 (May/June 2013), https://www.foreignaffairs.com/articles/united-states/2013-04-03/why-us-army-needs-missiles; Terrence Kelly et al., "Employing Land-Based Anti-Ship Missiles in the Western Pacific" (Santa Monica, Calif.: RAND Corporation, 2013), http://www.rand.org/pubs/technical_reports/TR1321.html; and Michael D. Swaine, "Beyond American Predominance in the

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size the need to turn the tables and focus on exploiting areas of Chinese relative vulnerability—most notably, by leveraging U.S. undersea dominance that is poorly countered by China's weak antisubmarine warfare capacity.[129]

Ultimately, the premise of the denial strategy is that even if China is able to effectively deny U.S. surface ships and aircraft access to the area close to its coast, it can be prevented from using this geographic space as a launching pad for projecting military power in a conflict. In this view, the geographic area close to China's coast is not poised to flip from being a potential launching pad for the United States to use surface ships and aircraft to project power against China in a conflict to being a potential launching pad for China itself use these military assets to project power. Instead, the zone close to China's coast is poised to turn into a "no man's land" (or "no man's sea") in which neither state can effectively use surface ships or aircraft for force projection during a conflict.[130] This change is notable but needs to be kept in perspective. The 1990s baseline had China, a putative great power, incapable of preventing the globe's leading military power from having essentially unfettered access to its airspace and ocean surface right up to its territorial border. That China has begun to reverse this unusual vulnerability after spending tens of billions of dollars over decades is hardly surprising.[131]

Given its proximity and importance to China, Taiwan might create the greatest challenge to a denial strategy, especially given that the United States faces limits on what kind of capabilities it can share with Taipei. Yet, William Murray convincingly shows that there is a range of technologically feasible, affordable steps that Taiwan can take on its own to turn itself into a "porcupine" that would "offer Taiwan a way to resist PRC [Chinese] military coercion for weeks or months without presuming immediate U.S. intervention."[132] For different reasons, Japan would also create a potential challenge: if it were to increase its self-imposed limit of 1 percent of GDP for defense spending, its already highly strained diplomatic relationship

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Western Pacific: The Need for a Stable U.S.-China Balance of Power" (Washington, D.C.: Carnegie Endowment for International Peace, April 20, 2015), http://carnegieendowment.org/2015/04/20/beyond-american-predominance-in-western-pacific-need-for-stable-u.s.-china-balance-of-power. It should be noted that pursuing reverse A2/AD has utility for any approach that the United States takes in the region, including AirSea Battle.

129. A systematic analysis of the U.S. advantage in the undersea balance is Coté, "Assessing the Undersea Balance between the U.S. and China." See also Lyle Goldstein, "Beijing Confronts Long-Standing Weaknesses in Anti-Submarine Warfare," *China Brief*, July 29, 2011, http://www.jamestown.org/single/?tx_ttnews%5Btt_news%5D=38252&no_cache=1#.ViaO_36rS71.

130. The authors thank Eugene Gholz for helpful conversations on these issues.

131. The authors thank Owen Coté for a helpful conversation on this issue.

132. See Murray, "Revisiting Taiwan's Defense Strategy," pp. 15–16. A complement to the porcupine approach for Taiwan is the maritime strategy outlined in Holmes and Yoshihara, *Defending the Strait*.

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with China could degenerate into a dangerous spiral. Yet as Toshi Yoshihara underscores, Japan can adopt a range of affordable and defensively oriented measures to create "an anti-access strategy of its own. . . . Japan is well-positioned and -equipped to draw lines on the map beyond which Chinese anti-access/area-denial forces can expect to encounter stiff, deadly resistance. Access and area denial works both ways."[133]

Needless to say, there are other potential challenges that might call for tough choices, especially surrounding maritime disputes. The main takeaway from the burgeoning literature on denial strategies is to reinforce Betts's point that the United States' sole superpower position gives the U.S. government room to maneuver. China's military rise can elicit strategic as well as military responses from the United States and its allies. Thomas Christensen has argued that China can "pose problems without catching up."[134] The United States' position of global primacy gives it options to address those problems other than by decisively countering each new Chinese military capability. As strategic thinkers from B.H. Liddell-Hart to Thomas Schelling remind us, using military power to challenge a settled status quo is very hard to do. China's military rise may push the United States to recognize these old truths and exploit the advantages of standing on the defensive.

Conclusion

The concept of polarity helps scholars understand some consequential differences in how historical international systems function, and the unipolarity concept has productively shaped research on comparisons between the current system and its predecessors. The concept, however, is more often used to inform debates about changes in the current one-superpower system and the speed with which it might evolve into another kind of system. Pundits, government analysts, and policymakers nearly always use the term in this way, but scholars, too, have tended to follow suit. We have shown that the polarity concept is inherently ill suited to address how today's system is changing. It pushes a minority of analysts to downplay consequential changes and a majority to exaggerate change. Notwithstanding China's dramatic economic growth in the past few decades, the scope, significance, and pace of its global ascent must be kept in perspective. Historical precedent and standard measurement approaches are not especially helpful for understanding the pace and sig-

133. Yoshihara, "Going Anti-Access at Sea," pp. 4, 10.
134. Thomas J. Christensen, "Posing Problems without Catching Up: China's Rise and Challenges for U.S. Security Policy," *International Security*, Vol. 25, No. 4 (Spring 2001), pp. 5–40.

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nificance of China's rise because China is so unlike previous rising states and the world in which it is rising is different in ways that hinder the ascent to global power.

In this article, we have developed a set of concepts and measures tailored to understanding the systemic significance of China's rise and the longevity of today's one-superpower system. The world has moved from 1+X to 1+1+X, with the United States set to long remain the sole superpower, followed by China as an emerging potential superpower. That is an important harbinger. It generates new pressures on the United States to face the trade-offs inherent in its grand strategic choices and the need to make adjustments to its military posture. This does not mean, however, that the one-superpower system is on the cusp of structural change or that there has been a transformation in its fundamental operating dynamics.

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